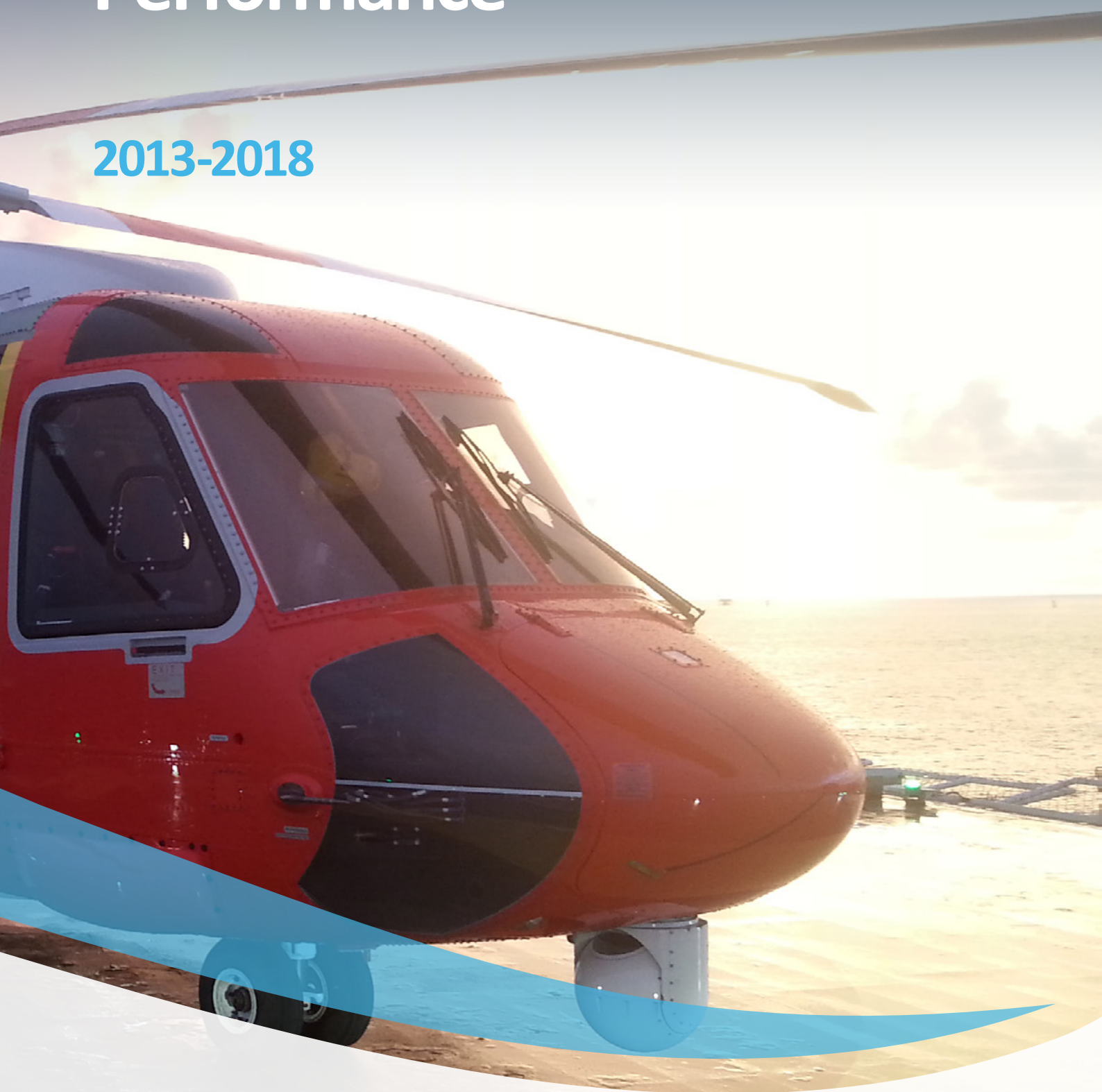


Helicopter Safety Performance

2013-2018



HeliOffshore
Safety Through Collaboration





HeliOffshore would like to gratefully acknowledge the contribution of Milestone Aviation to the preparation of this report through sponsorship at their Annual Event at the HAI HELI-EXPO show.

Two winners selected this report to receive sponsorship support:

Irene Makris
Pratt & Whitney



GO BEYOND

Jamie Mitchell
Brunei Shell Petroleum



Author: HeliOffshore

Graphic Design: Avid Design

Version: 1.0

Publication Date: December 2019

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Introduction



Dear reader,

We are delighted to present the first HeliOffshore Industry Safety Report.

Firstly, we would like to say a special thank you to all our member companies, many of whom contributed data for this report. It would not have been possible without you.

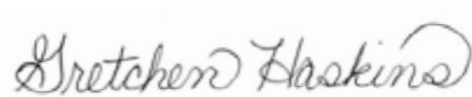
This report is a first step to understanding where we are as a global industry in terms of safety performance, giving us a crucial insight to support our collaborative efforts to further drive safety performance in our industry.

The data we are presenting in this report is just the beginning and we intend to expand its scope in further editions. As we strengthen our collaboration, and the benefit of the report becomes clear, we intend to improve the range, depth and quality of the data we gather. Please let us have your suggestions and feedback on this report. If your company wants to start providing data, please contact us via info@helioffshore.org.

This report will form the backbone of the work we do in the future, guiding our safety strategy and giving us feedback on our safety journey as an industry.



Bill Chiles
Chairman
HeliOffshore



Gretchen Haskins
CEO
HeliOffshore

Executive Summary

The greatest value of a picture is when it forces us to notice what we never expected to see.

John W. Tukey
Mathematician

The oil and gas passenger transport sector is a significant global operation. Based on numbers submitted for two-thirds of our operator member fleets, the industry transported in excess of 5.5 million passengers in 2018. This is equivalent to transporting the entire population of Scotland, Congo, Norway or Louisiana in a year. This was achieved flying nearly 400,000 flight hours over more than 750,000 flight sectors, or an average of more than 2,000 sectors per day.

This report was compiled using data gathered from operators, OEMs and industry bodies combined with information from agencies and regulators to try to give an overall safety picture for one part of the helicopter industry.

In the 5-year period from 2014-2018 helicopters transporting passengers for the oil and gas industry suffered 47 accidents, 23 of which were fatal, resulting in 120 fatalities. This gives an estimated 5-year fatal accident rate for the industry of 3.8 per million flight hours or 1.8 per million sectors. Fixed-wing operations are clearly different and metrics vary, but for comparison, the Aviation Safety Network gives the global 5-year fatal accident rate for aircraft capable of carrying more than 14 passengers, as 0.4 per million departures. HeliOffshore's membership has united around the safety strategy which is targeted to eliminate fatalities in our industry; with an interim goal of closing the gap to fixed-wing.

The three most common occurrence categories for fatal accidents were: controlled flight into terrain or water (CFIT); loss of control in flight (LOC-I); and system or component failure or malfunction – non-powerplant (SCF-NP). These 3 occurrence categories accounted for two-thirds of the fatal accident occurrences.

The data presented in this report highlight the importance of the HeliOffshore Safety Intelligence Programme and the benefits of sharing data as an industry; only by collaborating can we hope to understand the true safety performance of the industry and measure the improvements as we progress towards our goal of zero accidents.



More than 5.5 million passengers transported by our members in 2018.

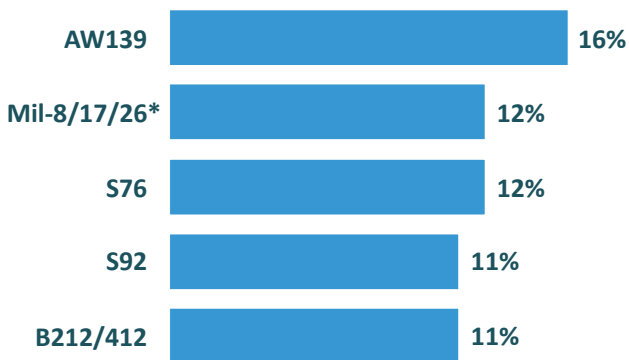


More than 115 members in total



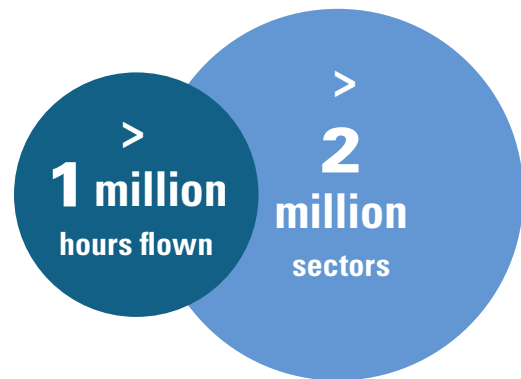
More than 50 helicopter operator members

Top 5 most common helicopter types in global Oil and Gas



*only a combined number was available

Hours and sectors flown in Oil and Gas in 2018



For the period 2013-2018



5-year average industry fatal accident rate (2014-2018)

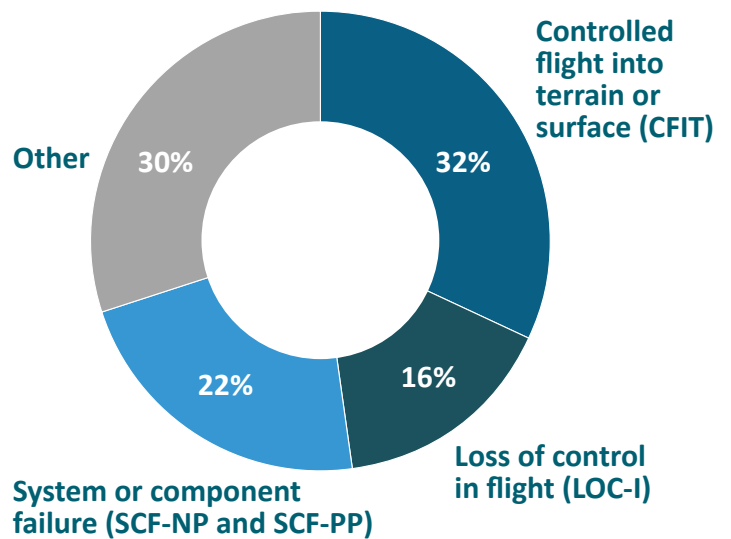


3.8 fatal accidents per million flight hours



1.8 fatal accidents per million sectors

Fatal accident occurrence categories



Section 1

Introduction and Background



1 Introduction and Background

1.1 What is HeliOffshore?

HeliOffshore is the global, safety-focused association for the offshore helicopter industry. Through collaboration with, and between, our members, we are delivering an industry-wide programme to enhance safety, worldwide. We bring together the global offshore helicopter industry so that:

- No lives are lost through offshore flight
- Information is shared to prevent accidents
- Best practice is used by the global frontline
- Our combined activities provide cost benefits to members
- Collective action delivers breakthroughs in safety performance

HeliOffshore was founded in 2014 by senior leaders with a commitment to offshore helicopter safety. Their aim was to establish a platform to work collaboratively to further improve safety. Today, 117 member companies worldwide are working together to develop and implement safety programmes identified as having the most potential to save lives. Our members include 51 helicopter operators, all four leading aircraft manufacturers, as well as engine and avionics makers, oil companies, leasing companies, and a wide array of specialist technology and support providers.

Our shared mission is to bring offshore workers home safely every day by pooling expertise and resources to pursue a path of continuous improvement. The full HeliOffshore Membership list at the time of publication is given in Appendix 1 and Figure 1.1 shows the global distribution of HeliOffshore's members.

1.2 The HeliOffshore Safety Strategy

HeliOffshore's work is based on our [Safety Strategy](#) which identifies the most likely potential accident types and the goals we must achieve to prevent each of these. It also identifies goals that need to be achieved to allow people to survive accidents if they do happen.

The key safety programmes we are currently working on include: Flight Path Management, Helicopter Terrain Awareness & Warning Systems, Flight Crew Operating Manuals, Health & Usage Monitoring Systems and Return to Base events. You will find more details of these programmes at HeliOffshore.org.





Figure 1.1 – Global Distribution of all HeliOffshore Members

1.3 The HeliOffshore Safety Intelligence Programme (HSIP)

The HeliOffshore Safety Intelligence Programmes (HSIP) is the mechanism through which the collection and analysis of industry data is managed. The aim of the programme is to collect and analyse data on behalf of our members to provide information and intelligence through which we can act to improve the safety performance of the industry.

As part of HSIP, HeliOffshore has developed a Memorandum of Understanding. This document sets out the governance process for the programme and the way in which data will be handled and presented. At present, around two-thirds of HeliOffshore’s operator members have signed the Memorandum of Understanding and those members that have signed operate more than 85% of the operator members’ fleet.

The programme is run in collaboration with our industrial partners: GE Aviation’s Digital Group provide sponsorship and analysis support with Tonic Analytics and NLR providing data handling and analysis support.

HSIP is a cross-cutting workstream which supports and enables many parts of HeliOffshore’s safety programme including:

- the Helicopter Flight Data Monitoring (HFDM) Working Group;
- the Return to Base (RTB) study; and
- the Flightpath Management (FPM) Working Group.



