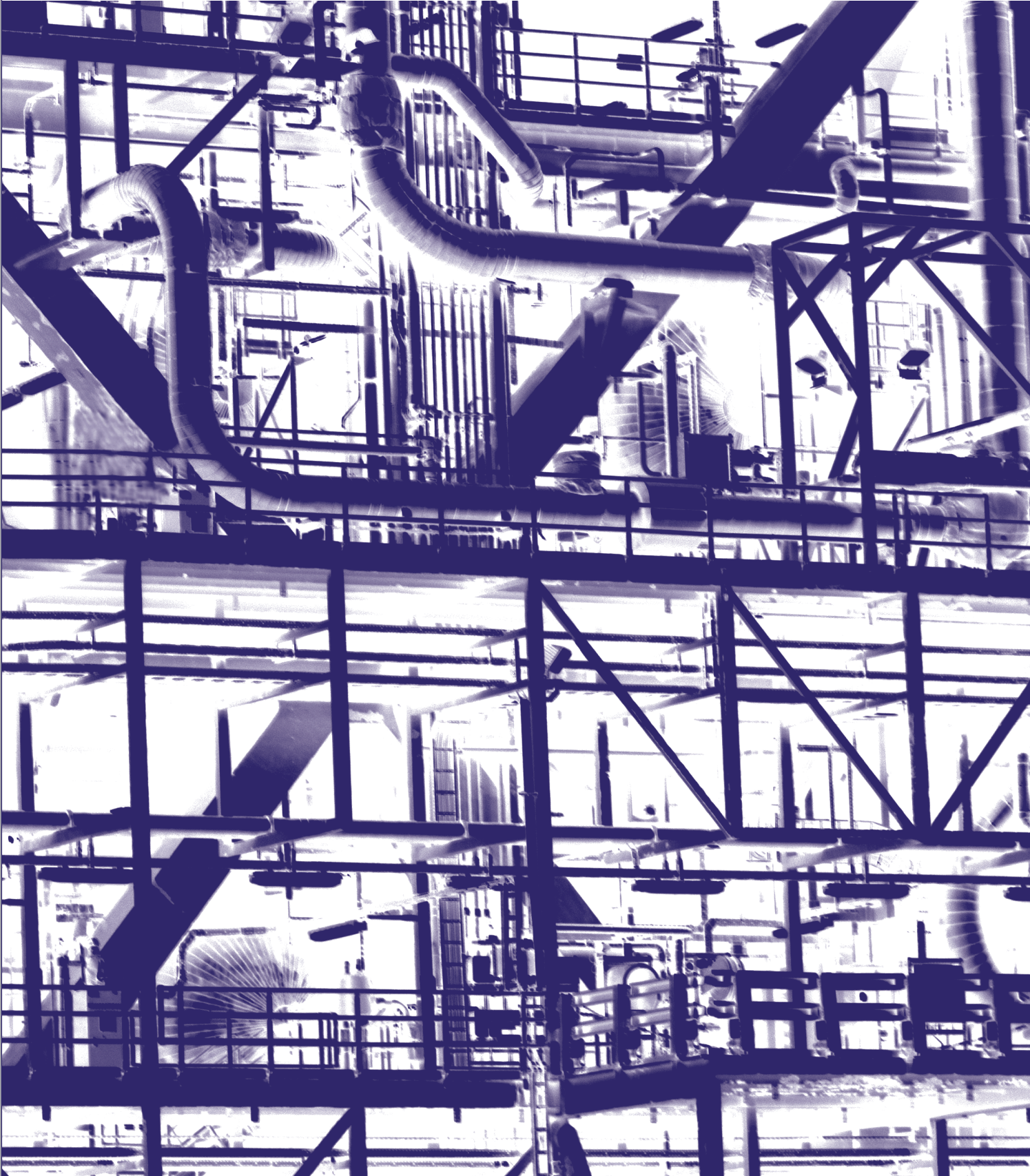


OIL&GAS^{UK}

HEALTH & SAFETY REPORT 2016





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1. Foreword

Welcome to the 2016 Oil & Gas UK *Health & Safety Report*. The publication captures key developments across health and safety in 2015 and provides explanatory commentary.

The report comes at a challenging time for the UK offshore oil and gas sector, which has had to find new ways of navigating through the downturn safely and efficiently. Regardless of the oil price, safe operations must remain at the heart of all that we do.

There were no reported fatalities in 2015 and personal safety performance on the UK Continental Shelf (UKCS) continued to improve. The over-seven-day and specified injuries rates per 100,000 workers decreased, while the sector's non-fatal injury rate is lower than many other industrial sectors in the UK economy, such as manufacturing and construction. The UKCS' lost time injury frequency is, meanwhile, lower than Norway, Denmark and Ireland, below the European average and only slightly behind the best performer in the region – The Netherlands.

That picture of improvement is echoed in the annual Oil & Gas UK benchmarking exercise that provides an overview of operator safety performance. Analysis of 28 production operators reveals a continuing downward trend in the frequency of reportable injuries and dangerous occurrences, with 2015 showing the lowest numbers since analysis began in 2006.

In process safety, year-on-year reductions are now being reported across planned, corrective and deferred safety-critical maintenance backlog. This is an area that has been – and remains – a key focus for industry.

The overall category of dangerous occurrences – such as hydrocarbon releases, fires or explosions, and dropped objects – also remains on a downward trend.

There has been a sharp decline in the total number of hydrocarbon releases since a peak in 2004. While major and significant releases remained low, a rise in the number of minor releases last year provides a specific area of opportunity for pan-industry focus.

In the last two years there were no reportable helicopter incidents on the UKCS. However, aviation safety is sadly once again to the fore following the Norway helicopter tragedy in April 2016, in which 13 people died. Work continues to further improve the safe movement of our offshore workforce.

All of these issues and more are covered by this report, which I hope you find interesting and informative. It should also provide reassurance that safe operations remain intrinsic regardless of the oil price. No matter the business climate, there must be no compromise or complacency.

The report also comes as industry awaits details of the UK's future relationship with Europe. However, our commitment to safety – and the environment – is key to our business and the referendum result and negotiations to come will not change that.

Any queries on content or feedback should be directed to Mick Borwell, Oil & Gas UK's health, safety and environment policy director on mborwell@oilandgasuk.co.uk.



Mick Borwell, Oil & Gas UK's Health, Safety and Environment Policy Director

2. Executive Summary

The UK offshore oil and gas industry is a major hazard sector and is committed to maintaining safe operations, protecting people, assets and the natural environment.

The Health and Safety Executive (HSE) regulates the industry within a legal framework that is regarded as world-class. Safety performance on the UK Continental Shelf (UKCS) is monitored using a range of metrics.

Personal Safety Performance¹

- Personal safety performance has continued to improve on the UKCS over the past 15 years. There were no reported fatalities in 2015 and the industry's three-year rolling average, non-fatal injury rate per 100,000 workers decreased by 24 per cent from 569 in 2008 to 430 in 2015.
- The UK offshore oil and gas industry's three-year average non-fatal injury rate in 2015 is lower than that of other industrial sectors such as manufacturing, transport/storage and construction.
- The UKCS' lost time injury frequency² (fatalities and lost work day cases per million man-hours) at 0.7 compares well with neighbouring oil and gas regions. This rate is lower than Norway, Denmark and Ireland, below the European average and only slightly behind the best performer in the region – The Netherlands.
- The over-seven-day injury rate in 2015 at just over 249 per 100,000 workers is at its lowest since it was first calculated in 1995-96. In 2015, 80 over-seven-day injuries were reported, with strains and sprains the most common causes.
- The specified injury rate per 100,000 workers decreased by 38 per cent from 2000-01 to 2012-13 and by 20 per cent between 2013 (129) and 2015 (103). Over the last four years, fractures have accounted for the highest number of specified injuries.

¹ Note this report covers a number of reporting periods with data taken from a variety of sources. More detail can be found in section 4 Figure 3.

² As reported in the International Association of Oil & Gas Producers' *Safety Performance Indicator Report 2014* www.iogp.org/pubs/2014s.pdf

Process Safety Performance

- Dangerous occurrences – such as hydrocarbon releases (HCRs), fires or explosions, dropped objects and weather damage – remain on a downward trend in the UK offshore oil and gas sector, with almost a 30 per cent fall between 2013 and 2015 from 425 occurrences to nearly 300.
- Since a peak in 2004, there has been a sharp decline of almost 70 per cent in the total number of HCRs from 273 to 87. The overall number of HCRs rose by almost nine per cent in 2015 due to the higher number of minor releases reported, while major and significant releases remained low.
- In 2015, the industry sought to reverse the increase in safety-critical maintenance man-hours in backlog of previous years, with year-on-year reductions now being reported across all three categories of planned, corrective and deferred backlog. This effort is supported by an increase of 2.6 per cent (125 workers) in the number of core maintenance crew working offshore over the first five months of 2016 compared to the same period in 2014.

Operator Safety Performance Benchmarking

- Each year, Oil & Gas UK carries out a benchmarking exercise for participating duty holders to gain an overview of their safety performance. Analysis of 28 operators reveals a continuing downward trend in the frequency of reportable injuries and dangerous occurrences, with 2015 seeing the lowest numbers since the analysis was first carried out in 2006. The reportable injury frequency has declined by 58 per cent since 2006 to an average of 1.54, while the dangerous occurrence frequency has fallen by 47 per cent to five.
- Specified injuries fell by six per cent, over-seven-day injuries by 34 per cent and dangerous occurrences by 14 per cent from 2014 to 2015.

Offshore Helicopter Safety in the UK

- In the last two years, there have been no reportable helicopter accidents on the UKCS. The accident rate data show that the five-year average for fatal accidents consistently sits on or below 0.6 per 100,000 flying hours.

Oil & Gas UK

- In 2015, Oil & Gas UK worked with its members to share good practice and lessons learnt on topics such as maintenance optimisation, fire and explosion, unmanned aerial systems (commonly referred to as drones) and aviation.
- The association also worked on a number of significant issues and activities affecting industry, including implementation of the EU Offshore Safety Directive; the Prevention of Fire and Explosion, and Emergency Response on Offshore Installation Regulations; changes to the offshore basic safety induction and emergency training standards; improvements in the quality of accident and failure frequency data; and encouraging joint aviation audits to reduce the administrative burden on helicopter operators.

3. Health

It is important to manage the health and well-being of the offshore workforce effectively, particularly given the remoteness of the worksite. It is Oil & Gas UK’s policy that all persons working offshore are examined regularly by a medical professional and deemed medically fit before travelling offshore. A suite of occupational health-related legislation also applies offshore. This section explores health-related activities and relevant offshore data.