1.4 Structure of the Report

This report is divided into six sections:

Section 1: sets the context and background for the report;

Section 2: describes the process of data collection and some of the assumptions made in the calculations;

Section 3: focuses on the 'usage' data for the industry including the types of aircraft being used and the number of hours and sectors being flown, which is crucial in producing any occurrence rate;

Section 4: deals with the accidents and incidents that have been experienced by the industry and describes the rationale behind the inclusion or exclusion of events;

Section 5: summarises the findings and the data collection approach that will be adopted in the future; and

Section 6: contains appendices giving more information and data.



Section 2

Data Collection



2 Data Collection

2.1 Scope

The scope of this report is oil and gas passenger transport operations, whether onshore or offshore. In many ways, the onshore/offshore distinction is artificial since many 'offshore' flights start from an onshore location and many 'onshore' flights are flown to the same requirements as offshore flights.

Other types of flights such as cargo, seismic, pipeline inspections and other aerial work are excluded from this report, except where there is dual purpose with an element of passenger transport.

2.2 Operator Membership

At the time of writing, HeliOffshore has 51 operator members with fleet sizes ranging from single aircraft up to hundreds of aircraft. Some of these operators have global operations in multiple countries and some operate in single countries. Operator members are shown with an asterix in Appendix 1 of this report.

For this report, data has been received from more than 20 operators and their responses provided data for two-thirds of the aircraft operated by HeliOffshore members (more than 600 aircraft from a total number of more than 900 aircraft).

2.3 Industry Data

This report aims to reflect the safety performance of the entire industry. However, for a variety of reasons, not all relevant operators are members of HeliOffshore. Therefore, to gain a wider industry picture, the operator member data has been supplemented by usage data from the airframe manufacturers.

2.4 Accidents

Defining accidents that should fall within the scope of this report is complex for a number of reasons.

For example, it is not always easy to establish the flight mission following an accident; some accident reports provide this information whereas others do not.

Similarly, whilst it is relatively easy to define accidents where fatalities are involved, it is more complex to classify severity for non-fatal accidents, serious incidents and incidents. Often, a national safety investigation agency will label an event, but sometimes that classification is not available.

For this reason, the accidents that are included in the analysis for this report are detailed in Appendix 3.



In general, the definition of an accident, as provided by ICAO Annex 13, is useful for categorisation. This can be summarised as:

“An occurrence associated with the operation of an aircraft, which... takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked... in which:

- a) *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*

[with exceptions]... 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,*

[with exceptions]... or

- c) *The aircraft is missing or is completely inaccessible”*

The definition is given in full in Appendix 2 of this report. The definition of a serious incident is also given and can be summarised as:

“An incident involving circumstances indicating that there was a high probability of an accident...”

with a note that

“The difference between an accident and a serious incident lies only in the result”.



Section 3

Fleet, Hours and Sectors Data



3 Fleet, Hours and Sectors Data

3.1 Aircraft Fleet

Members were asked to report their fleet for oil and gas operations as of 1st January 2019. In addition, the five main aircraft OEMs (Airbus Helicopters, Bell, Leonardo, Russian Helicopters and Sikorsky) provided data describing their aircraft involved in oil and gas operations.

Figure 3.1 shows the proportion of the OEM-reported global oil and gas fleet by aircraft type. Table 3.1 below shows the same data in more detail.

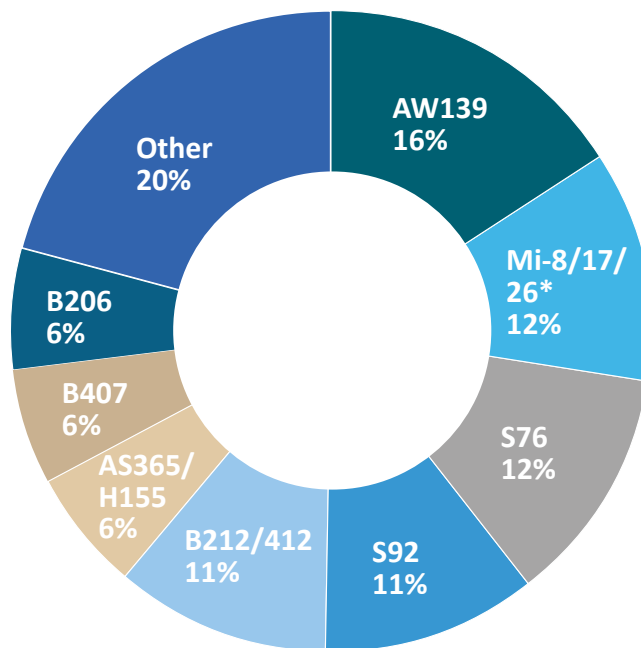


Figure 3.1 – Estimated Global Oil and Gas Fleet Numbers by Type

The data in Table 3.1 is the sum of the individual fleets as reported by HeliOffshore air operator members and the total fleets in oil and gas service as reported by the aircraft OEMs.






















| | | Type | Member reported | OEM total | %age |
|----------|---|---------------------|-----------------|-------------|-------|
| Airbus |  | AS350 / H125 / H130 | 18 | 49 | 2.6% |
| |  | AS365 / H155 | 16 | 115 | 6.1% |
| |  | BO105 | 2 | 12 | 0.6% |
| |  | H135 | 15 | 35 | 1.8% |
| |  | BK117 / H145 | 2 | 40 | 2.1% |
| |  | H175 | 4 | 22 | 1.2% |
| |  | AS332 / H225 | 15 | 101 | 5.3% |
| Bell |  | B206 | 0 | 111 | 5.9% |
| |  | B212 / B412 | 32 | 202 | 10.6% |
| |  | B407 | 69 | 111 | 5.9% |
| |  | B429 | 2 | 5 | 0.3% |
| Leonardo |  | A109 / AW119 | 8 | 31 | 1.6% |
| |  | AW139 | 162 | 294 | 15.5% |
| |  | AW169 | 0 | 12 | 0.6% |
| |  | AW189 | 16 | 41 | 2.2% |
| Russian |  | Mi-8 / Mi-17 | 8 | 231* | 12.2% |
| |  | Mi-26 | 0 | | |
| Sikorsky |  | S76 | 95 | 230 | 12.1% |
| |  | S92 | 142 | 211 | 11.1% |
| | | Other | 9 | 43 | 2.3% |
| | | | 615 | 1896 | |

Table 3.1 – Global Oil and Gas Fleet Reported by Members and OEMs

*Only a combined value for Mi-8/17 and Mi-26 was available. However, the majority are expected to be Mi-8/17.

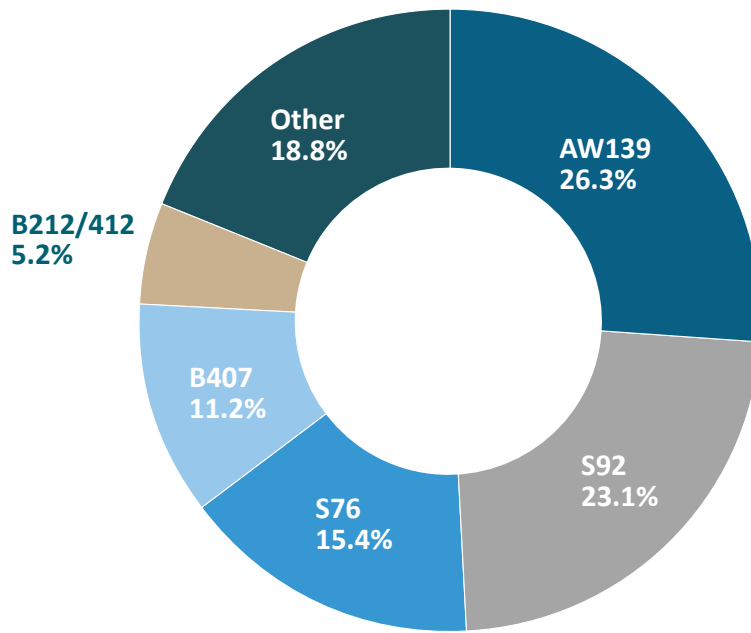


Figure 3.2 – Breakdown of Members’ Reported Fleet by Type

Figure 3.2 shows the breakdown of aircraft types for the members’ reported fleet shown in Table 3.1. In the ‘Other’ category, all individual percentages were less than 3%.

3.2 Geographic Breakdown of Fleet

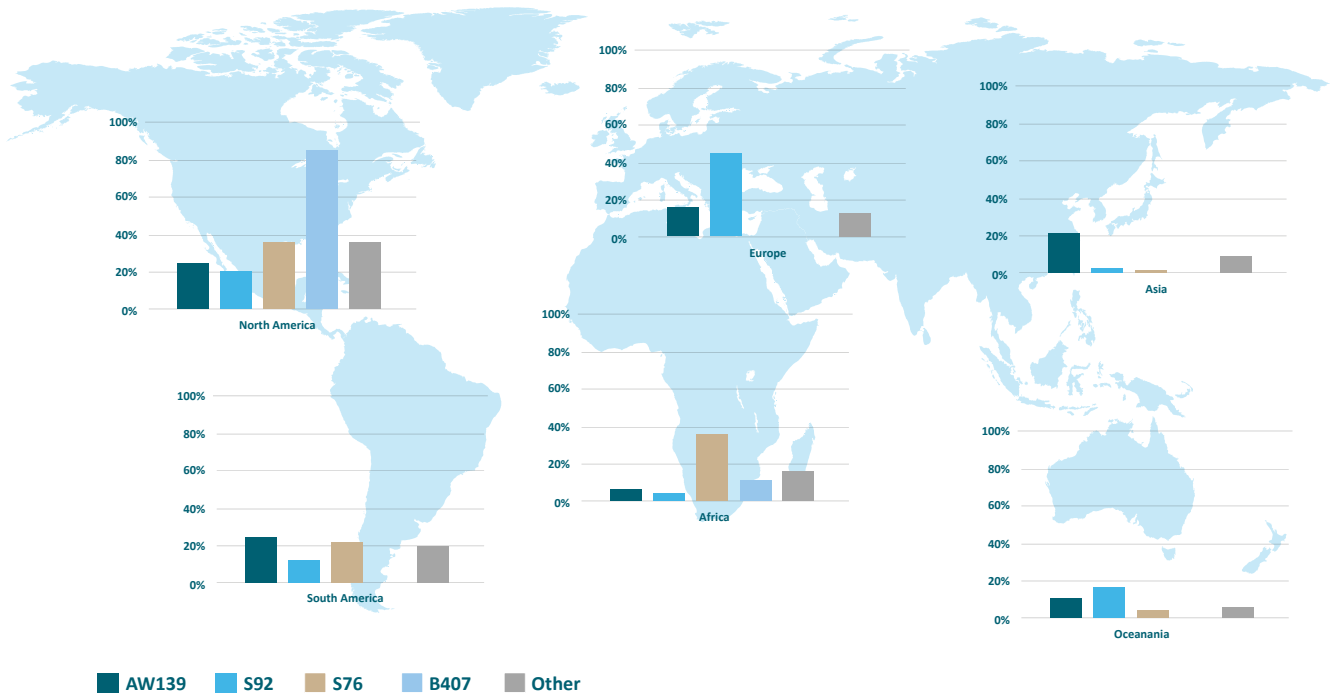


Figure 3.3 – Reported Aircraft Types by Area of Operation

Figure 3.3 shows the distribution of aircraft based on the fleet numbers submitted by operator members, with the numbers shown below in Table 3.2. The highest percentages are shown in blue.

| | AW139 | S92 | S76 | B407 | Other |
|---------------|-------|------|------|------|-------|
| North America | 25% | 20% | 36% | 88% | 35% |
| South America | 22% | 12% | 22% | 0% | 21% |
| Europe | 14% | 44% | 0% | 0% | 13% |
| Africa | 6% | 5% | 37% | 12% | 16% |
| Asia | 21% | 1% | 1% | 0% | 10% |
| Oceania | 11% | 18% | 4% | 0% | 5% |
| | 100% | 100% | 100% | 100% | 100% |

Table 3.2 – Distribution of Reported Aircraft Types by Area of Operation

3.3 Annual Flight Hours

The focus on flight hours and sectors may seem to be a distraction from the more obvious ‘safety’ events such as accidents. However, one deficiency in the global understanding of safety performance has been the lack of reliable usage statistics which are fundamental to the calculation of rates. Only by producing and analysing this rate data can we hope to truly understand the safety performance of the industry and how it is changing.

Figure 3.4 shows the member-reported and industry flight hours as reported by the OEMs for the last 6 years.

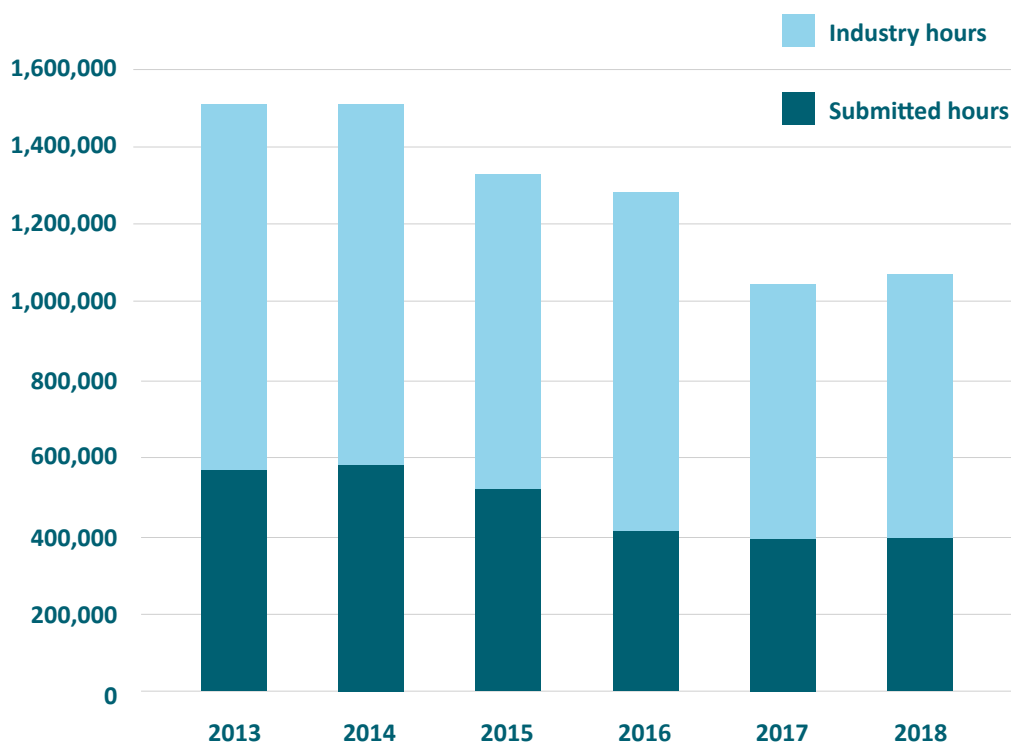


Figure 3.4 – Annual Flight Hours

The figures show the significant decline that has been seen in the industry over the last few years; compared with the submitted 2013 flight hours, the submitted hours for 2017 and 2018 were both down by one third.

The data supplied by the OEMs includes all types of oil and gas activity, including aerial work. To correct for this, the flight hours have been reduced by the corresponding percentage given in the annual IOGP Safety Performance Indicators to estimate only the passenger transport hours. This adjustment ranged from 2.5% to 8.7% annually with an average of 5%. Russian Helicopters were not able to supply hours information and therefore an estimate has been included in the industry figures.

3.4 Annual Sectors

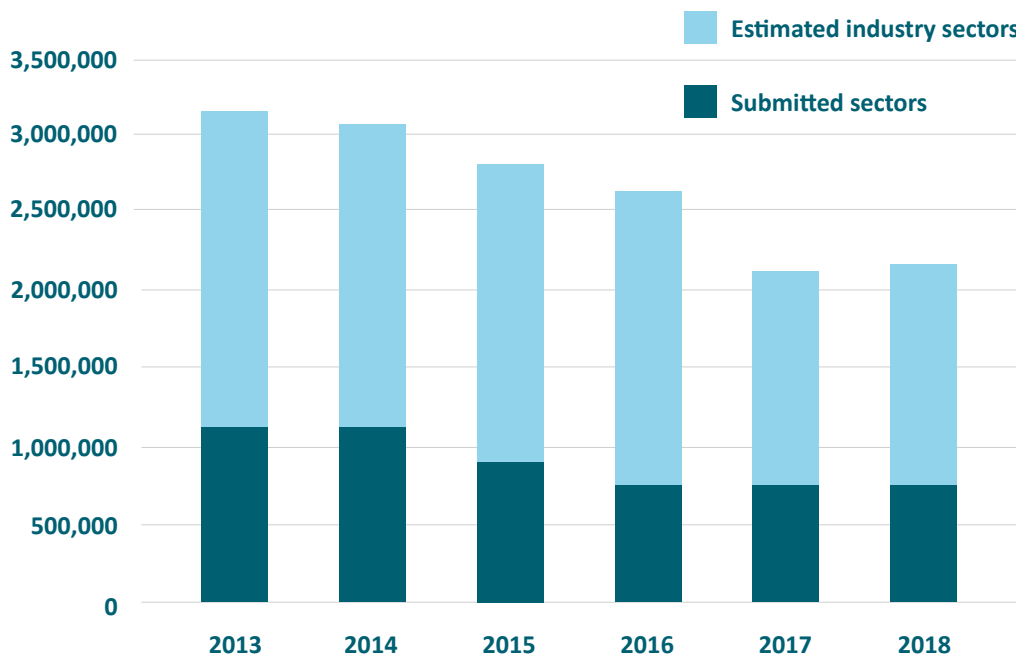


Figure 3.5 – Annual Sectors Flown

Figure 3.5 shows the sectors submitted by members and the estimated industry sectors, derived from OEM industry hours for the last six years. The submitted sectors match the trend of the submitted flight hours, which is perhaps to be expected; the reduction in flying hours has been a reduction in volume of flying, not a large change in the type of flying being done. The industry sectors have been calculated using the industry hours supplied by the airframe manufacturers and mean sector times for the different aircraft types.

3.5 Breakdown by Aircraft Type

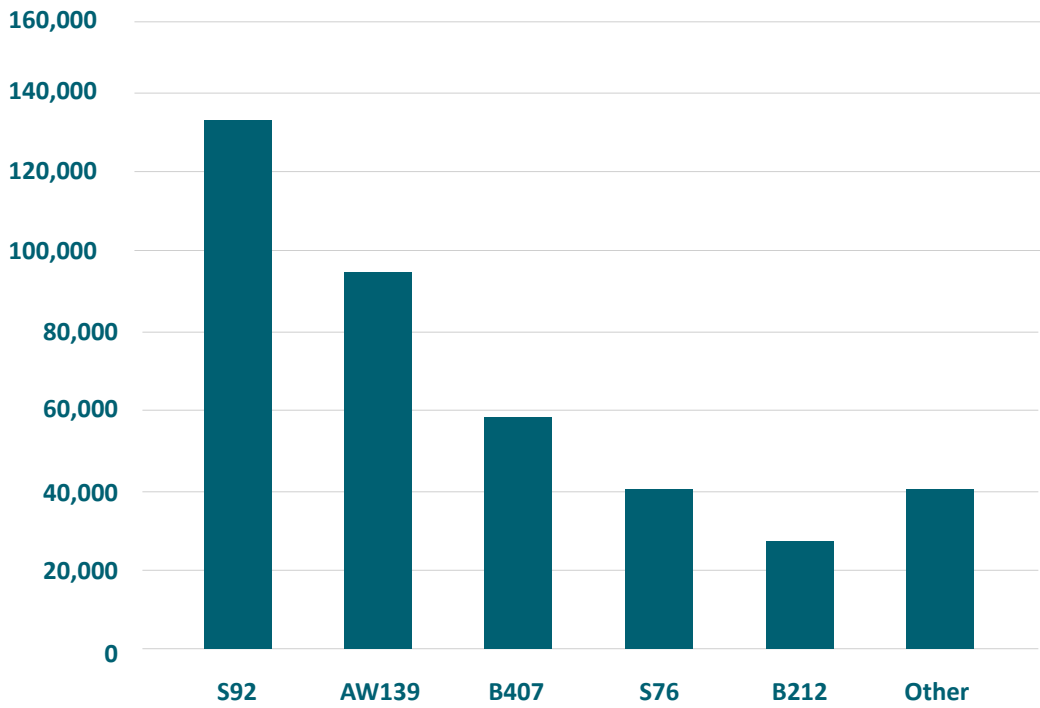


Figure 3.6 – 2018 Submitted Flight Hours by Aircraft Type

Figure 3.6 shows the breakdown of submitted 2018 flight hours by helicopter type. Figure 3.7 shows that the first 3 helicopter types account for more than 70% of the total submitted 2018 flight hours.

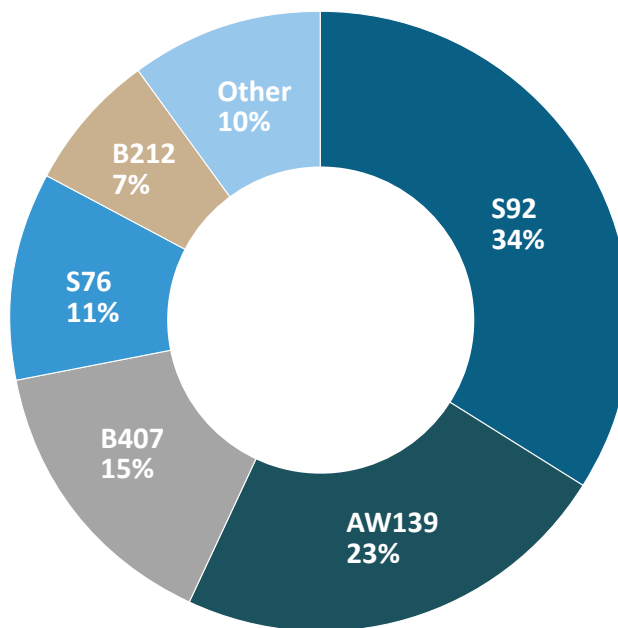


Figure 3.7 – 2018 Submitted Flight Hours by Aircraft Type

Figure 3.8 shows the breakdown of submitted 2018 sectors by aircraft type in the same order as presented for flight hours above.

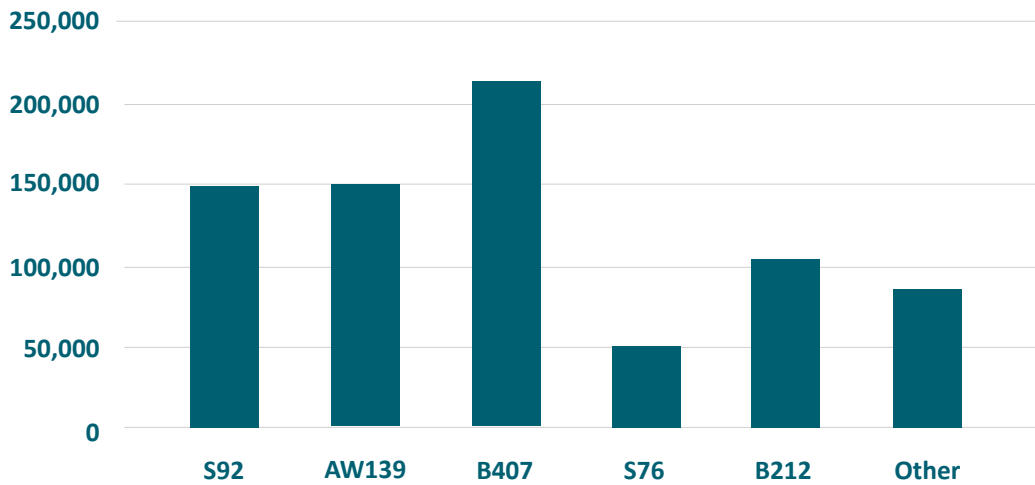


Figure 3.8 – 2018 Submitted Sectors by Aircraft Type

Figure 3.9 shows the breakdown of submitted 2018 sectors for 2018 by aircraft type. It is interesting to note that the S92 represents 34% of the flight hours, but only 20% of the sectors. Conversely, the B407 accounted for 15% of the hours but 28% of the sectors. This is to be expected due to the size and typical use patterns for these helicopters. However, it raises questions over how to assess the relative risk between flight time and take-offs / landings.

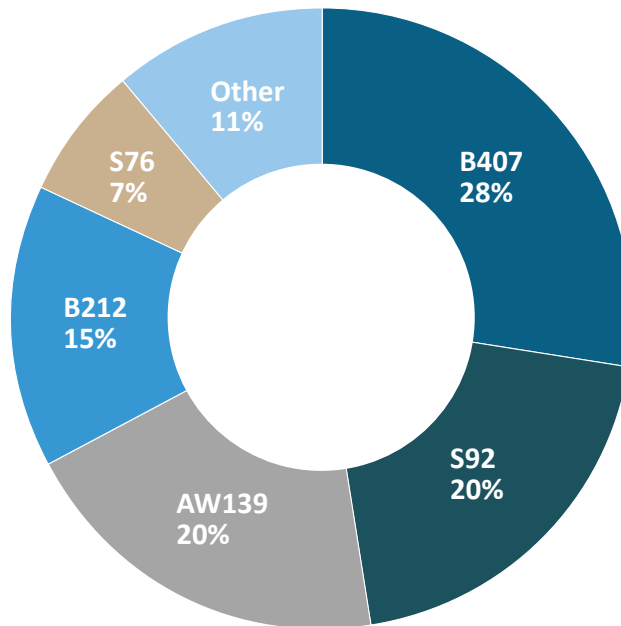


Figure 3.9 – 2018 Submitted Sectors by Aircraft Type

Based on the total submitted 2018 data, the average sector length for all helicopter types is 31 minutes. However, as the sector and hours breakdown above confirms, different aircraft are used in different ways. Figure 3.10 below shows the average 2018 sector length for different aircraft types.