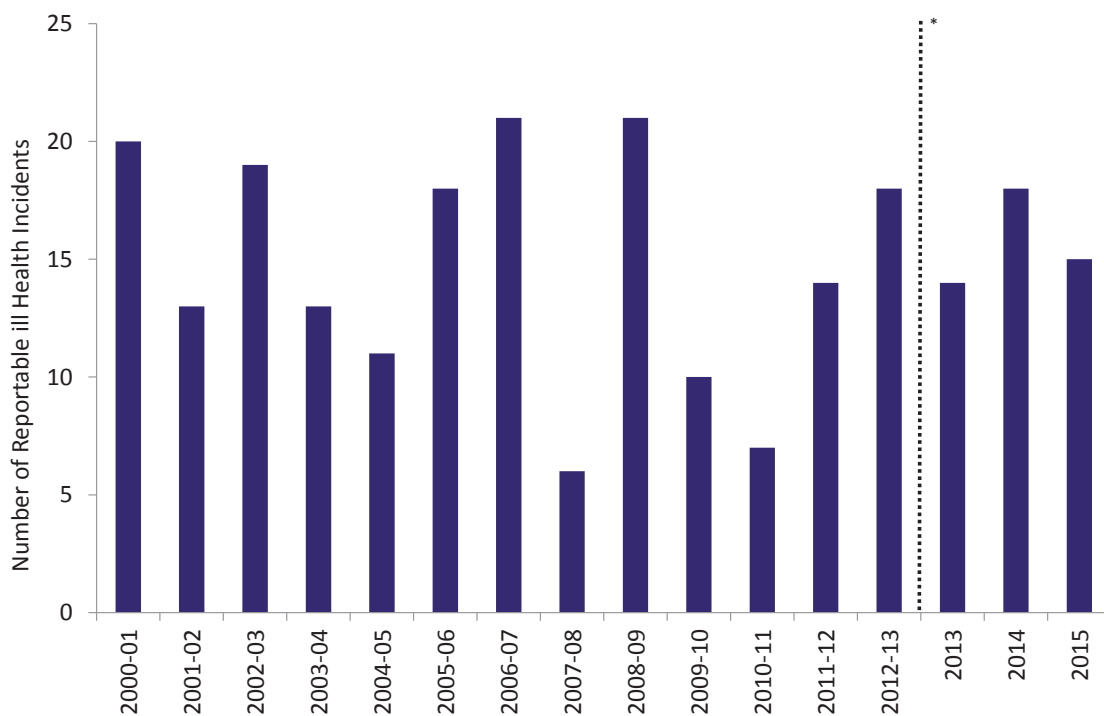
3.1 Occupational Health and Hygiene

The number of reported incidents of ill health offshore has fluctuated over the years. There were only 47 incidents of ill health reported between 2013 and 2015. The largest number (40 per cent) were due to viral or bacterial conditions such as chickenpox or mumps, while musculoskeletal (e.g. hand-arm vibration) and occupational skin conditions make up the remaining incidents. Cardiovascular disease (heart attacks and, increasingly, strokes) continues to be the leading cause for medical emergencies on offshore installations.

Oil & Gas UK’s Occupational Health and Hygiene Technical Group works to raise the profile of health and hygiene related issues offshore and shares learnings and good practice in managing them. The group also provides a platform for industry engagement with the regulators and supports regulatory compliance to improve occupational health management.

To ensure consistent quality in the delivery of healthcare offshore, the group has proposed developing an industry training and competence standard for offshore medic competency assurance. It is collaborating with OPITO – the Offshore Petroleum Industry Training Organisation – to create such a standard.

Figure 1: Number of RIDDOR³ Reported ill Health Incidents



*Period of reporting changed from fiscal to calendar year

Source: The Health and Safety Executive

³ Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR).

3.2 Examining Doctors' Assessments and Training

Each year, doctors carry out medical assessments of offshore oil and gas employees around the globe using the Oil & Gas UK *Medical Aspects of Fitness for Offshore Work: Guidance for Examining Physicians*⁴. The doctors are asked to submit a statistical return, indicating the total number of medicals they have performed and the number of cases in which individuals have failed to pass their assessments. The number of medicals performed has exceeded 100,000 in each of the past three years and has almost trebled in less than a decade. The failure rate has been fairly consistent, between 1 and 1.4 per cent each year.

Figure 2: Examining Doctors' Statistics

Year	Total Number of Medicals Conducted	Percentage of Medicals Failed (Total Number)
2010	56,850	1.4 (784)
2011	59,900	1.1 (665)
2012	93,219	1.4 (1,284)
2013	113,006	1.2 (1,333)
2014	118,597	1.1 (1,285)
2015	111,651	1 (1,125)

The most common causes for individuals failing these assessments are related to cardiac disease, diabetes, drug abuse, weight, hypertension and respiratory disease, and these have been consistent over a number of years.

Almost three per cent of the total Oil & Gas UK medical certificates issued in 2015 were restricted, that is the certificate was valid for one (or more) named installation(s) only and issued only after discussion with the operator of the installation(s) concerned. The top three causes for restricted medical certificates are related to weight, diabetes or cardiovascular conditions.

To join the Oil & Gas UK list of examining doctors, medical professionals must complete the association's Introduction for Oil & Gas UK Registered Doctors course. This training course is designed to give delegates knowledge of life and work offshore so that they have a better understanding of the standard of medical fitness required. The course involves an underwater helicopter training exercise. In 2015, 170 doctors were trained through 11 workshops.

Oil & Gas UK also annually runs an Examining Doctors Conference to bring together registered doctors from across the world, providing them with essential updates and networking opportunities. Over 100 doctors from 31 countries attended the 2015 conference.

⁴ The *Medical Aspects of Fitness for Offshore Work: Guidance for Examining Physicians* is available to download at <http://bit.ly/medicalguidelines>

4. Safety Performance

The UK offshore oil and gas sector is a major hazard industry and is committed to maintaining safe operations, protecting people, assets and the natural environment. Safety is embedded in all it does and the sector continually strives to improve personal and process safety.

The industry has made significant strides over the last few decades. Following the Piper Alpha incident in 1988, the *Cullen Report* led to the creation and implementation of a legislative safety regime in the UK that is generally regarded as one of the best in the world. It introduced a number of improvements across barriers associated with people, plant and process:

- **People** – stronger focus on safety leadership, greater workforce engagement and a legal requirement for elected safety representatives
- **Plant** – improved installation design using robust codes and standards, introduction of the concept of safety-critical equipment and third party verification
- **Process** – requirement for an installation to have a safety case that is accepted by the regulator and demonstrates how the operator manages and controls major accident hazards

This regime was further strengthened after the Deepwater Horizon incident in the Gulf of Mexico in 2010, when the European Commission responded by publishing the EU Offshore Safety Directive in July 2013 (see section 5.1 for more details on the Directive)⁵. A large proportion of the Directive's requirements were already embedded in the UK's existing regulatory framework, although it did prompt an update to the Safety Case Regulations.

It is apparent from the industry's recent safety performance outlined in this section that the solid regulatory framework has had a positive impact, in terms of the number and severity of incidents occurring offshore in the UK.

This section outlines key aspects of the UK offshore oil and gas industry's safety performance using different metrics and a range of reference sources. Please note that the data sets cover different reporting periods based on the latest information available and these are stipulated on the individual charts.

⁵ As Oil & Gas UK went to print with this report, the UK voted to leave the EU. Oil & Gas UK will work with its members to make this transition as smooth as possible and to maintain our world-class and robust safety regime on the UK Continental Shelf.

Figure 3 provides an overview of the data sources and reporting periods covered in this section.

Figure 3: Summary of Data Category, Reporting Period and Data Source

Data Category	Reporting Period	Data Source
Non-Fatal Injury Rate per 100,000 Workers	2012-15	Health and Safety Executive
Over-Seven-Day, Specified and Fatal Injury Rate per 100,000 Workers	2014-15	Health and Safety Executive
Lost Time Injury Frequency	2014	International Association of Oil & Gas Producers
Number of Dangerous Occurrences	2014-15	Health and Safety Executive
Number of Hydrocarbon Releases	2014-15	Health and Safety Executive
Operators' Reportable Injury Frequency (Benchmarking)	2015	Health and Safety Executive, Vantage Personnel on Board and Oil & Gas UK
Operators' Dangerous Occurrence Frequency	2015	Health and Safety Executive, Vantage Personnel on Board and Oil & Gas UK

4.1 Health and Safety Statistics

In the UK, the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)⁶ requires employers and individuals in control of work premises, such as offshore installations, to report certain workplace accidents, occupational diseases and specified dangerous occurrences. Duty holders offshore must report these to the Health and Safety Executive (HSE). In this publication, the following types of incidents as defined by RIDDOR are examined:

- **Fatalities** – all deaths that arise from a work-related accident
- **Over-Seven-Day Injuries** – accidents that cause an employee to be away from work or unable to perform their normal work activities for more than seven consecutive days
- **Specified Injuries** – as listed in Regulation 4 of RIDDOR 2013 and including injuries such as fractures (other than to fingers, thumbs and toes) and amputations
- **Dangerous Occurrences** – certain specified events, such as hydrocarbon releases (HCRs), fires or explosions, dropped objects and weather damage