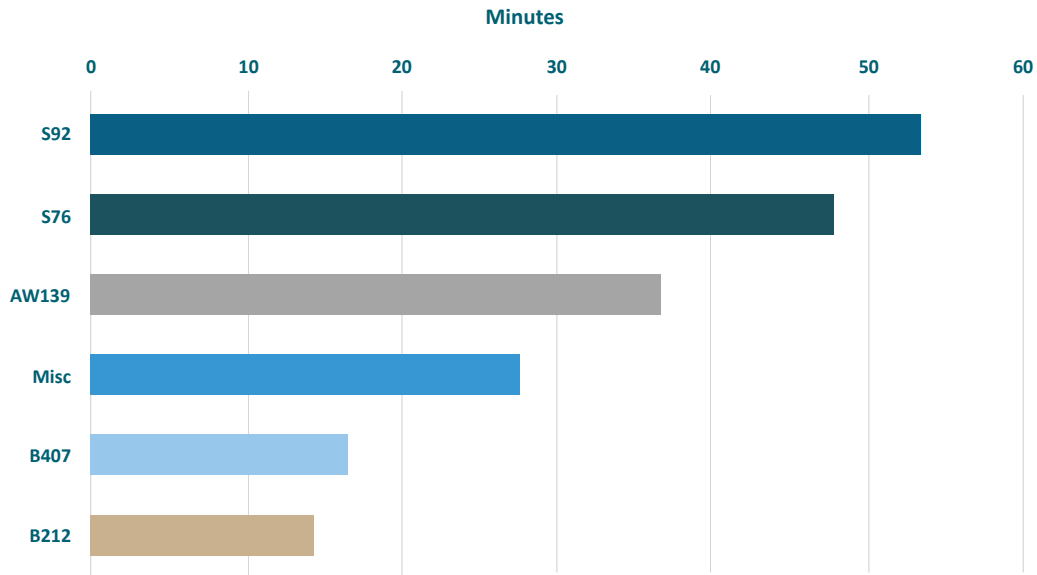


Figure 3.10 – Average Sector Length by Aircraft Type from Submitted Data



Section 4 Accidents



4 Accidents

4.1 Definitions

For clarity, and in part due to complexity in categorisation discussed in Section 2.4, Appendix 3 contains a list and short summary of the accidents which are included in the analysis below. Aircraft registrations are included in this list only to ensure complete transparency about which accidents are being included in these statistics.

4.2 Data Sources

There is no single definitive, authoritative source for global accident information. As a result, the data presented in Appendix 3 represent a composite of many different sources, fused in an attempt to provide a complete picture.

4.3 Total Number of Events

In the period January 2013 to December 2018, a total of 59 accidents were identified that could be considered relevant to passenger transport in the oil and gas industry. These accidents involved 147 fatalities.

4.4 Number of Accidents by Year

Figure 4.1 shows the distribution of fatal and non-fatal accidents over the period. Of the 59 accidents identified, 28 were fatal and 31 were non-fatal.

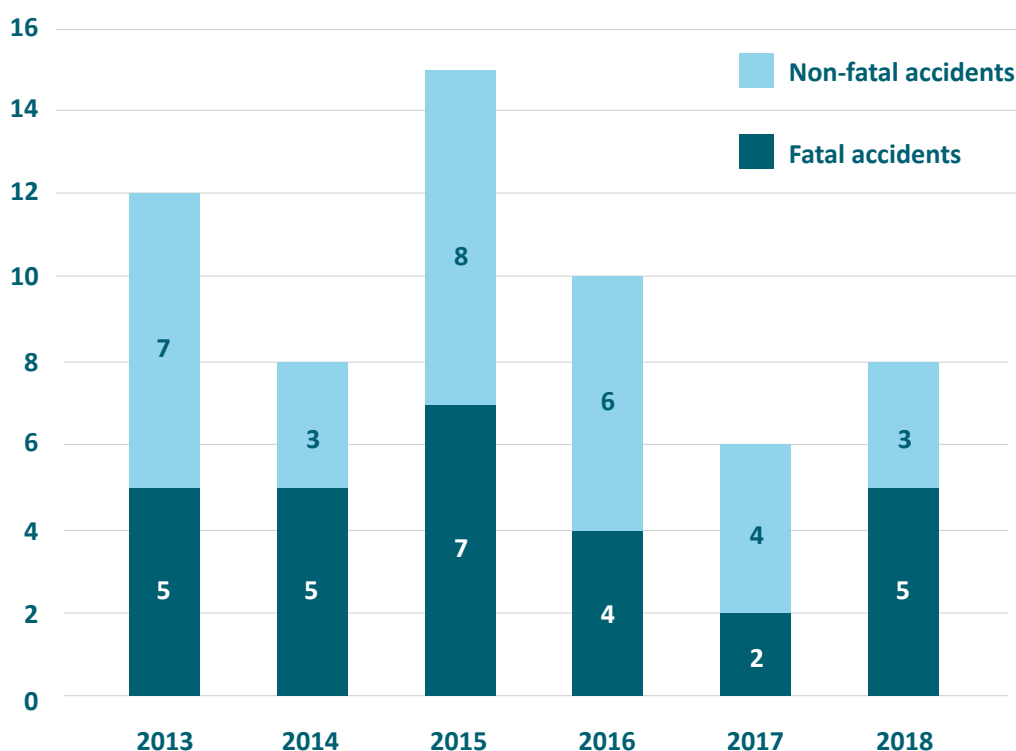


Figure 4.1 – Accidents by Year (fatal and non-fatal)

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Total |
|-------------------------|--|---|-----------|-----------|----------|----------|-----------|
| Non-fatal | 7 | 3 | 8 | 6 | 4 | 3 | 31 |
| Fatal | 5 | 5 | 7 | 4 | 2 | 5 | 28 |
| Total | 12 | 8 | 15 | 10 | 6 | 8 | 59 |
| 5-yr (2013-2017) | Non-fatal = 28 (5.6/yr mean) Fatal = 23 (4.6/yr mean) Total = 51 (10.2/yr mean) | | | | | | |
| 5-yr (2014-2018) | | Non-fatal = 24 (4.8/yr mean) Fatal = 23 (4.6/yr mean) Total = 47 (9.4/yr mean) | | | | | |

Table 4.1 – Breakdown of Fatal and Non-fatal Accidents by Year

4.5 Fatalities by Year

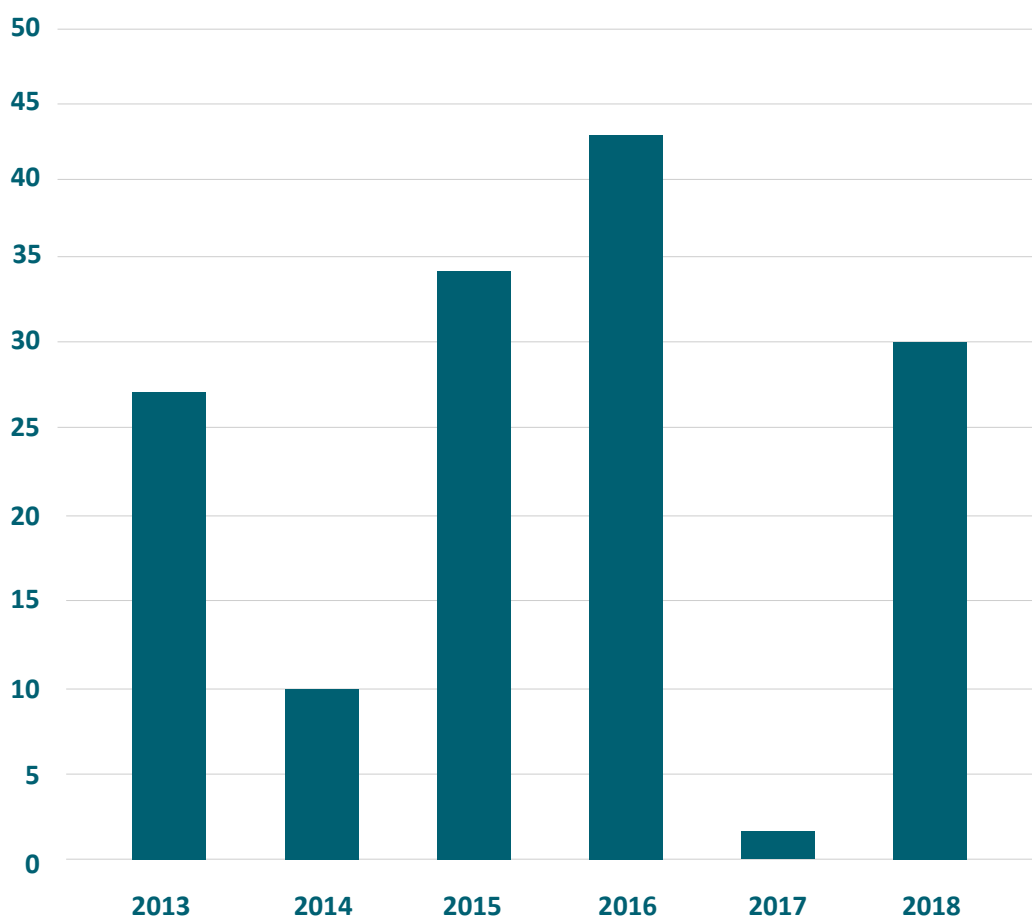


Figure 4.2 – Fatalities by Year

In the six-year period covered by this report, there were 147 fatalities in the identified accidents. Considering all accidents (fatal and non-fatal) gives a mean fatality rate of 2.49 fatalities per accident. Considering only fatal accidents, the mean fatality rate becomes 5.25 fatalities per accident.

4.6 Causes by CAST/ICAO Common Taxonomy Team (CICCT) Definition

Appendix 4 includes a list of the CICCT aviation occurrence categories. For each of the accidents, one or more CICCT occurrence categories were allocated and these are shown with the events in Appendix 3. In some cases, more than one occurrence category is applied to a single accident.

Figure 4.3 shows the breakdown of all 59 accidents by CICCT occurrence categories. The same breakdown is shown in Figure 4.4, but only for the 28 fatal accidents.

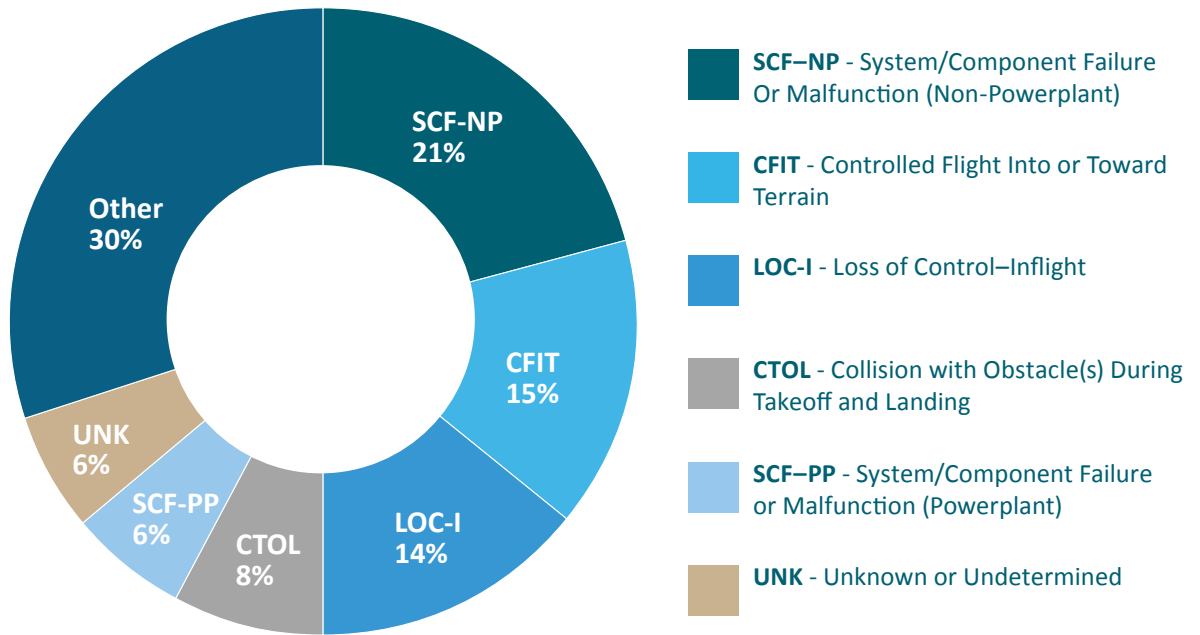


Figure 4.3 –CICCT Occurrence Categories for All Accidents

Based on this analysis, the largest single occurrence associated with all accidents is non-powerplant system or component failures (SCF-NP = 21%) followed by controlled flight into terrain or water (CFIT = 15%) and loss of control in flight (LOC-I = 14%). The ‘Other’ category here contains 14 different causes, each with a proportion of 5% or less.



Changing focus to only fatal accidents changes this breakdown significantly; Figure 4.4 shows the proportion of occurrence categories associated with fatal accidents only.

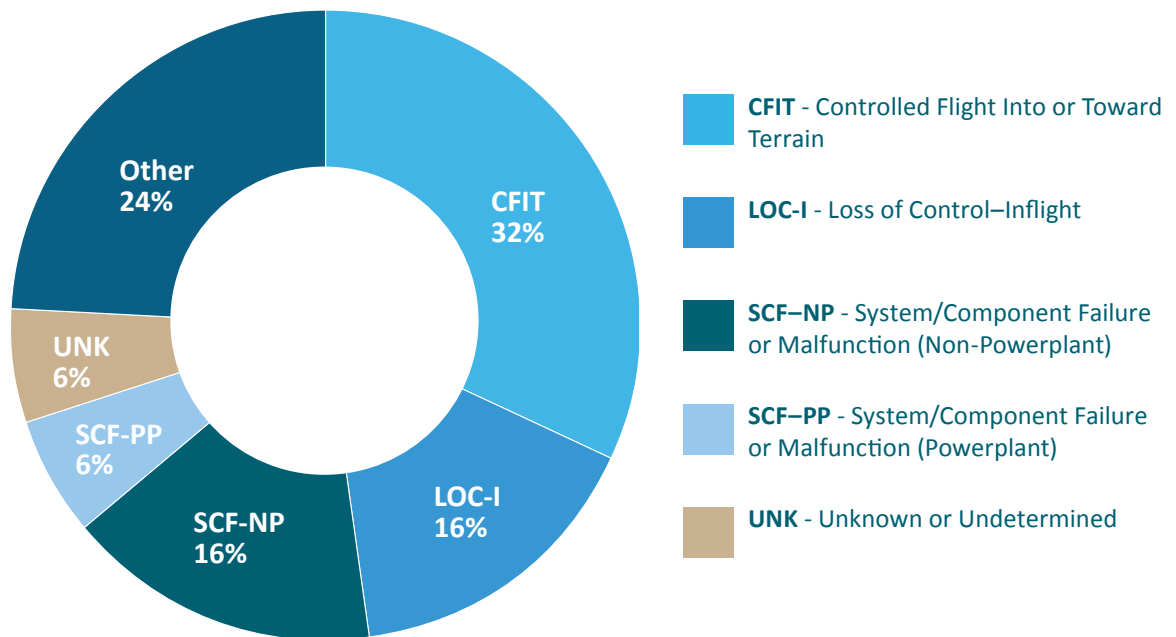


Figure 4.4 – CICTT Occurrence Categories for Fatal Accidents Only

Figure 4.4 shows that controlled flight into terrain or water is the most common category associated with fatal accidents (CFIT = 32%) followed by loss of control in-flight (LOC-I = 16%) and non-powerplant system or component failures (SCF-NP = 16%). Here ‘Other’ contains 7 categories each with a proportion of 4% or less.

These occurrence categories agree very well with the HeliOffshore Safety Performance Model focus areas of:

- Surface / obstacle conflict;
- Aircraft Upset; and
- System Failure.

4.7 Normalised Accident Rates

Based on the hours and sectors provided and estimated in Section 3 and the accidents described above, it is possible to estimate the following accident rates for the most recent 5-year period:

| | 2014-2018 | |
|---------------------------------|-----------|---------|
| 5-yr all accident rate | 7.8 pMfh | 3.8 pMs |
| 5-yr fatal accident rate | 3.8 pMfh | 1.8 pMs |

pMfh = per million flight hours

pMs = per million sectors

4.8 Comparison with Fixed Wing

The Boeing 2017 Statistical Summary of Commercial Jet Airplane Accidents gives the number of fatal accidents from 2008 to 2017 as 55 in total, resulting in a total of 2,261 fatalities onboard. This equates to a 10-yr average fatal accident rate of 0.16 per million departures for scheduled commercial passenger operations. Figure 4.5 shows the breakdown by occurrence category.

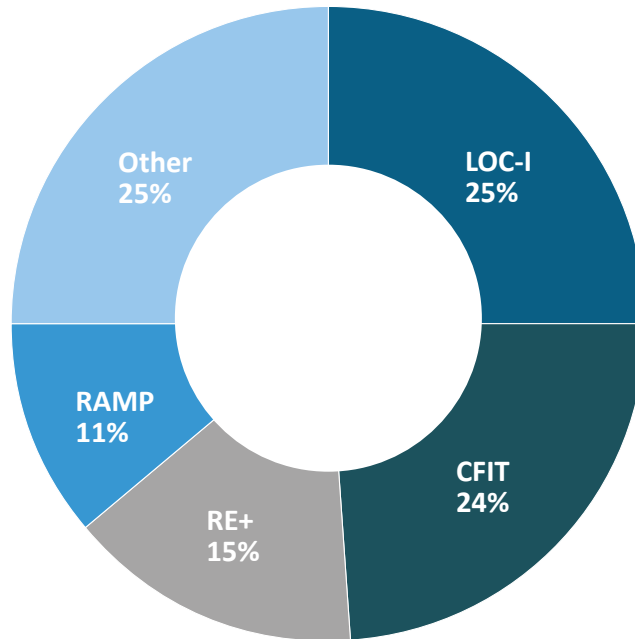


Figure 4.5 – CICTT Occurrence Categories for Commercial Jet Fixed-Wing Fatal Accidents

Non-powerplant system or component failure (SCF-NP) has not been assigned to any of the 55 commercial fixed-wing fatal accidents in the period 2008-2017. RE+ combines runway excursion (RE), abnormal runway contact (ARC) and undershoot / overshoot (USOS).

The Boeing statistics do not include aircraft manufactured in the Commonwealth of Independent States (CIS) or Russia due to a lack of operational data. The Aviation Safety Network gives the global 5-year fatal accident rate for aircraft capable of carrying more than 14 passengers, as 0.4 per million departures.



Section 5 Conclusions



5 Conclusions

This report has, for possibly the first time, given a consolidated picture of the safety performance of passenger transport in the global oil and gas industry.

The information contained within this report can be significantly improved – accuracy and fidelity can be improved, industry intelligence can be expanded and further analysis can be performed. However, none of this detracts from the value that this data provides in giving a reliable assessment of the current safety and risk picture.

As part of the continuing work of the HeliOffshore Safety Intelligence Programme we will be making these improvements, which are best-achieved with the help and insight of our members. Also, as part of the HSIP, we will be providing the data in a more dynamic, personalised way for operator members.

Whilst the gathering of this data is a crucial first step in improving the industry's safety performance, it is not, in itself, of any value unless it is acted upon. Therefore, HeliOffshore will use this, and other data to continue to inform its safety strategy to provide the greatest safety benefit for the industry and benchmark its progress through the ongoing collection and analysis of data within the HeliOffshore Safety Intelligence Programme. In particular, data will allow us to 'close the loop' on our safety initiatives to check that our actions are having the desired outcomes.



Section 6 Appendices



Appendix 1

Full membership list at time of publication (* indicates an Operator Member)

| | |
|---|--|
| Aeroservicios Especializados S.A. De C.V.* | G.E.D.A. S.p.A. |
| Aerossurance Limited | GE Aviation |
| AeroteQ Consulting Limited | Green Deck Operations Limited |
| Air Greenland* | GV Consulting |
| Air Safety Engineering LLC | Heli Holland Offshore B.V.* |
| Airbus Helicopters | Heli-One |
| Aircontact Services AS | Heli-Union* |
| Airtight Aviation Services Ltd | HeliAmérica, SAC* |
| Airwork NZ Limited | Helicopter Association International (HAI) |
| Arrow Aviation | Helideck Certification Agency Limited |
| AviaSafety Consulting International | Heliportugal* |
| Aviashelf* | HeliService International GmbH* |
| Aviator Group* | Heliservicio S.A.* |
| Baines Simmons Ltd | HeliVibe Training and Consultancy Ltd |
| Bel Air Aviation A/S* | HNZ New Zealand Ltd / PHI International* |
| Bell | Honeywell Aerospace |
| BHP | HOSI Malta Limited (Heliconia Aero Solutions)* |
| Blue Sky Network | HTM Helicopter Travel Munich GmbH* |
| BP Plc | HUCON |
| Bristow Group Inc.* | International Aircraft Services (IAS)* |
| Brunei Shell Petroleum Company Sdn Bhd* | International Association of Oil & Gas Producers |
| Canadian Helicopters Offshore* | International Aviation Marketing Limited |
| Caverton Helicopters* | JLT Speciality USA |
| CHC Helicopter* | KN Helicopters A/S* |
| Chevron Corporation | LCI Helicopters Ireland Limited |
| Collins Aerospace | Leonardo Helicopters |
| ConocoPhillips | Líder Aviação S/A* |
| Coptersafety OY | Lobo Leasing Limited |
| CONTROL UNION Testing and Inspection B.V. | Macquarie Rotorcraft Leasing Inc. |
| Cougar Helicopters Inc.* | Milestone Aviation Group Limited |
| Cranfield University | Modena Air Service* |
| DART Aerospace | National Helicopter Services Limited (NHSL)* |
| Echelon Consulting Limited | Nesto Aviation Ltd* |
| Ecole Nationale de l'Aviation Civile (ENAC) | NHV Group* |
| Elilombarda s.r.l.* | Northern HeliCopter GmbH* |
| Era Group Inc.* | Norwegian Confederation of Trade Unions |
| Euro-Asia Air* | Oil & Gas UK |
| Everett Aviation* | OMNI Helicopters International* |
| Exxon Mobil Corporation Aviation Services | OuterLink Global Solutions |
| Flight Data Services Limited | PANH Helicopters* |
| Flight Safety Foundation | Pathfinder Aviation* |
| FlightSafety International Inc. | Patrick Pinna Consulting |

PHI Inc.*
Pratt & Whitney Canada
PT Pelita Air Service*
PT Travira Air*
Regional Air Services*
Royal Navy
Safran Helicopter Engines
Sazma Aviation*
SFS Aviation Company Limited*
SGS Hart Aviation
Shell Aircraft Limited
Siemens Gamesa Renewable Energy
Sikorsky Aircraft Corporation
SKYTRAC Systems Limited
SonAir Airline Services S.A.*
Spectro|Jet-Care
StandardAero
Step Change in Safety Limited
Thai Aviation Services Limited*
The LOSA Collaborative
THG Group*
Thales Avionics
Tonic Analytics Limited
TOTAL S.A.
Transportes Aéreos Pegaso S.A. de C.V.*
Tunisavia*
Ultimate Heli (Pty) Ltd*
United Offshore Aviation Company Limited*
Upstream Aviation
UTair-Helicopter Services*
Weststar Aviation Services Sdn Bhd*
WIKING Helikopter Service GmbH*
Zodiac Aerospace

Appendix 2

ICAO Annex 13 gives the definition of an accident and serious incident as:

Accident

An 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 as 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, windcreens, the aircraft skin (such as small dents or puncture holes), or for 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

Serious incident

An incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of 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 as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Note – The difference between an accident and a serious incident lies only in the result.

Appendix 3

The information given below is for transparency with regard to the accident statistics in the report. The ICAO Annex 13 definition of an accident has been the nominal benchmark for inclusion but this can be a subjective threshold. Where available the investigating agency's assessment has been used. Brief descriptions are given only to help outline the event and in no way attempt to summarise all the relevant factors. Accidents are almost always complex events with many factors and as such the accident report, where available, should be treated as the definitive description of the event and its causal factors.