⁶ RIDDOR is available to view at www.hse.gov.uk/riddor

4.1.1 Personal Injuries and Fatalities

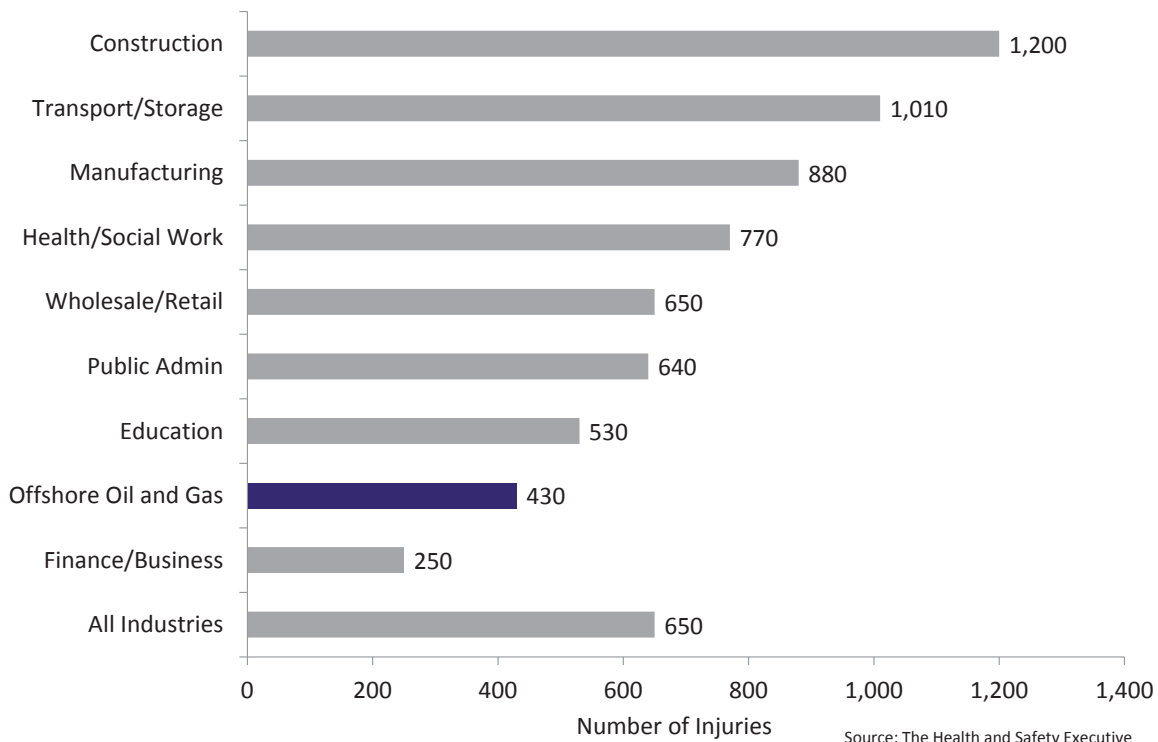
Despite being a major hazard industry, the UK offshore oil and gas sector has a relatively low personal injury rate in comparison to many other sectors in the UK and it is below the UK's all industries' average (see figures below and opposite).

The non-fatal injury rate is based on the over-seven-day and specified injury rate as well as population figures reported in the HSE's annual *Offshore Statistics and Regulatory Activity Report*. The offshore population figures are taken from the Vantage Personnel On Board (POB) tracking system, while the figures for other industries come from the UK's Annual Population Survey⁷ that is based on the Labour Force Survey (LFS)⁸.

The UK offshore oil and gas sector's three-year average non-fatal injury rate per 100,000 workers is almost one third that of the construction industry (see Figure 4 below). The three-year rolling average for the offshore sector, meanwhile, is on a continuous downward trend, plateauing off over the last two reporting periods as illustrated opposite. The rate has fallen by 24 per cent from 569 in 2008 to 430 in 2015, compared to the construction industry, for example, which has seen an increase in the same period.

Favourable performance compared to other sectors reflects well on the industry's unstinting efforts to manage hazards and continually improve safety performance, underpinned by a robust and effective regulatory regime.

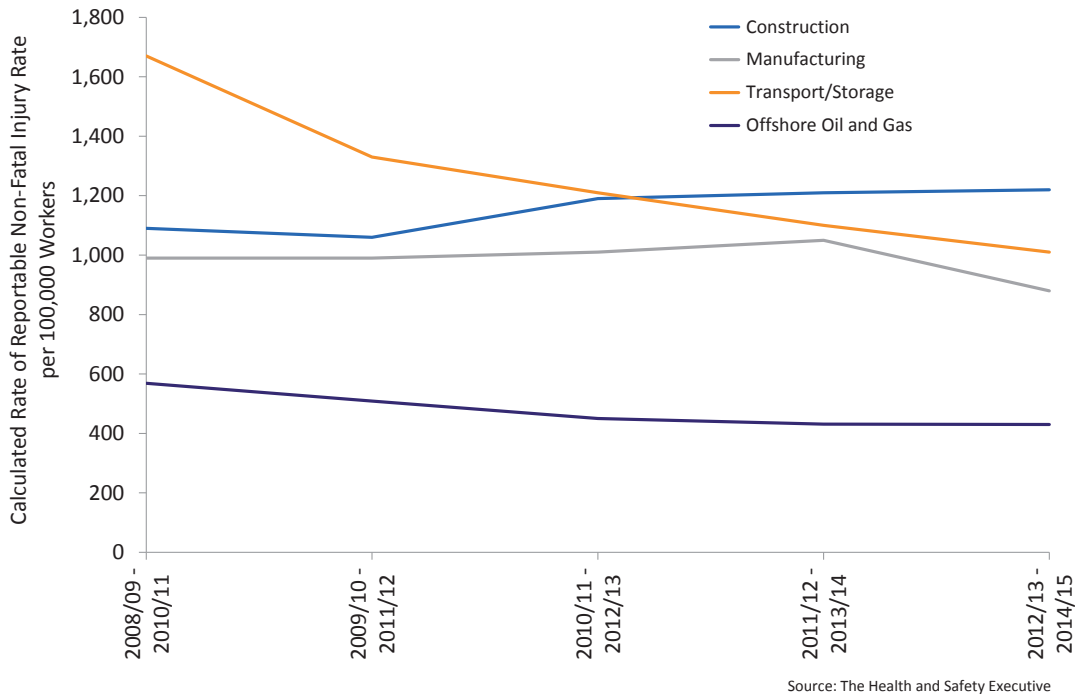
Figure 4: The Three-Year Average (2012 to 2015) Non-Fatal Injury Rate by UK Industry Sector per 100,000 Workers



⁷ See www.nomisweb.co.uk/articles/873.aspx

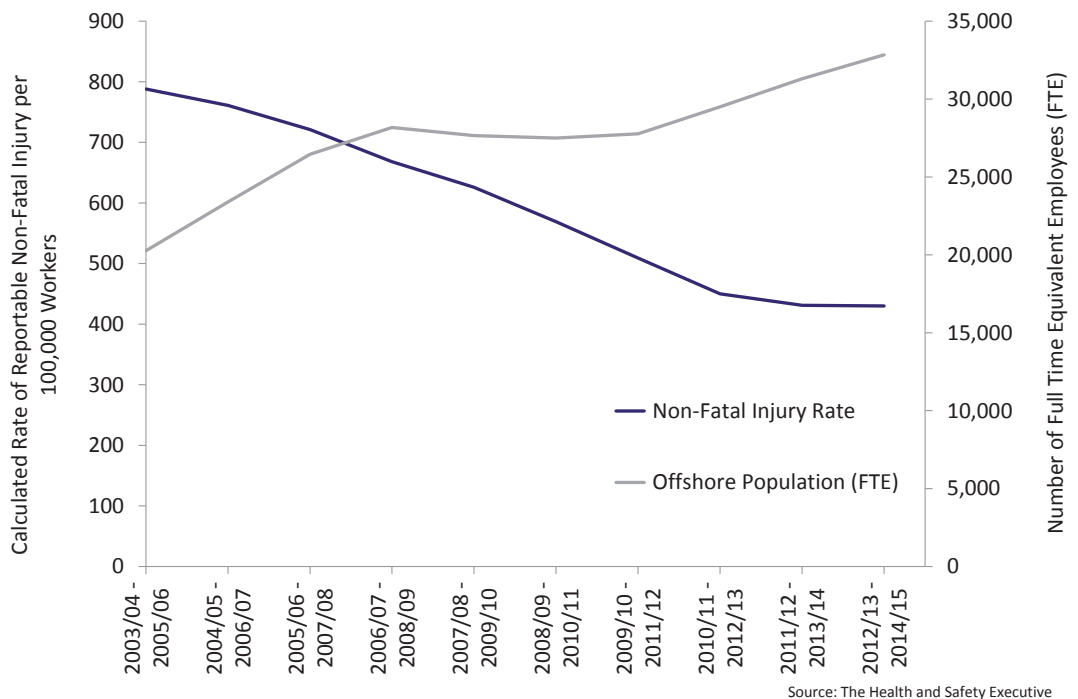
⁸ See <http://bit.ly/1YubdYA>

Figure 5: The Three-Year Rolling Average Non-Fatal Injury Rate per 100,000 Workers for the UK Offshore Oil and Gas Sector Compared with other UK Industry Sectors



Furthermore, Figure 6 below illustrates that, since 2003, the offshore oil and gas industry non-fatal injury rate has steadily declined by about 46 per cent in comparison to an increase in the offshore population by 62 per cent.

Figure 6: The Three-Year Rolling Average Non-Fatal Injury Rate per 100,000 Workers and Population for the UK Offshore Oil and Gas Sector



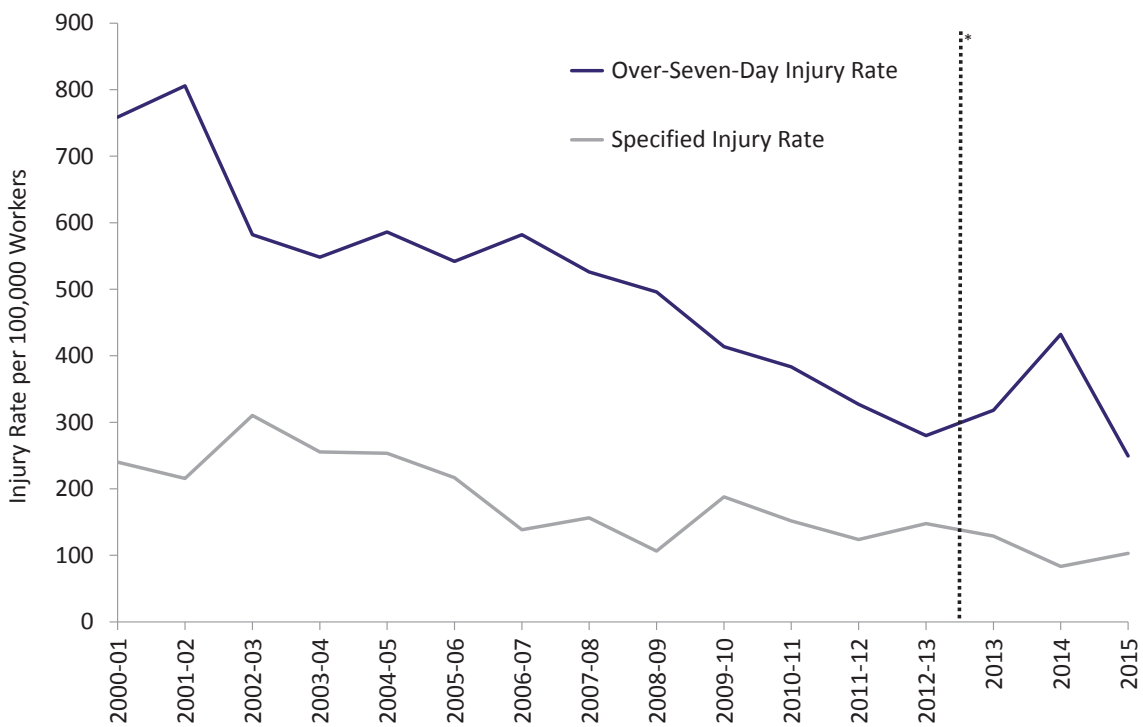
The breakdown of over-seven-day and specified injuries per 100,000 workers is given below. It is important to note that there were some key changes to the RIDDOR reporting requirements that may have impacted the statistics:

- From April 2012, over-seven-day rather than over-three-day injuries are reported
- From October 2013, specified injuries replaced the previous major injury category and some of the dangerous occurrence descriptions changed

The over-seven-day injury rate in 2015 per 100,000 workers at 249 is at its lowest since it was first recorded in 1995-96. In 2015, 80 over-seven-day injuries were reported, with strains and sprains the most common causes. There was a slight increase from 2013 to 2014 that could be attributed to the change in RIDDOR definitions, but the overall trend remains downward as the rate fell further by 42 per cent from 432 in 2014 to 249 in 2015.

The specified injury rate decreased by 38 per cent from 2000-01 to 2012-13 and by 20 per cent between 2013 (129) and 2015 (103).

Figure 7: Over-Seven-Day and Specified Injury Rate per 100,000 Workers



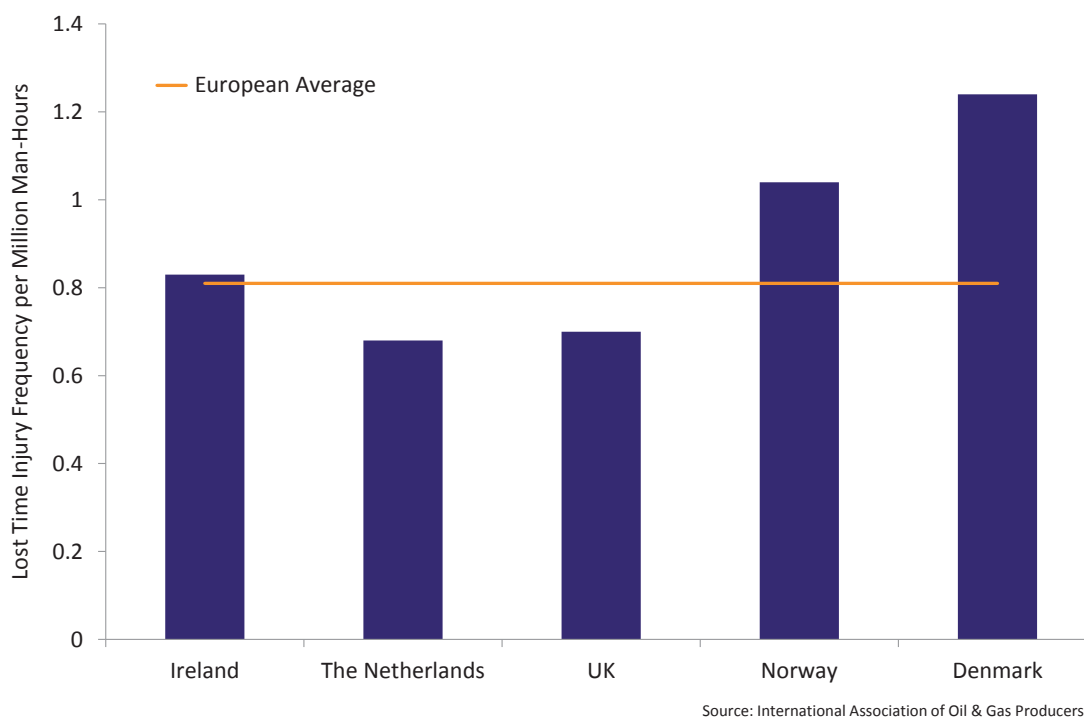
*Period of reporting changed from fiscal to calendar year

Source: The Health and Safety Executive

Worldwide comparative accident statistics are published by the International Association of Oil & Gas Producers (IOGP). The IOGP incident reporting system covers global exploration and production operations, both onshore and offshore, and includes incidents involving both IOGP members and their associated contractors. Data are provided to the IOGP on a voluntary basis and validated by the association’s Safety Committee.

Figure 8 compares the UK's lost time injury frequency (fatalities plus lost work day cases per million hours worked) with neighbouring oil and gas regions. The UK compares well, with a rate of 0.7 that is lower than the European average and only slightly behind the best performer, The Netherlands. Apart from a slight increase in 2011, the UK frequency has been declining for a number of years.

Figure 8: Lost Time Injury Frequency for Oil and Gas Sectors Surrounding the UK in 2014



There was one fatality in the UK offshore oil and gas sector in the reporting period 2014-15 that occurred on 4 September 2014 due to a fall from height. In 2015, no fatalities were reported. These figures are based on work activities while on an installation and do not include helicopter incident figures, which are covered in section 6.

Figure 9 shows that the industry reported eight fatalities in the last ten years, compared with 22 in the previous ten-year period. No fatality is ever acceptable and the industry's continuous efforts to protect its workers from harm have helped to reduce these incidents in the last decade.

Figure 9: Number of Fatalities

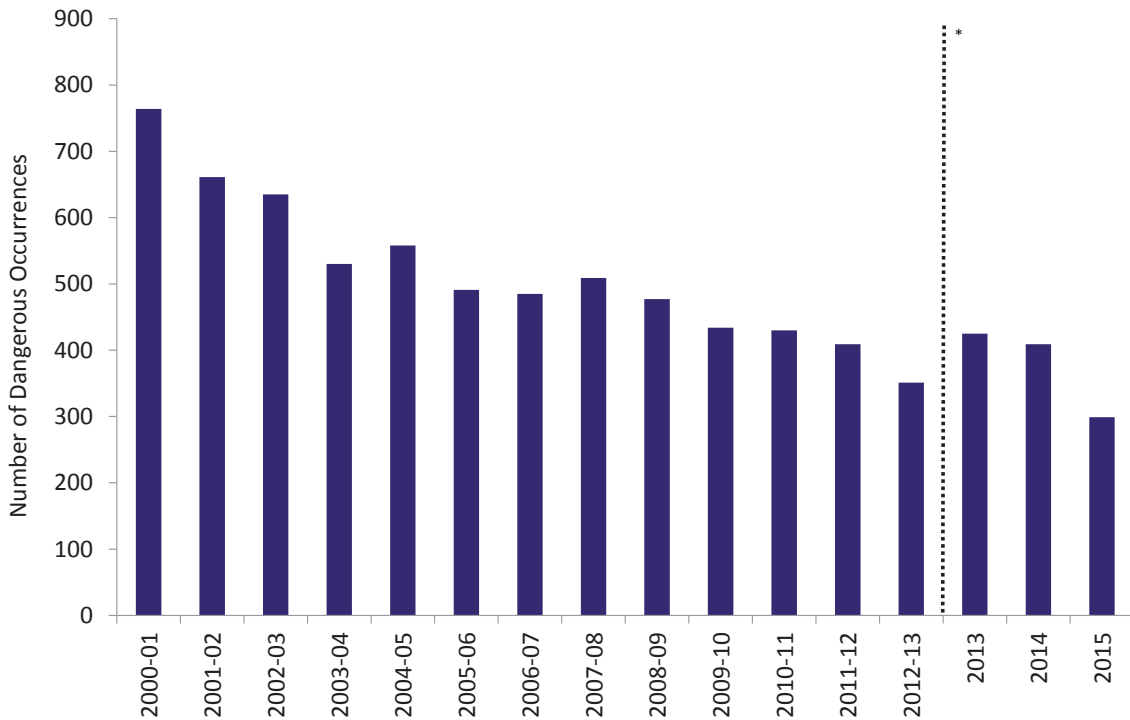
Year	Number of Fatalities	Year	Number of Fatalities
2014-15	1	2004-05	0
2013-14	1	2003-04	3
2012-13	0	2002-03	0
2011-12	2	2001-02	3
2010-11	0	2000-01	3
2009-10	0	1999-00	2
2008-09	0	1998-99	1
2007-08	0	1997-98	3
2006-07	2	1996-97	2
2005-06	2	1995-96	5

4.1.2 Dangerous Occurrences

Dangerous occurrences are events that have the potential to cause death or serious injury. A specific list of dangerous occurrences reportable for the offshore industry is published in Schedule 2⁹ of RIDDOR.

From 2000-01 to 2012-13, there was a 54 per cent decrease in the total number of reportable dangerous occurrences offshore, and between 2013 and 2015 there has been a further decline of almost 30 per cent from 425 occurrences to nearly 300. The numbers of wells and pipelines related dangerous occurrences have continued to decrease since 2013, with the number of wells incidents dropping from 51 to 26 and pipeline incidents falling from 51 to 38. HCRs are looked at in more detail in section 4.1.3.