| Date | Type | Registration | Town | Country | Phase | Occurrence | Severity | CICCT categories | | Onboard | Injuries | Fatalities |
|--|--------------|--------------|-----------------------|----------------|------------------------|-----------------------------|----------|------------------|---|---------|----------|------------|
| 07 January 2013 | Boeing 234LR | N241CH | Pucallpa | Peru | En route | Blade broke-up in flight | Accident | SCF-NP | - | 7 | 0 | 7 |
| While enroute to a drilling location, the helicopter crashed into the jungle and caught fire approximately 5 minutes after takeoff. The green main rotor blade lost a part of the blade which precipitated a break-up of the aircraft causing severe vibrations. A pre-existing fatigue crack was found in the sheet metal structure which resulted in a susceptibility to vibration from a loss of a portion of a blade. All 6 of the blades had previously been installed on G-BISO which had crashed into the North Sea in 1984 and sank. | | | | | | | | | | | | |
| 20 March 2013 | AS365N3 | D2-EWG | 60km S of Soyo | Angola | Landing – Landing Roll | Collision with objects | Accident | CTOL | - | 11 | 0 | 0 |
| The helicopter was reportedly 'caught by a gust of wind' while landing on the helipad of the offshore accommodation barge and its tail boom struck the electrical grounding cable installation. The landing was completed safely but the helicopter's tail boom apparently sustained damage. | | | | | | | | | | | | |
| 27 March 2013 | B412SP | PT-HUW | Campos Basin | Brazil | Landing – Approach | Power Loss | Accident | LOC-I | - | 3 | 0 | 0 |
| The helicopter made a controlled ditching in the Campos Basin, following a flight from Rio de Janeiro. It initially remained afloat and upright but subsequently capsized. | | | | | | | | | | | | |
| 07 April 2013 | Mil Mi-8PS | OB-1916-P | Loreto | Peru | Approach | Loss of directional control | Accident | SCF-NP | - | 13 | 0 | 13 |
| The investigation gave the probable cause as: Sudden loss of directional control and flight disintegration of the helicopter, in the phase of descent to the helipad, due to the loss of continuity of the tail rotor passage control system and the impact of the main rotor against the boom tail caused by a foreign object (cargo stowage mesh) placed in the access compartment of the power transmission shaft of the tail rotor and an over control in the handling of flight controls, exceeding its limitations at the time of emergency. | | | | | | | | | | | | |
| 14 June 2013 | B212 | PR-HRZ | Tefé – Amazonas | Brazil | En Route | Spatial disorientation | Accident | CFIT | - | 2 | 0 | 2 |
| The Bell 212, engaged in support of oil and gas activity, crashed, killing two occupants. The marks left on the vegetation in the treetops indicated that the aircraft collided frontally and with a lateral inclination of 45 ° to the left about 0.6nm from the departure point. Classified as Spatial Disorientation by CENIPA. | | | | | | | | | | | | |
| 14 July 2013 | Mil Mi-8T | RA-25607 | Kyshtovka | Russia | Take-off | Collision with wires | Accident | CTOL | - | 17 | 7 | 0 |
| The helicopter was contracted to transport offshore oilfield workers. The helicopter fell over on its side almost immediately after takeoff from the landing site of the Igolsko-Talovoye oil field in the north of the Tomsk region. During the take-off, the aircraft began an abrupt left yaw, and made a half turn before colliding with the ground 61 meters from the helipad. Most probably the accident was caused by crew uncoordinated actions during take-off resulted in helicopter accelerated left rotation and its ground impact. | | | | | | | | | | | | |
| 14 August 2013 | B407 | N53LP | Ship Shoal Field, GOM | United States | Take-off | Loss of power and ditching | Accident | SCF-PP | - | 3 | 0 | 0 |
| The helicopter departed from an offshore oil platform with the pilot and two passengers onboard. The pilot reported that he heard a loud "bang" just after the turboshaft-powered helicopter lifted off. The low rotor rpm horn sounded, and the pilot subsequently maneuvered the helicopter for a forced water landing and deployed the float system. The helicopter sustained substantial damage when its main rotor blades impacted the water, which resulted in the engine and transmission separating from the helicopter. The three occupants were subsequently rescued from the helicopter by boat. The platform was venting methane gas on the day of the accident; the pilot was not informed about the vented gas. Examination of the helicopter's engine revealed no preaccident mechanical malfunctions or failures that would have precluded normal operation. A review of data from the helicopter's engine monitoring system (EMS) revealed that, just after liftoff, the engine accelerated at an excessive rate while the full-authority digital electronic engine control system reduced the metered fuel to the engine. The data also revealed that an engine surge occurred followed by an engine flameout. The pilot's report that he heard a bang during takeoff and the EMS data are consistent with the engine experiencing a compressor surge due to the ingestion of vented methane gas. | | | | | | | | | | | | |
| 23 August 2013 | AS332L2 | G-WNSB | off Garths Ness | United Kingdom | Landing – Approach | Undershot | Accident | LOC-I | - | 18 | 4 | 4 |
| The helicopter was destroyed when it came down during the final stage of a LOC/DME approach to Sumburgh Airport. The helicopter impacted the sea in an upright attitude but then rapidly rolled over and remained floating inverted. The weather conditions were such that the final approach was flown in cloud. The approach was flown with the autopilot in 3-axes with Vertical Speed (V/S) mode, which required the captain to operate the collective manually to control the helicopter's airspeed. Although the approach vertical profile was maintained initially, insufficient collective input was applied to maintain the approach profile and the target approach airspeed of 80kt. This resulted in insufficient engine power being provided and the helicopter's airspeed continuously reduced during the final stage of the approach. Control of the flight path was lost. During the latter stages of the approach the helicopter's airspeed decreased below 35kt and a high rate of descent developed. The decreasing airspeed went unnoticed by the pilots until a very late stage, when the helicopter was in a critically low energy state. The captain's attempt to recover was unsuccessful and the helicopter struck the water. | | | | | | | | | | | | |
| 09 October 2013 | B206L3 | N54LP | Gulf of Mexico | United States | Take-off | Power loss | Accident | SCF-PP | - | 4 | 3 | 1 |
| As the helicopter departed from the oil platform's helipad, witnesses heard a "pop" followed by a high-pitch screeching noise coming from the back of the engine. The helicopter nosed-over into the water with the emergency floats extended. Examination of the engine revealed that one of the second-stage turbine disk blades had liberated due to a high-cycle fatigue (HCF) crack. | | | | | | | | | | | | |

| Date | Type | Registration | Town | Country | Phase | Occurrence | Severity | CICTT categories | | Onboard | Injuries | Fatalities |
|---|-----------|--------------|------------------------------|---------------|------------------------|--------------------------------------|----------|------------------|-------|---------|----------|------------|
| 05 December 2013 | S76B | N707MY | Port Fouchon, LA | United States | Take-off | Vortex ring | Accident | LOC-I | - | 10 | 0 | 0 |
| <p>The pilot reported that he was departing from a helipad and all cockpit instrument indications were "in green" status. Wind was very calm to none and the pilot verified it by looking at two flags on an offshore vessel. Another aircraft took off from the helipad and departed to the east. The pilot hover taxied to the west of the flight area with a right pedal turn. He rechecked the instruments, which were "all normal." He added power and the flight was normal as the helicopter was climbing.</p> <p>The helicopter was about 40 to 50 feet over a roadway and it started to settle. He added more power and it looked as if it was going to recover. Then the helicopter started to sink again. There were occupied trailers under the helicopter and obstacles blocking a nearby field. The pilot elected to head left of course for less impact with anything on the ground or with property. The helicopter impacted terrain where it sustained substantial tailboom and fuselage damage. The pilot reported that the helicopter was within weight and balance requirements and that there were no mechanical malfunctions. Following the impact, he noticed that the previously observed flags were now showing the wind was blowing and gusting from the southwest direction.</p> | | | | | | | | | | | | |
| 12 December 2013 | S76 | 9M-STE | Off coast of Bintulu | Malaysia | Approach | Power Loss | Accident | SCF-PP | - | 8 | 0 | 0 |
| <p>The helicopter apparently impacted the sea in on approach to survey vessel MV Viking Vision of CGG after an apparent power loss at the Landing Decision Point. Both pilots and the passengers, six oil workers, escaped and were rescued. They did not sustain serious injuries. The helicopter subsequently sank.</p> | | | | | | | | | | | | |
| 23 December 2013 | Mi-8T | RA-24491 | Novy Urengoy | Russia | Ground – taxi | Collision with objects | Accident | GCOL | - | 16 | 0 | 0 |
| <p>While taxiing after landing at Novy Urengoy, the helicopter's tail rotor struck a ground power unit. The collision substantially damaged the helicopter's tail rotor and tail boom. The helicopter was operating a flight from Sabetta.</p> | | | | | | | | | | | | |
| 05 January 2014 | B430 | N430CT | West Delta 109, GM | United States | Landing – Landing Roll | Collision with objects | Accident | CTOL | - | 2 | 0 | 0 |
| <p>The helicopter's tail rotor struck a handrail during landing on the West Delta 109 oil platform in the Gulf of Mexico. The helicopter was over the landing circle when it was turned and a severe shudder was felt so the pilot immediately landed and shut down the helicopter. The examination of the helicopter and landing platform revealed that the tail rotor blades had struck a handrail on the east crane davit, which resulted in substantial damage to the tail rotor gearbox and drivetrain.</p> | | | | | | | | | | | | |
| 08 May 2014 | AS365N | TU-HAA | Takoradi | Ghana | En Route | In-flight fire | Accident | F-NI | - | 8 | 0 | 4 |
| <p>The aircraft was conveying workers to an off-shore drilling rig JACK RYAN on its third flight but did not arrive due to fire that caused the aircraft to crash into the sea. The aircraft departed Air Force Base, Takoradi at 1259hrs with ETA of 1310hrs. TU-HAA crashed 4.5nm from take-off point into the sea. Out of the eight passengers on board, four survived with four fatalities. The weather was marginally fair for the safe conduct of VMC flights.</p> <p>The findings indicated that the nut of the rear bearing scavenge pipe was undone prior to the accident which was the source of the fire. The engines of the aircraft were on fire before the crash. Additionally the flight following for the aircraft was not effective resulting in the late response of the search and rescue. Also, the operator was in the process of acquiring the necessary permit for off-shore operations but was not completed.</p> | | | | | | | | | | | | |
| 19 May 2014 | S-76C++ | PK-PUX | off Matak Island | Indonesia | Landing – Approach | Loss of control in flight | Accident | WSTRW | LOC-I | 12 | 0 | 0 |
| <p>The helicopter was reportedly caught by 'wind shear' during final approach to the helipad on FPSO Anoa Natuna and entered a rapid uncontrolled descent (possibly vortex ring). The crew inflated the emergency floats but were apparently unable to avoid the helicopter hitting the water hard. The helicopter remained floating upright and, after evaluating the situation, the crew elected to get airborne again and fly to a nearby platform where a safe landing was made sometime later.</p> | | | | | | | | | | | | |
| 11 June 2014 | B206L-4 | N207MY | South Timbalier Platform, GM | United States | En route | Loss of control for unknown reasons | Accident | LOC-I | - | 2 | 0 | 2 |
| <p>The commercial-rated pilot and passenger were en route to an oil platform located in the Gulf of Mexico. A witness, who was on the platform, saw the helicopter heading toward the platform. As the helicopter approached, it started to spin in a clockwise direction. The helicopter spun several times before it dropped to the water. Examination of the helicopter and rotor system did not reveal any preimpact abnormalities.</p> | | | | | | | | | | | | |
| 03 July 2014 | EC225 | - | nr Bergen | Norway | En route | Medevac patient jumped from aircraft | Accident | SEC | - | - | 0 | 1 |
| <p>During a medical transport from an offshore facility, the patient opened an exit and jumped from the aircraft. This was not classified as an aviation accident by AIBN but it is included here as an outcome of the Oil and Gas transport.</p> | | | | | | | | | | | | |
| 10 July 2014 | Mil Mi-2 | RA-23721 | Koalym | Russia | En route | Collided with wires | Accident | CFIT | - | 1 | 0 | 1 |
| <p>While returning from the Varyegan oilfield, the Mil Mi-2 helicopter crashed. The accident was caused by performing flight at the altitude 10-12 m not ensuring safe operation over obstacle that resulted in rotorcraft collision with aerial PTL wires. It wasn't possible to determine exactly the cause of operation at the altitude 10-12 m but most probably the pilot during take-off was distracted from helicopter piloting and outside monitoring due to the possible drop of HP iPAQ Travel Companion pocket PC from its attaching point used by PIC as non-standard navigation device. Lack of aerial PTL wires marking could be the contributing factor.</p> | | | | | | | | | | | | |
| 14 October 2014 | Mil Mi-8T | RA-24506 | Zhigansk | Russia | Landing | Crashed on landing | Accident | CTOL | - | 16 | 0 | 0 |
| <p>The accident was due to the landing and piloting technique errors during overweight landing at the ground selected from air. Landing was performed by the PIC who most probably was intoxicated by alcohol. The contributing factors were:</p> <ul style="list-style-type: none"> - PIC's decision to perform operation in condition of alcohol intoxication; - unsatisfactory work of medical assistant of Polyarny a/p with regard to providing the air traffic controller (briefing officer) with information about PIC's suspended from flying duties; - failure by acting the deputy leader to ground the helicopter after receiving information about PIC's alcohol intoxication; - flight safety control system non-operability in the airline that made the helicopter departure and the task performance by the PIC not authorized for flight possible. - not taking the appropriate measures by the other crew members to prevent the operation; <p>The exceeding of maximum allowable take-off mass of the helicopter became possible due to the issuance of the transmittal documents for the flight without real weighting of load onboard.</p> | | | | | | | | | | | | |
| 07 December 2014 | Mil Mi-8T | RA-06138 | Arkhangel'sk Region | Russia | Emergency Landing | Double engine flameout | Accident | SCF-PP | - | 7 | 0 | 2 |