Figure 10: RIDDOR Reportable Dangerous Occurrences



*Period of reporting changed from fiscal to calendar year

Source: The Health and Safety Executive

⁹ See www.legislation.gov.uk/ukxi/2013/1471/schedule/2/made

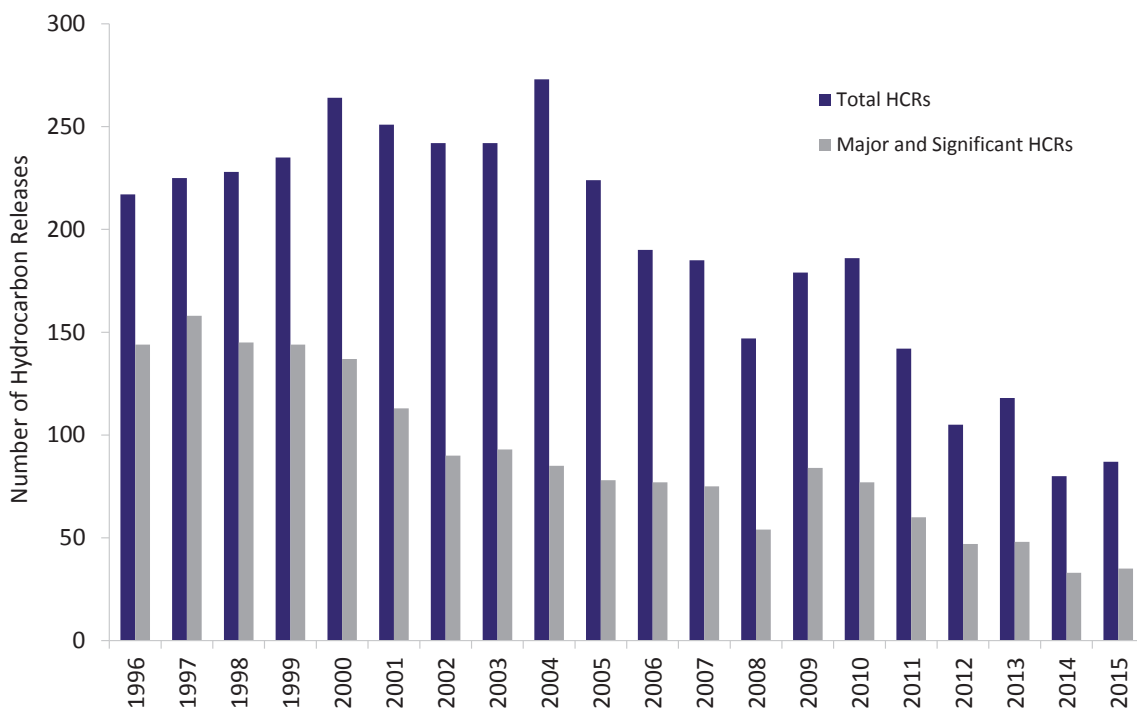
4.1.3 Hydrocarbon Releases

The HSE set up the HCR reporting scheme in 1992 in response to Lord Cullen’s recommendation following the Piper Alpha disaster. Data are supplied to the HSE by duty holders of offshore installations and relate to incidents that are reportable under RIDDOR. HCRs are classified as major, significant or minor¹⁰ based on their potential to cause a major accident if ignited.

Since a peak in 2004, there has been an overall sharp decline in the total number of HCRs by almost 70 per cent from 273 to 87. 2015 saw a nine per cent increase in total HCRs on the previous year, the majority of which were minor releases. Major releases remained unchanged at three.

The fact that HCRs remain largely minor reflects the many control measures employed to respond to and limit the effect of releases. It should be noted that in the second half of 2015, the EU Implementing Regulation introduced new reporting criteria and this may have contributed to the increased number of minor releases, which were not deemed reportable under previous legislation. Oil & Gas UK will analyse the HCRs further to determine any common or recurrent issues where improvement efforts may be focused.

Figure 11: Number of Hydrocarbon Releases Occurring Offshore



Source: The Health and Safety Executive

¹⁰ The definitions of HCR severities can be found on the HSE website at https://www.hse.gov.uk/hcr3/help/help_public.asp#Severity

4.2 Operator Safety Performance Benchmarking

Each year Oil & Gas UK carries out a benchmarking exercise for participating duty holders to gain an overview of their safety performance. This is conducted on an anonymous basis with each company allocated a letter. The participating company receives their individual results.

Figure 12: Companies Participating in the Benchmarking Exercise

Participating Companies	
Apache North Sea	Fairfield Energy Ltd
BG Group Plc	GDF Suez E&P UK Ltd
Bluewater Services UK Limited	Maersk Oil North Sea UK Ltd
BP Exploration Operating Company Ltd	Marathon Oil UK Ltd
BW Offshore UK	Nexen CNOOC UK Ltd
Centrica Energy Upstream	Perenco UK Limited
Centrica Storage Ltd	Petrofac Facilities Management Ltd
Chevron North Sea Ltd	Premier Oil UK Limited
CNR International UK Limited	Shell UK Limited
ConocoPhillips UK Limited	Talisman-Sinopec Energy UK Ltd
Dana Petroleum Plc	TAQA Bratani Limited
ENI Liverpool Bay Operating Company	Teekay Petrojarl
EnQuest Plc	Total E&P UK Limited
E.ON E&P UK Limited	Wood Group PSN Ltd

N.B. It is important to note that companies are listed above in alphabetical order and this does not correspond to letters allocated to companies in the performance charts in Figure 14.

The benchmarking process uses incident data from the HSE and man-hour data from the Vantage POB tracking system and covers the calendar year. The injury rates are then calculated per million man-hours based on a 12-hour working day as illustrated in Figure 13 below.

Figure 13: Oil & Gas UK's Safety Performance Benchmarking Calculations

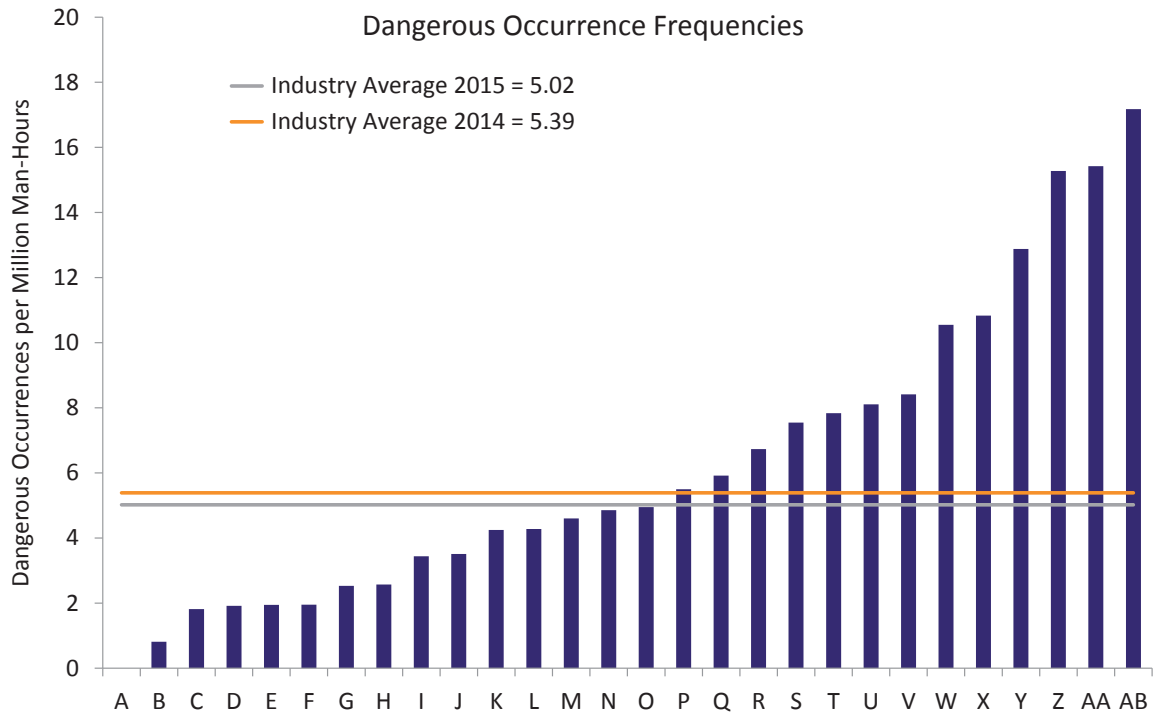
$$\frac{\text{Number of Incidents}}{\text{Daily POB Figure}} \times 1,000,000$$

The benchmarking process covers the RIDDOR reportable injury frequencies (fatal, specified and over-seven-day) and reportable dangerous occurrence frequencies.

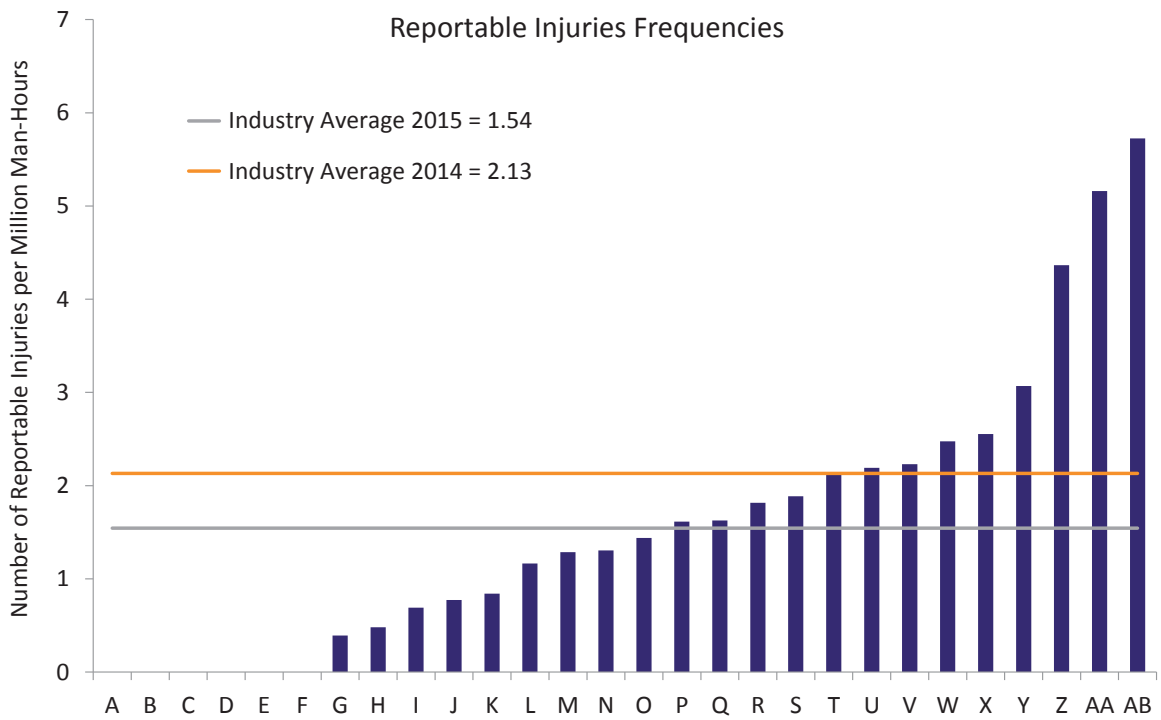
2015 saw the lowest recorded industry average of reportable injuries and dangerous occurrences since Oil & Gas UK first carried out the operator benchmarking analysis in 2006. The reportable injury frequency has declined by 58 per cent since 2006 to 1.54 while the dangerous occurrence frequency has fallen by 47 per cent to five.

Fifteen of the 28 participating operators performed better than the industry average in 2015. It should be noted however that it is not the same 15 operators in each category in the figures opposite.