| Date | Type | Registration | Town | Country | Phase | Occurrence | Severity | CICTT categories | Onboard | Injuries | Fatalities | |
|--|-----------|--------------|--------------------------------|---------------|--------------------------|-------------------------------|----------|------------------|---------|----------|------------|---|
| <p>The accident occurred during the emergency landing with two dead engines in whiteout ground conditions and lack of ground cues that did not allow the pilot to determine real flight altitude and perform safe landing.</p> <p>Failure (flameout) of TB2-117 engines set at the helicopter was caused by its aircraft structure imperfection connected with its gasdynamic stability decrease and combustors extinction during operation in conditions causing ice or water flow path encounter.</p> <p>Following dangerous factors contributed to the accident:</p> <ul style="list-style-type: none"> - lack of effective design solutions and operational recommendations on prevention TB2-117 engine flameout causing gasdynamic stability loss; - lack of flight restrictions in operational documentation depending on icing rate and anti-icing system specified characteristics; - failure to maintain flight parameters recommended by FOM Mi-8 helicopter performing landing at lifting propeller autorotation mode by pilot-instructor; - lack of instructions (recommendations) regulating the crew cooperation and operating procedures in case of one or two engine failure in the air when active piloting is performed by the pilot taking the first officer seat taking into account ergonomic features of engine throttle control levers and radio altimeter indicator position. | | | | | | | | | | | | |
| 20 February 2015 | A119 | N802SM | Gulf of Mexico | United States | En Route | Pitch change link failure | Accident | SCF-NP | - | 2 | 0 | 0 |
| <p>The pilot reported that, while in cruise flight over water, the helicopter experienced an abrupt, uncommanded left yaw. The pilot returned to the departure airport and performed a run-on landing. A postflight examination of the helicopter revealed that one of the tail rotor pitch change links (PCL) was fractured.</p> | | | | | | | | | | | | |
| 21 March 2015 | S-76C+ | PK-FUP | 100km NE of Balikpapan | Indonesia | En Route | Separation of control pushrod | Accident | SCF-NP | - | 7 | 1 | 0 |
| <p>The helicopter reportedly suffered a control problem towards the end of a flight from Handil to the Sungai Mahakam delta and crash landed in a mangrove swamp on one of the islands in the delta. The helicopter had been flying at 1,000ft but, when about 8nm from CPU, the captain instructed the co-pilot, who was flying the helicopter, to begin a descent to 600ft. However, as it descended through about 800ft, it suddenly entered an uncommanded left bank and began to pitch nose-up and then down. The captain took over control and attempted to recover but, although it would appear that some control was regained, the helicopter crashed.</p> <p>The investigation determined the contributing factor was the helicopter un-commanded attitude caused by loosening of the jam nut on the forward rod end bearing which subsequently separated from the push rod, resulted in the un-commanded servo movement.</p> | | | | | | | | | | | | |
| 02 June 2015 | Mi-8T | RA-22580 | 60km NE of Talakan | Russia | Take Off – Initial Climb | Loss of control in flight | Accident | WSTRW | LOC-I | 4 | 1 | 0 |
| <p>The accident was caused by not holding speed rate during helicopter acceleration followed by climbing optimal trajectory during no-run takeoff using ground effect most probably with helicopter overweight resulted in rotorcraft mush during “ground effect” recovery and collision with trees.</p> <p>The following factors most probably contributed to the accident:</p> <ul style="list-style-type: none"> - unstable wind conditions: wind shift and/or wind speed change and possible downburst; - lack of specified form and sizes at wind sock platform. | | | | | | | | | | | | |
| 08 June 2015 | B407 | N501PH | (near) Pecan Island | United States | En Route | Component or system failure | Accident | SCF-NP | ARC | 5 | 0 | 0 |
| <p>The operator reported that the helicopter air taxi flight was in cruise about 1,000 ft above ground level when the pilot felt an impact and a strong vibration. The pilot completed an instrument and functional control check and could not immediately identify any anomalies. The pilot stated that, as he slowed the helicopter for landing, he noticed a “heavy mechanical sound and strong vibration.” The vibration worsened, and the pilot began to have difficulty controlling the helicopter; he subsequently initiated an autorotation and deployed the helicopter’s floats. The helicopter touched down in a marshy area, and the pilot and passengers egressed.</p> <p>During the landing, the main rotor blades contacted the tail boom and one of the tail rotor blades, resulting in separation of the tail rotor gearbox (TRGB) support structure, which was subsequently located in the marsh. A postaccident examination and metallurgical analysis revealed that fatigue fractures on two of the four TRGB attachment studs likely existed before the accident flight.</p> | | | | | | | | | | | | |
| 28 June 2015 | B407 | N311RL | South Timbalier 127, GM | United States | Ground | Pushed off deck by wind | Accident | LOC-G | - | 1 | 1 | 0 |
| <p>The commercial pilot reported that he had landed the helicopter on the oil platform about 1 hour before the accident. He noted that the weather conditions were deteriorating west and north of the platform; he then decided to depart the platform, which did not have any weather monitoring systems installed. He had initiated the start sequence when a strong wind gust struck the platform and pushed the helicopter off of the raised helideck into the water. Witness reports corroborated the pilot’s account, and two of the witnesses reported that the helicopter blades were turning but had not yet reached flight idle speed. If a weather monitoring system had been available, the pilot might have decided not to depart the platform given the gusting wind conditions. The pilot’s lack of awareness of the severity of the gusting winds, which led to the helicopter being pushed off of the oil platform by a wind gust during engine start. Contributing to the accident was the unavailability of a nearby weather monitoring system.</p> | | | | | | | | | | | | |
| 13 July 2015 | AW109 | EP-TRK | nr. Khark Island, Persian Gulf | Iran | En Route | Loss of control in cruise | Accident | LOC-I | - | 4 | 0 | 4 |
| <p>The accident occurred in dark night conditions, and the report concludes that spatial disorientation is the most likely cause.</p> | | | | | | | | | | | | |
| 12 August 2015 | S-76C+ | 5N-BGD | (near) Oworoshoki | Nigeria | Landing – Approach | Component or system failure | Accident | SCF-NP | - | 12 | 6 | 6 |
| <p>The helicopter was destroyed when it went out of control and crashed into the waters of Lagos Lagoon while on approach to Murtala Muhammed International Airport, Lagos. The flight had apparently been routine but, shortly after reporting the airfield in sight and while flying at 1,000ft amsl at 120kt, the helicopter suddenly pitched up and rolled to the left. Control was not regained and it crashed. The AIB determined the cause of the accident was the separation of the forward servo clevis rod assembly from the bearing and jamnut (bell crank assembly) which is part of the cyclic control system responsible for stabilising the attitude of the helicopter and made the helicopter uncontrollable.</p> | | | | | | | | | | | | |
| 15 August 2015 | Mil Mi-8T | RA-22559 | sea of Okhotsk | Russia | En Route | Crashed into water | Accident | CFIT | - | 16 | 11 | 5 |
| <p>The aircraft destination was Ongachan Bay site. The accident was caused by not holding safe altitudes and speed by the crew under the weather deterioration below specified for VFR operations values that resulted in vortex-ring state entering and water collection. The accident was caused by the crew timely indecision about the transition to IFR flight or diversion to alternate aerodrome under the weather deterioration below specified minima. The absence of radio altimeter setting at the safe altitude and maneuvering over the smooth water surface contributed to the flight altitude monitoring failure. The fatality of 5 passengers was caused by their drowning in the sunk helicopter who were not evacuated in time after the rotorcraft immersion.</p> | | | | | | | | | | | | |

| Date | Type | Registration | Town | Country | Phase | Occurrence | Severity | CICTT categories | | Onboard | Injuries | Fatalities |
|--|-----------|--------------|--|---------------|--------------------------|--|----------|------------------|---|---------|----------|------------|
| 03 October 2015 | A109E | EP-TRB | Bahregan Helicopter Base north west of Persian Gulf | Iran | Ground – engines running | Uncorrected ground resonance | Accident | LOC-G | - | 2 | 0 | 0 |
| During the final phase of pre-takeoff check, the helicopter at full RPM began to bounce up and down and then the right landing wheel sheared and detached within a few seconds. As soon as the right landing wheel was broken, one of the main rotor blade (the Red blade) hit the tailboom and within a second the helicopter came to the rest on its right L/G (shock strut) and finally sustained substantial damage. | | | | | | | | | | | | |
| 06 October 2015 | R44 II | N779DZ | Ketchikan, Alaska | United States | Ground – startup | Failure to maintain direction control | Accident | LOC-G | - | 2 | 0 | 0 |
| The helicopter pilot reported that during the engine start sequence on an offshore barge with a bare steel deck, the main rotor system clutch was engaging, and the throttle was applied to maintain 60 percent engine revolutions per minute. He reported that the skid and tundra/snow board equipped helicopter began a rapid right yaw, left pedal was applied simultaneously with throttle closure, but the helicopter rapidly yawed left resulting in the vertical stabilizer and tail rotor blade system impacting a crane stationed on the deck. The pilot then shut down the helicopter without further incident. A postflight inspection revealed substantial damage to the vertical stabilizer and the tail rotor blade system. The pilot reported there were no pre-impact mechanical failures or malfunctions with the airframe or engine that would have precluded normal operation. | | | | | | | | | | | | |
| 30 October 2015 | B407 | N420PH | Cameron, LA | United States | Ground – engines running | Ground handling | Accident | RAMP | - | 1 | 0 | 0 |
| After landing on an offshore platform, the pilot secured the helicopter's main rotor by attaching a tie-down strap from the forward left (blue) main rotor blade to the left front skid cross tube. Several hours later, he returned to the helicopter and began the engine start sequence. He started the engine but 'a few seconds later' the helicopter made an 'unusual noise' and began to shake. The pilot shut down the helicopter without further incident. A subsequent inspection found that the start up had been attempted without removing the tie-down strap resulting in substantial damage to the blue main rotor blade. | | | | | | | | | | | | |
| 04 November 2015 | AS365N3 | VT-PWF | c. 82 nm W of Mumbai | India | Approach | Spatial disorientation | Accident | CFIT | - | 2 | 0 | 2 |
| The aircraft crashed in the Arabian Sea while carrying out night landing practice on the Ron Tappmeyer mobile drilling rig alongside the EE ONGC Platform. The helicopter impacted into the sea at high velocity, as <ul style="list-style-type: none"> - The pilot on controls, who had a long break in night offshore flying, got into complete spatial disorientation, as a result of black hole phenomenon, while approaching a helideck at high speed in tail winds on a dark night, and - The PIC did not take over controls when the helicopter descended below critical height. | | | | | | | | | | | | |
| 26 November 2015 | Mil Mi-8T | RA-25361 | Igarka | Russia | En route | Unknown | Accident | UNK | - | 25 | 15 | 10 |
| The aircraft was reportedly en route to the Vankor oil field, transporting shift workers. It crashed into the Yenisei River for unknown reasons. | | | | | | | | | | | | |
| 29 November 2015 | AS350B3 | RA-04037 | near Kedrovyy, Khanty-Mansi Autonomous Okrug | Russia | En route | Spatial disorientation | Accident | CFIT | - | 4 | 0 | 4 |
| The aircraft was on contract to an oil company. The accident was caused by aircraft spatial disorientation in low visibility conditions and ground "whiteout" that resulted in rolling uncontrolled descent and aircraft collision with the river ice-covered surface. Contributing factor was VFR flight operation at unauthorized low altitude. | | | | | | | | | | | | |
| 16 December 2015 | Mil Mi-8T | RA-24402 | 77km from Sobolev, Sobolevsky District, Kamchatka Krai | Russia | Take-off | Spatial disorientation on take-off | Accident | CFIT | - | 25 | 10 | 1 |
| Most probably the fatal accident was caused by the crew spatial disorientation during acceleration performing helicopter take-off in whiteout conditions. Airlines Operational Flight Plan as opposed to Mi-8T helicopter FOM allows no-run takeoff in ground effect given the possibility of snow whirl formation. Most probably the following factors contributed to the accident: <ul style="list-style-type: none"> - non-compliance with take-off procedure in conditions of possible snow whirl formation; - inadequate crew members coordination in snow whirl conditions. | | | | | | | | | | | | |
| 07 January 2016 | AW139 | # | # | Indonesia | Final Approach | Engine cowl contacted blades | Accident | SCF-NP | - | 13 | 0 | 0 |
| During Final approach to an offshore facility, the crew heard a thud sound once. Aircraft controls were normal and there was no abnormal vibration felt. The crew continued their approach. Upon Landing the HLO informed the pilot (LH Seat) pointing to the LH engine area. The RH pilot (Commander) then exited the aircraft and checked the area pointed out by the HLO. The Commander then found there is damage in the form of bent sheet metal on the forward lower part of the LH Engine Cowl. The decision was made to shut down the aircraft. Further inspection of the aircraft found all five main rotor was damaged on the lower part near to the root end. | | | | | | | | | | | | |
| 03 February 2016 | S-76C++ | 5N-BQJ | 95 miles off Lagos | Nigeria | En Route | Ditching due to instrument and flight control issues | Accident | OTHR | - | 11 | 0 | 0 |
| The report cites the causal factor as "The crew switched the Compass to "FREE" DG mode for Landing on the helideck at Erha FPSO, and did not return to the "SLAVE" mode after take-off which caused the trim fail to cut off consistently which in turn disengaged the autopilot as a result of the unsynchronised heading inputs." | | | | | | | | | | | | |