Figure 14: Production Installation Operators' Safety Performance Benchmarking Results



Source: Health and Safety Executive, Vantage POB and Oil & Gas UK



Source: Health and Safety Executive, Vantage POB and Oil & Gas UK

The table below shows the incident numbers and man-hours over a five-year period. There is improvement across all categories from 2014 to 2015. There were no fatalities in 2015, over-seven-day injuries fell by 34 per cent, dangerous occurrences fell by 14 per cent, and major/specified injuries fell by six per cent.

Figure 15: Reportable Incidents

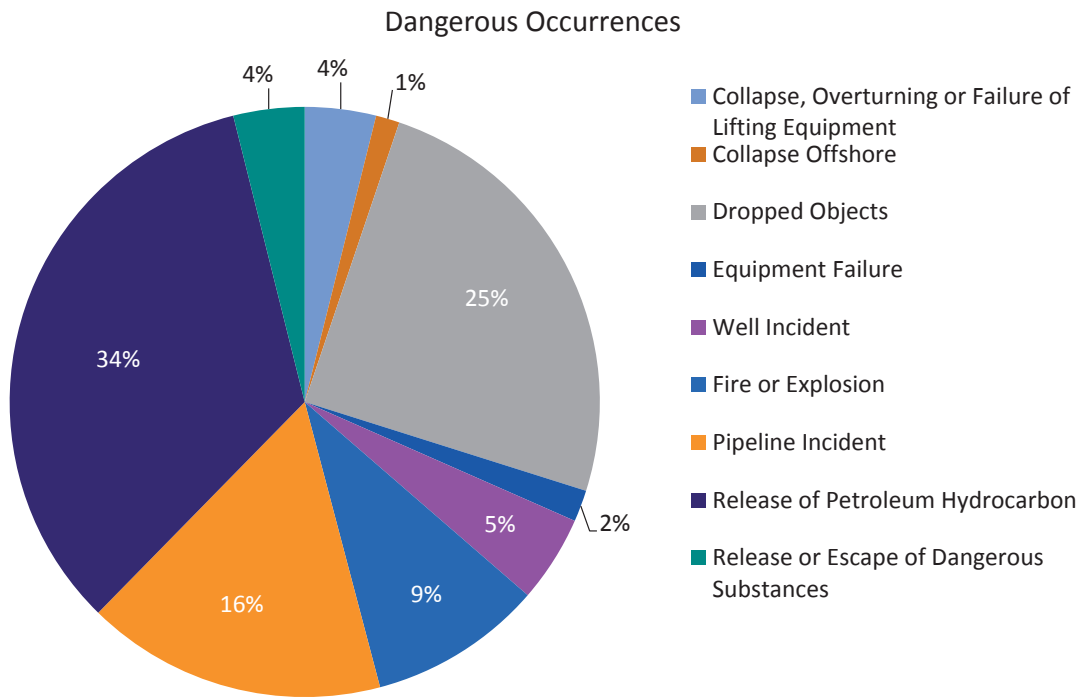
Year	Number of Reporting Companies	Fatalities	Major/ Specified Injuries	Over-Seven-Day Injuries	Dangerous Occurrences	Man-Hours
2011	28	2	25	72	347	45,081,195
2012	26	0	27	70	260	51,339,945
2013	28	0	32	81	316	56,695,543
2014	31	2	16	103	306	56,793,896
2015	28*	0	15	68	262	53,778,551

*The reduction in the number of participating companies is due to companies no longer operating in the UK sector and Britannia Operator Ltd data now being included under ConocoPhillips UK Ltd.

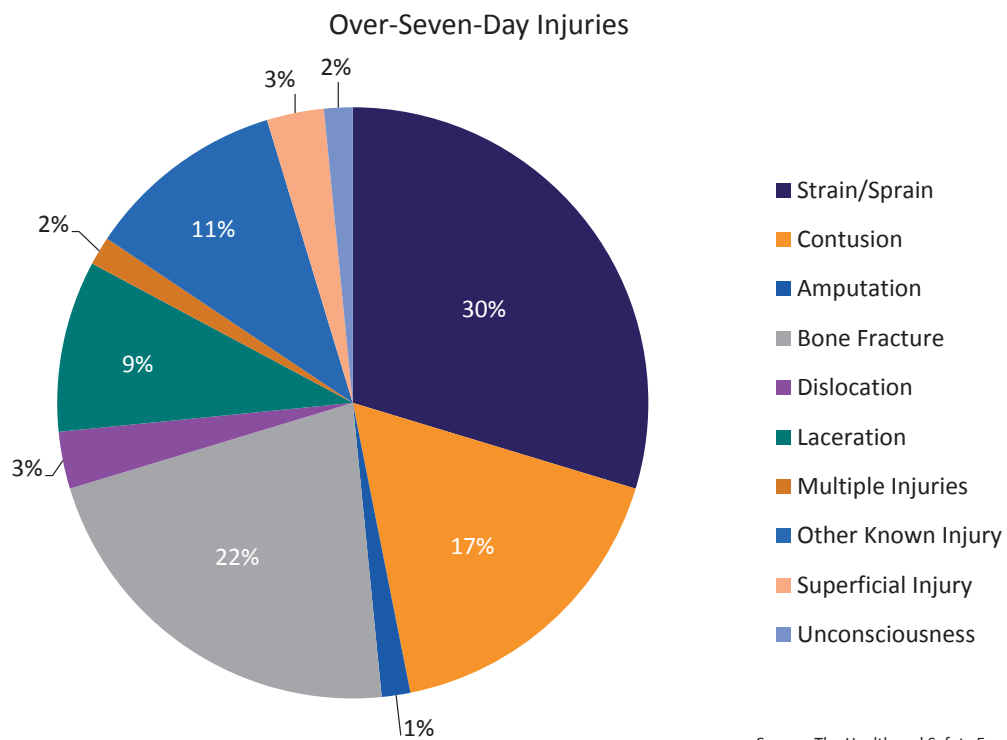
Figure 16 breaks down each of the reporting categories revealing that:

- The three largest dangerous occurrence categories are HCRs, dropped objects and pipeline-related incidents.
- Strains/sprains, contusions and bone fractures are the most common causes of over-seven-day injuries.
- Bone fractures are the main reported reason for specified injuries, with the majority affecting hands and wrists following slips, trips and falls or from lifting and handling activities.

Figure 16: Breakdown of Reportable Incidents in 2015

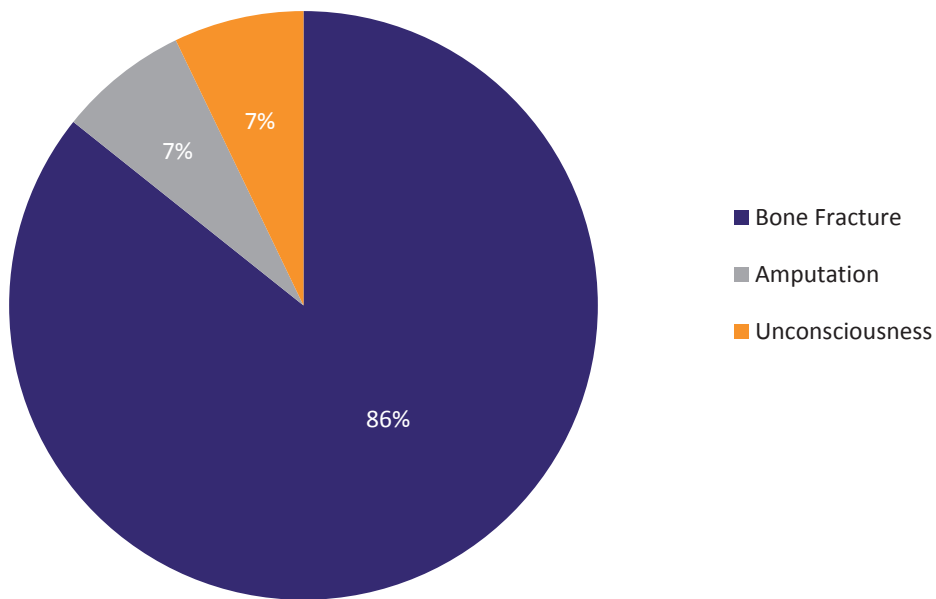


Source: The Health and Safety Executive



Source: The Health and Safety Executive

Specified Injuries



Source: The Health and Safety Executive

4.3 Asset Integrity Key Performance Indicators

Since 2000, the HSE has specifically focused on reducing HCRs (Key Programme 1). This was followed by a wider focus on asset integrity (Key Programme 3).

The HSE's Key Programme 3 (KP3) inspection programme on asset integrity management ran from 2004 through to 2007. It defined asset integrity as "the ability of an asset to perform its required function effectively and efficiently while protecting health, safety and the environment". Asset integrity management was defined as "the means for ensuring that the people, systems, processes and resources that deliver integrity are in place, in use and will perform on demand over the whole life cycle of the asset".

One of the many responses from the UK offshore oil and gas industry to KP3 was to develop and implement asset integrity related leading key performance indicators (KPIs) that would consistently demonstrate industry progress over time, complementing the HCR statistics described in section 4.1.3.

In 2009, the industry set up an asset integrity KPI scheme with the data provided by Oil & Gas UK member companies on a voluntary basis at the end of every quarter. KPI-1 looks at HCRs as covered in section 4.1.3, while KPI 2 and 3 are discussed in the sections opposite.

4.3.1 KPI-2 Verification Non-Compliance

Lord Cullen's inquiry and report into the Piper Alpha disaster raised a number of recommendations for identifying and managing hazards that could lead to major accidents.

The Offshore Safety Case¹¹ regime requires operators and installation owners to identify and maintain safety and environmental critical elements (SECEs) and to have these verified by an Independent Competent Person (ICP) as being suitable for their intended purpose as defined by the performance standard. The ICP must report any deficiencies in relation to the performance standards or the verification scheme itself. Findings raised by the ICP are ranked as levels 1, 2 or 3 depending on their severity.

The industry asset integrity scheme KPI-2 monitors and measures non-compliances under levels 2 and 3 as they are the more significant findings. At the end of 2015, the average number of open (unresolved) level 2 findings per installation was nine – slightly higher than the seven at the end of 2014. On a quarterly basis, the average number of level 2 findings that are raised and closed has remained consistent since 2011 sitting at around two to three per quarter.

Level 3 findings relate to more serious matters raised by the ICP. As such, findings are relatively rare and the number per installation is small. The total number across all participating installations is monitored and reported. At the end of 2015, there were a total of 11 unresolved findings across approximately 180 installations.

4.3.2 KPI-3 Safety-Critical Maintenance Backlog

KPI-3 produces a record of safety-critical (SC) maintenance backlog in three distinct categories:

- Planned SC maintenance that has passed its scheduled completion date and is now overdue
- Corrective maintenance backlog where equipment undergoing SC maintenance has been found to be in need of some form of recertification or repair
- Deferred maintenance where SC maintenance has passed its planned completion date and been rescheduled following a robust deferral assessment

Figure 17 overleaf is a high level snapshot of industry performance in this area. As can be seen, backlog man-hours increased significantly from mid-2013 to the end of 2014 and that prompted increased cross-industry focus to reverse this trend. Operators carried out structured reviews of maintenance practice to improve equipment reliability and contribute to a marked reduction in backlog. See section 9.2 for more on maintenance optimisation and a drive to share best practice in this area to ensure that those maintenance regimes are fit for purpose and support safe, reliable and sustainable operations.

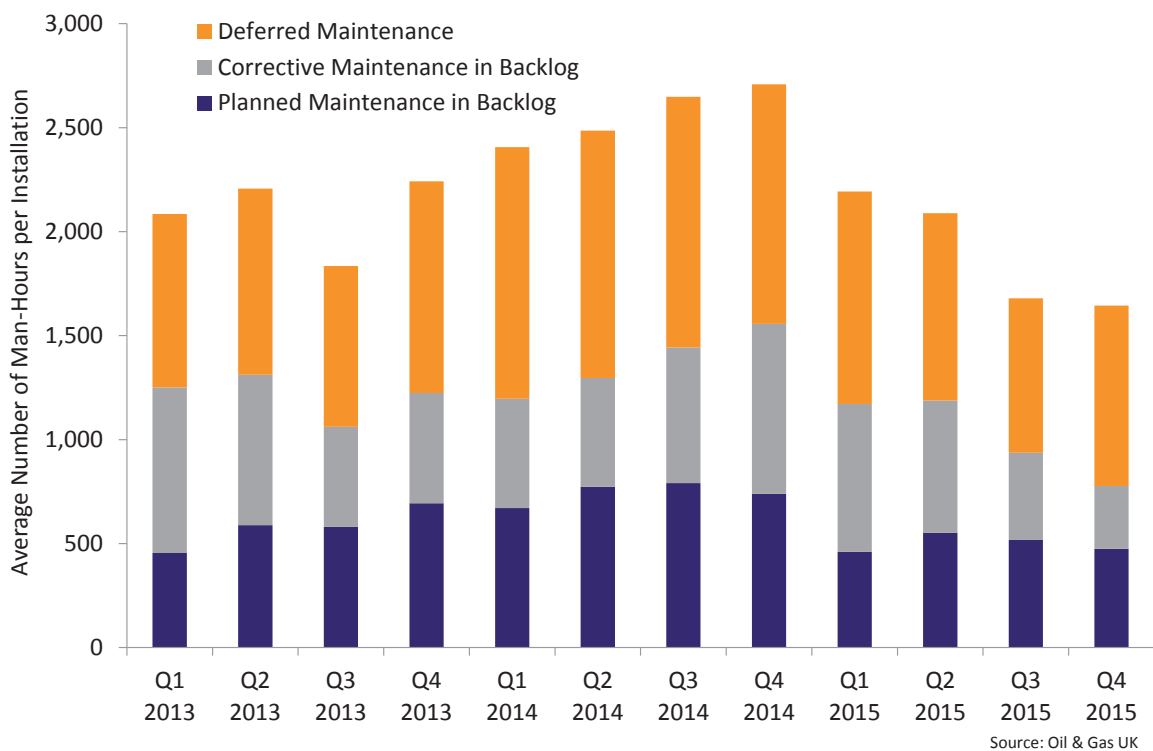
Vantage POB data for the first five months of 2016 show a 0.7 per cent increase in the number of core maintenance crew working offshore compared to the same period in 2015, with an overall rise of 2.6 per cent (representing around 125 workers) compared to the first five months of 2014. This demonstrates the ongoing commitment to core maintenance and the increase in crew figures in this discipline has helped support industry's efforts at tackling its maintenance backlog.

¹¹ Every offshore installation has a safety case – accepted by the HSE – that demonstrates they have the ability and means to control major accident risks effectively.

As a result, the 2015 year-end position does show some improvement with year-on-year reductions across all three categories of SC maintenance backlog, particularly the corrective backlog figure, suggesting that instances of failed or degraded SECE are being resolved more effectively.

Also worth noting is that the 2015 data set represents figures from a higher number of operators and installations, making the results significantly more representative of industry performance than they may previously have been. Participation in the scheme had been decreasing from 2012 to 2014, prompting Oil & Gas UK to encourage more companies to contribute. The average number of installations covered by the data increased from 133 in 2014 to 195 in 2015.

Figure 17: Average Number of Planned, Corrective and Deferred Safety-Critical Maintenance Man-Hours in Backlog per Installation



Given the maturity of the industry asset integrity KPI scheme, Oil & Gas UK has set up a task and finish work group to review the scheme with a view to identifying and implementing any improvements required. That group will seek to develop a revised scheme ready for implementation in 2017.

5. Safety – Significant Issues and Activities

This section summarises some of the more significant safety issues affecting the industry in 2015, which were in turn reflected in Oil & Gas UK's activities for the year. It does not set out to represent the entire scope of issues and activities, but only those of key significance or of wider interest to member companies and other stakeholders.

5.1 EU Offshore Safety Directive¹²

On 19 July 2015, the EU Offshore Safety Directive became UK law, representing the single biggest change to domestic offshore health, safety and environmental management in many years. Responding to the Deepwater Horizon incident in the Gulf of Mexico in April 2010, the European Commission sought to align the different major accident hazard regulatory frameworks across Europe with one rigorous regime aimed at further minimising the risks of offshore operations.

In the UK, the majority of the Directive's requirements were introduced through the Offshore Installation (Offshore Safety Directive) (Safety Case etc.) Regulations 2015. It maintains the existing Safety Case Regulation 2005 provisions as well as incorporating the new EU requirements.

There is much in the Directive that the UK industry is familiar with, but there are a number of important changes. One of the key changes is that each EU Member State must create an independent Competent Authority, responsible for regulatory oversight of major accident, safety and environmental risk management. In the UK, the HSE's Energy Division and the Department of Energy & Climate Change's (DECC) Offshore Oil & Gas Environment and Decommissioning Team has partnered to create the Offshore Safety Directive Regulator (OSDR)¹³.

Throughout 2015, Oil & Gas UK and industry engaged with the OSDR to support the development of regulatory interpretative guidance and implementation of the Directive.

Annex IX of the Directive, which covers common incident reporting requirements across oil and gas operations in Europe, was published as EU Implementing Regulation No 1112/2014. Although UK companies still have to report the same types of offshore incidents as they did before, there are now a range of additional incidents and dangerous occurrences that must be reported to the OSDR. For example, any loss or non-availability of SECEs, requiring immediate remedial action, is now reportable. There are also changes to the HCR reporting requirements. The Oil & Gas UK *Supplementary Guidance on the Reporting of Hydrocarbon Releases* has been updated accordingly¹⁴.

¹² As Oil & Gas UK went to print with this report, the UK voted to leave the EU. Oil & Gas UK will work with its members to make this transition as smooth as possible and to maintain our world-class and robust safety regime on the UKCS.

¹³ See www.hse.gov.uk/osdr

¹⁴ The Oil & Gas UK *Supplementary Guidance on the Reporting of Hydrocarbon Releases* is available to download at www.oilandgasuk.co.uk/product/hs095

The HSE has therefore brought in new administrative arrangements for the statutory reporting of incidents offshore, including those relating to offshore pipeline or pipeline works and diving operations. The aim is to align existing and new reporting requirements and minimise bureaucracy through a single form called a *ROGI – Reporting of an Oil and Gas Incident*. The *ROGI* will replace several existing *Offshore Incident Report (OIR)* forms. Oil & Gas UK was actively involved in helping the OSDR develop the *ROGI* to improve the efficiency of reporting and ensure consistency in approach across the UKCS.

The Directive also requires Member States to establish a mechanism for effective tripartite consultation between regulatory, industry and workforce representatives. Previously, the Offshore Industry Advisory Committee (OIAC) fulfilled this role in the UK.

The OIAC has now been reconstituted into a strategic committee with a focus on major accident hazard prevention and associated environmental matters as covered by the Directive. This new body is called the Offshore Major Accident Hazards Advisory Committee (OMAHAC). The OMAHAC consists of up to 12 members, representing the HSE, DECC, Department for Transport/Maritime and Coastguard Agency, Oil and Gas Authority, HSE Northern Ireland, industry and trade unions.

5.2 Prevention of Fire and Explosion and Emergency Response Regulation 16

An overly prescriptive revised legal interpretation of Regulation 16 of the Prevention of Fire and Explosion, and Emergency Response (PFEER) on Offshore Installation Regulations would have required duty holders to provide additional tertiary escape equipment on installations. This would have had no risk reduction benefits over the equipment already in place.

Oil & Gas UK successfully argued that the obligation for duty holders under PFEER Regulation 5 to identify, assess and put in place different means of evacuation, escape and rescue was sufficient to secure effective emergency response arrangements for those on an installation. Continuing to apply the original interpretation of the legislation has not compromised the safety of those on board an installation, while saving the industry considerable cost, time and effort.

5.3 Piper Alpha Garden Upkeep

Oil & Gas UK gave over £185,000 to the Pound for Piper Memorial Trust in summer 2015 to help pay for the ongoing maintenance of the North Sea Memorial Garden in Aberdeen – a tribute to the 167 men who lost their lives in the 1988 Piper Alpha disaster. The donation came from the funds raised by industry to help support the refurbishment and upkeep of the garden at Hazlehead Park.

5.4 Basic Offshore Safety Induction and Emergency Training

The Civil Aviation Authority's (CAA) CAP 1145¹⁵ review of helicopter safety, issued in February 2014 following the 2013 Sumburgh helicopter crash, made a series of recommendations, some relating to post-crash survivability. Among them was a requirement for the Category A Emergency Breathing System (Cat-A EBS) to be available to all passengers and air-crew flying offshore in the UK from 2014.

The Basic Offshore Safety Induction and Emergency Training and Further Offshore Emergency Training (BOSIET/FOET) standards were amended to provide training on using the EBS equipment and the resulting new life jacket. The new standards – which were introduced in February 2016 – will involve Cat-A EBS training by the poolside as well as breath-holding exercises in the water using the new life jacket.