| Date | Type | Registration | Town | Country | Phase | Occurrence | Severity | CICTT categories | | Onboard | Injuries | Fatalities |
|---|-----------|--------------|---|----------------|--------------------|--------------------------------------|----------|------------------|------|---------|----------|------------|
| 07 April 2016 | AW139 | N639NA | Galliano, LA | United States | En Route | Tail rotor lightning strip separated | Accident | SCF-NP | - | 9 | 0 | 0 |
| <p>On April 7, 2016, at an unknown time, an AgustaWestland AW139 helicopter, N639NA, sustained damage to a main rotor blade during a flight over the Gulf of Mexico. The pilot, co-pilot, and 7 passengers were not injured, and the helicopter sustained substantial damage. Visual meteorological conditions prevailed for the flight and a company visual flight rules (VFR) flight plan had been filed. The flight originated at 0600 from South Lafourche Leonard Miller Jr. Airport, (GOA), Galliano, Louisiana, with an en route stop at an oil rig in the Gulf of Mexico and terminated at GOA about 1135.</p> <p>On May 9, 2018, the operator reported the accident to the NTSB and stated that during the flight the crew felt a slight vibration of the tail rotor. After landing at GOA during a post flight inspection, one of the tail rotor blade (TRB) erosion shield extensions commonly known as a lightning strip (LS) was missing and only its side tabs remained attached to the blade. Additionally, a main rotor blade (MRB) tip was damaged.</p> | | | | | | | | | | | | |
| 29 April 2016 | H225 | LN-OJF | 20km NW of Bergen | Norway | En Route | Component or system failure | Accident | SCF-NP | - | 13 | 0 | 13 |
| <p>The helicopter was destroyed by impact and post impact fire when it crashed at Turøy about 20km northwest of Bergen. It was subsequently determined that the whole rotor head and mast had 'suddenly' detached in flight. The investigation found that the accident was a result of a fatigue fracture in one of the eight second stage planet gears in the epicyclic module of the helicopter's main rotor gearbox.</p> | | | | | | | | | | | | |
| 05 July 2016 | S92 | LN-OND | Stavanger | Norway | Taxi-in | Ground collision | Accident | GCOL | - | 16 | 0 | 0 |
| <p>During taxi-in all 4 Main Rotor blade tips impacted the rear upper right corner of a parked truck. Debris from the Rotor blades and the truck was spread over a wide area. Damage to the Rotor blade tips was extensive.</p> | | | | | | | | | | | | |
| 07 September 2016 | Mil Mi-8 | - | Kyzylorda region | Kazakhstan | Take-off | Crashed on take-off | Accident | UNK | - | 22 | 4 | 0 |
| <p>The helicopter crashed upon takeoff. There were 4 injuries. 3 crew members and 19 passengers were onboard.</p> | | | | | | | | | | | | |
| 26 September 2016 | B430 | - | offshore Cabinda | Angola | En Route | - | Accident | UNK | - | 6 | 0 | 6 |
| <p>Crashed offshore on contract to an oil company.</p> | | | | | | | | | | | | |
| 21 October 2016 | Mil Mi-8T | RA-22869 | 80 km from Novy Urengoy, Yamal | Russia | En Route | Spatial disorientation | Accident | CFIT | FUEL | 22 | 2 | 19 |
| <p>The aircraft planned to carry passengers and cargo Urengoy aerodrome to Vankor settlement and Suzun settlement with intermediate landings at R-404 for refueling helicopters with fuel.</p> <p>The cause of the crash was the loss of spatial orientation by the crew when trying to perform an emergency landing in night conditions with continuous cloud cover and the absence of light landmarks at the landing site. The need for an emergency landing was due to the small remaining fuel.</p> | | | | | | | | | | | | |
| 27 November 2016 | Mil Mi-17 | EP-HRB | Iran Amir Kabir, Mobile Offshore Drilling Unit, Caspian Sea near Behshahr | Iran | En Route | Spatial disorientation | Accident | CFIT | - | 5 | 0 | 5 |
| <p>The helicopter crashed into the sea during a night-time medivac flight to a mobile offshore drilling rig. The investigation found that the cause was disorientation and lack of situational awareness. The pilots failed to follow night flight procedures.</p> | | | | | | | | | | | | |
| 28 December 2016 | S-92A | G-WNSR | North Sea | United Kingdom | Landing – Approach | Component or system failure | Accident | SCF-NP | - | 11 | 0 | 0 |
| <p>The helicopter made a normal approach to the platform and crossed over the helideck. During the descent to land, the helicopter yawed rapidly to the right. At the same time it rolled to the left, at which point the left main undercarriage contacted the helideck. The helicopter continued to yaw to the right on its left main wheels and nose wheels before the right wheels contacted the helideck.</p> <p>An initial inspection of the helicopter's tail rotor found that the servo piston had been damaged and the tail rotor pitch change shaft (TRPCS) double row angular contact bearing 'was in a severely distressed condition'. It was found that the roller bearings had seized to the inner member. The outer race roller had excessive axial play (0.5 in), such that the tail rotor driveshaft imparted a torsional load to the tail rotor servo. This torsional load caused the primary piston rod to fracture inside the servo. Due to the failure of the primary piston, the secondary piston sleeve separated axially from the primary piston adjacent to the link fitting, with the consequential total loss of control of the tail rotor.</p> | | | | | | | | | | | | |
| 06 February 2017 | B206B | N978RH | Galveston, Texas | United States | En Route | Disorientation | Accident | UIMC | CFIT | 3 | 0 | 1 |
| <p>The non-scheduled passenger helicopter flight departed from an oil tanker ship that was anchored in a bay. The pilot reported that the departure had been delayed, but, when the helicopter did depart, the weather was "good." He said he had more than 6 miles visibility, that and he could see the moon above and the water below, and that his en route altitude was between 700 and 800 feet. He added that as the flight approached the shore at 500 feet, he could see the city lights and lights off the water. The next thing he remembered was being in the water. He and the two passengers were subsequently found by the US Coast Guard about 1 hour later. The nearest weather observation station, located 8 miles east of the accident site, reported an overcast ceiling of 400 feet and 5 miles visibility in mist about 17 minutes before the accident. TAFs and AIRMETS issued about 1.5 hours and 1 hour before the accident, respectively, forecast instrument meteorological conditions (IMC).</p> <p>Postaccident examination of the helicopter wreckage was consistent with a relatively level impact, and no pre-impact mechanical anomalies were noted that would have precluded normal operation. It is likely that the flight encountered IMC at night and that the pilot did not properly gauge the distance of the helicopter from the water, which led to its collision with the water.</p> | | | | | | | | | | | | |
| 27 February 2017 | B407 | N1371 | Timbalier Bay, LA | United States | Positioning | Collision with terrain | Accident | CFIT | - | 1 | 0 | 1 |
| <p>The commercial pilot was repositioning the helicopter from an offshore oil platform to the operator's home base in visual meteorological conditions. When the helicopter did not return as expected, the operator initiated a search; the helicopter wreckage was found in a shallow marsh area just off shore. No radio distress calls were received from the pilot, and the skid-mounted emergency float system was not deployed. Onboard flight-following equipment recorded a straight flight path tracking directly to the intended destination with a gradual descent just prior to impact. The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain proper altitude resulting in a collision with water for reasons that could not be determined based on the available information.</p> | | | | | | | | | | | | |

| Date | Type | Registration | Town | Country | Phase | Occurrence | Severity | CICTT categories | | Onboard | Injuries | Fatalities |
|---|----------|--------------|---|----------------------|--------------------|-----------------------------|----------|------------------|--------|---------|----------|------------|
| 01 March 2017 | S-76C++ | PR-MEY | Platform P-37, off Macae | Brazil | Landing | Unknown | Accident | ARC | TURB? | 10 | 4 | 0 |
| The helicopter crashed on landing on the Petrobras oil platform P37 in the Marlim Field in the Campas Basin off Macae, Brazil; coming to rest on its right side. | | | | | | | | | | | | |
| 15 April 2017 | S92 | PR-CHR | Oil rig SS86 , Campo de Buzios, Bacia de Santos | Brazil | Landing (offshore) | Collision with objects | Accident | CTOL | - | 21 | 0 | 0 |
| The helicopter was on a mission to transport several workers to the oil rig SS60 at Búzios Field in Santos Basin , Brazil. The tail rotor touched a mast near the heli pad and the helicopter subsequently made a hard landing. | | | | | | | | | | | | |
| 29 April 2017 | AW139 | A6-AWN | (near) Abu Dhabi | United Arab Emirates | En route | Landing off runway | Accident | SCF-NP | - | 3 | 0 | 0 |
| While en route the crew noted that the oil temperature indications for the main gearbox were rising and elected to alter course towards Mubarras Island. However, shortly after this, there was a 'loud grinding noise' from the upper deck and they decided to carryout an immediate precautionary landing in the sea about 4nm from land. The helicopter landed safely on its emergency floats and all occupants were quickly rescued; however, about three hours after the landing, the aft left float appears to have deflated and the helicopter rolled over to float inverted. The investigation identified that the MGB oil temperature increased because the MGB oil cooling fan failed due to bearing damage, which resulted in the loss of airflow through the oil cooler. | | | | | | | | | | | | |
| 02 May 2017 | Bell 407 | N457PH | (near) Venice | United States | En route | Component or system failure | Accident | SCF-NP | - | 6 | 0 | 0 |
| The pilot reported that, while en route, he detected an in-flight vibration and made a precautionary landing on an oil platform. As he was shutting down the engine, the vibration increased, and he initiated an emergency shutdown using the rotor brake. Post-accident examination revealed that a tip block and weights had separated from one of the tail rotor blades. Cracks were noted on the tail rotor gear box, which was detached from the tailboom support casting. The casting was entirely fractured. | | | | | | | | | | | | |
| 13 January 2018 | AS365N3 | VT-PWA | c.37 NM offshore Mumbai | India | En Route | - | Accident | UNK | - | 7 | 0 | 7 |
| The helicopter did not arrive at its destination, an ONGC offshore installation in the Indian Ocean. The wreckage has been located by sonar on the sea bed and the CVR recovered. | | | | | | | | | | | | |
| 13 January 2018 | B206-L4 | N174RL | c 80mi SSW of Houma | United States | En Route | - | Accident | UNK | - | 1 or 2 | 0 | 0 |
| Ditched in the Gulf of Mexico off Louisiana after a possible engine power loss. The two people on board were reportedly rescued uninjured. | | | | | | | | | | | | |
| 18 February 2018 | S-76C+ | N860AL | New Iberia | United States | Ground, Taxi | Broke through surface | Accident | ADRM | SCF-NP | 5 | 0 | 0 |
| The pilot reported that, while the copilot was taxiing the wheel-equipped helicopter to the runway for departure, he saw a "bump" on the concrete. The copilot reported that he attempted to stop before the "bump," which turned out to be a pothole, but the helicopter struck the pothole with the right main landing gear, which collapsed. The pilot and the copilot both reported that the taxi speed was less than 5 knots. The helicopter sustained substantial damage to the internal fuselage structure. | | | | | | | | | | | | |
| 17 April 2018 | B212 | EP-HUA | Persian Gulf | Iran | En route | Spatial disorientation | Accident | LOC-I | - | 4 | 0 | 4 |
| The aircraft was performing an unlicensed medevac from an offshore oil platform. After take-off from the platform the aircraft crashed into the sea due to spatial disorientation. | | | | | | | | | | | | |
| 04 August 2018 | Mi-8AMT | RA-25640 | 180km NW of Igarka | Russia | En route | Collision with aircraft | Accident | MAC | EXTL | 18 | 0 | 18 |
| The helicopter was totally destroyed by impact and post impact fire when it went out of control and crashed after its main rotors struck a sling load being transported by another Mil Mi-8 (RA-22427). Both helicopters were operating from the same site. All 15 passengers and 3 crew members on board were killed, the rotorcraft was destroyed and partially burned down. The other helicopter was not damaged and landed safely at the airfield. | | | | | | | | | | | | |
| 28 November 2018 | Mi-26T | RA-06029 | (near) Kharyaginsky | Russia | Landing – Approach | Unknown | Accident | ARC | - | 6 | 5 | 1 |
| The helicopter apparently landed hard and rolled over onto its left side while attempting to land at the Pizhma helipad near Kharyaginsky, Nenets Autonomous Region, Russia. The accident site is reportedly some 500m from the helipad. The helicopter is said to have made three attempts to land before it crashed. The accident happened in darkness (1546L) and in poor weather with reduced visibility and a low overcast ceiling, temperature -28C. The helicopter was returning to its operational base from a work site. The investigation is ongoing. | | | | | | | | | | | | |
| 16 December 2018 | Mi-8 | RA-22649 | Kedrovoy City Industrial Zone, Tomsk Oblast | Russia | Landing – Approach | Unknown | Accident | - | - | 25 | 4 | 0 |
| On 16.12.2018 on Kedrovoy landing site (Parabelsy District, Tomsk Region, RF), the accident with Mi 8T RA-22649 helicopter owned by Yeltsovka Aircraft enterprise CJSC occurred. According to the available information, 3 crew members and 22 passengers were on board. As a result of the accident 4 persons were injured, the helicopter was damaged. The investigation is ongoing. | | | | | | | | | | | | |

Appendix 4

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|--|--------|
| Abnormal Runway Contact | ARC |
| Abrupt Maneuver | AMAN |
| Aerodrome | ADRM |
| Airprox/TCAS Alert/Loss of Separation/Near Midair Collisions/Midair Collisions | MAC |
| ATM/CNS | ATM |
| Bird | BIRD |
| Cabin Safety Events | CABIN |
| Collision with Obstacle(S) During Takeoff And Landing | CTOL |
| Controlled Flight Into or Toward Terrain | CFIT |
| Evacuation | EVAC |
| External Load Related Occurrences | EXTL |
| Fire/Smoke (Non-Impact) | F–NI |
| Fire/Smoke (Post-Impact) | F–POST |
| Fuel Related | FUEL |
| Glider Towing Related Events | GTOW |
| Ground Collision | GCOL |
| Ground Handling | RAMP |
| Icing | ICE |
| Loss of Control–Ground | LOC–G |
| Loss of Control–Inflight | LOC–I |
| Loss of Lifting Conditions En Route | LOLI |
| Low Altitude Operations | LALT |
| Medical | MED |
| Navigation Errors | NAV |
| Other | OTHR |
| Runway Excursion | RE |
| Runway Incursion | RI |
| Security Related | SEC |
| System/Component Failure Or Malfunction (Non-Powerplant) | SCF–NP |
| System/Component Failure Or Malfunction (Powerplant) | SCF–PP |
| Turbulence Encounter | TURB |
| Undershoot/Overshoot | USOS |
| Unintended Flight In IMC | UIMC |
| Unknown or Undetermined | UNK |
| Wildlife | WILD |
| Wind Shear or Thunderstorm | WSTRW |

More details about the taxonomy and the categories can be found [here](#). This also includes guidance on how to apply the categories.

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