5.5 Accident and Failure Frequency Data

Oil & Gas UK and industry representatives working with the HSE and the Health & Safety Laboratory have reviewed existing accident and failure of equipment frequency data to determine whether there is a need to update the data and improve its quality. The aim is for all data, including equipment parts count data, to be fit for purpose when fed into quantitative risk assessment and other assessments, facilitating better decision making when managing major hazard risks.

Work was undertaken by a DNV GL-led industry work group to identify gaps in the industry's equipment parts count data. These gaps were then filled using data from similar installation types that had complete data sets and has now been published by the HSE¹⁶.

5.6 Joint Aviation Audits

Oil & Gas UK is working with the IOGP Aviation Safety Committee and HeliOffshore to minimise the burden of UKCS aviation auditing on helicopter operators, as recommended by the CAA CAP 1145 report. An online portal run by Oil & Gas UK gives helicopter and oil and gas operators access to a range of aviation auditing tools such as a scheduler, a standard IOGP pre-audit questionnaire, an audit template and a feedback form. The aim is to facilitate greater co-ordination of helicopter operator audits by installation operators and encourage a more standardised approach to preparing and carrying out audits. The initiative does not extend to commercial arrangements between operators.

Uptake of the joint approach has been positive and has reduced the number of audits being carried out. A major benefit has been that helicopter operator personnel can spend more time on core functions such as safety management. Work will continue to encourage co-operative auditing along with a more standardised approach to audits and follow-up processes.

¹⁵ The CAA CAP1145 Report can be downloaded at <http://bit.ly/CAP1145Report>

¹⁶ The data can be downloaded at www.hse.gov.uk/offshore/statistics.htm

6. Offshore Helicopter Transport Safety Record

6.1 Background

Since 1976, commercial air transport helicopter flight statistics and reportable accident data for UKCS offshore operations have been collected by the CAA under its mandatory occurrence reporting (MOR) scheme. During this 40-year period, up to year-end 2015, over 65.5 million passengers have been transported to and from UKCS offshore installations, with over 7.8 million flights (or sectors flown) and 3.7 million flying hours. During the same period, 13 fatal accidents have claimed the lives of 117 offshore workers and flight crew and there have been 60 non-fatal accidents¹⁷.

To provide a report that is representative of today's offshore flight operations using a fleet of modern helicopters, data for the last 20 years (from 1996 to 2015) have been used for comparative purposes. With this in mind and as a measure of current UKCS activity, in 2015, just under 115,500 sectors were flown, consuming 69,052 flight hours and transporting just over 825,200 passengers offshore. This is a significant reduction on 2014 when 141,000 sectors were flown with 1.53 million passengers transported. Since 1996, four fatal accidents have claimed the lives of 38 offshore workers and flight crew and there have been 16 non-fatal accidents.

From 1996 to 2015, a large number of safety improvements have been introduced to UKCS helicopter operations. These improvements have resulted from industry-led initiatives and CAA research projects and are summarised in section 6.5¹⁸.

6.2 Helicopter Types

At the end of 2015, the UKCS helicopter fleet numbered 86 aircraft and comprised a mix of airframe types – a reduction of 15 per cent from 101 airframes in 2014 due to reduced offshore activity in the current downturn. Helicopter types used for UKCS offshore oil and gas support at the beginning of 2016 are shown in the table below.

Figure 18: Helicopter Types used for UK Offshore Oil and Gas Support

Type	Weight Class	Introduced	In Fleet
AgustaWestland AW139	Medium	2005	19
Eurocopter AS365 N3 (Dauphin)	Medium	1979	3
Eurocopter EC155	Medium	2007	2
AgustaWestland AW189	Heavy	2014	2
Eurocopter AS332 L2 (Super Puma)	Heavy	Pre 2005	6
Eurocopter EC225 (Super Puma 2)	Heavy	2005	23
Sikorsky S92	Heavy	2005	31

¹⁷ A complete listing of the 73 reportable accidents involving helicopters serving the UK offshore oil and gas sector from 1976 to 2015 is provided in an appendix on the Oil & Gas UK website at www.oilandgasuk.co.uk/healthandsafetyreport

¹⁸ For a full and detailed list of industry-led safety initiatives and CAA research projects, see the appendix provided on the Oil & Gas UK website at www.oilandgasuk.co.uk/healthandsafetyreport

Since 2001, only heavy and medium twin-engine helicopters have been used on the UKCS. This is because two-pilot, light helicopter operations generally don't have sufficient range or payload to meet contemporary offshore commercial requirements.

It is also important to make the distinction between heavy and medium twin-engine helicopter operations. As a rule, heavy twins (such as AW189, AS332L2, EC225 and S92) operate mainly out of Aberdeen or Scatsta and generally fly sectors with long flight times. Medium twins (such as AS365, EC155 and AW139) fly mainly out of the regional heliports (that is Blackpool, Humberside and Norwich) and these aircraft record a high number of sectors with relatively short flight times.

6.3 Offshore Helicopter Reportable Accidents on the UK Continental Shelf

All flight safety occurrences, as deemed reportable by the CAA's CAP 382, are reported to the CAA using the MOR scheme. There are a number of reports submitted every month, providing constant oversight of safety-related occurrences.

From 1996 to 2015, four fatal accidents claimed the lives of 38 offshore workers and flight crew. Two accidents were caused by catastrophic component failure and two attributed to human factors.

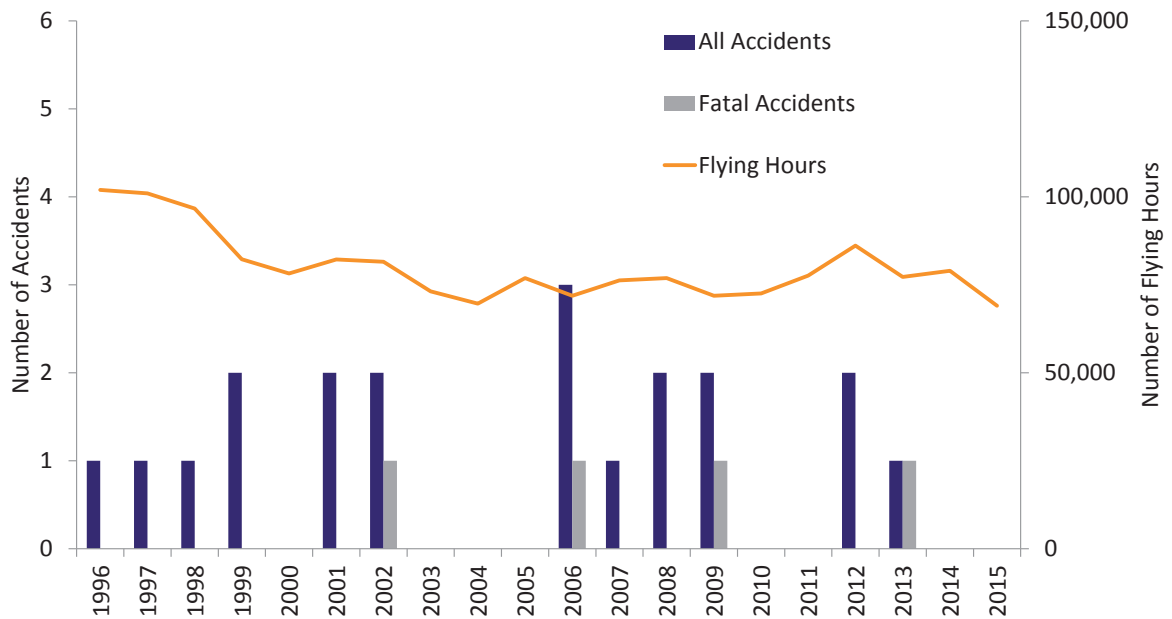
Sixteen reportable non-fatal accidents have also occurred since 1996. The causes included major component failures, pilot error, lightning strikes, major airframe damage, and main and tail rotor damage. In most cases, only the helicopter was damaged but, infrequently, these accidents have resulted in injury to personnel.

In the last two years there have been no reportable fatal or non-fatal accidents on the UKCS. Furthermore, the accident rate data show that the five-year average for fatal accidents sits consistently on or below 0.6 per 100,000 flying hours.

6.4 Accident Analysis

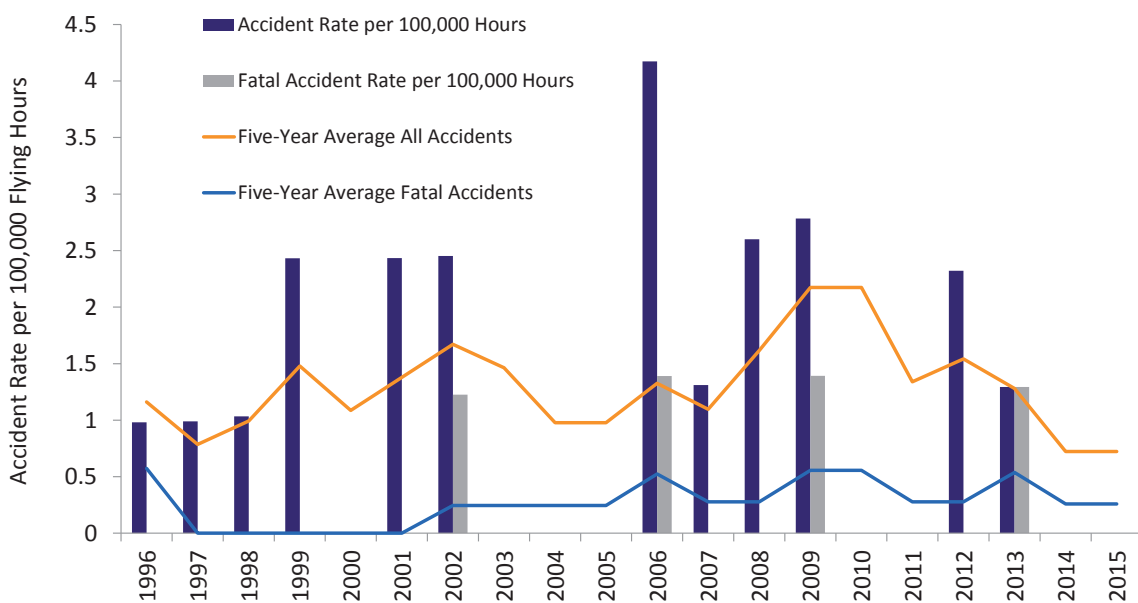
The following graphs illustrate the distribution of UKCS fatal and all reportable accidents from 1996 to 2015, as well as fatal and all accident rates per 100,000 flying hours.

Figure 19: Fatal and All Accidents Distribution



Source: Oil & Gas UK

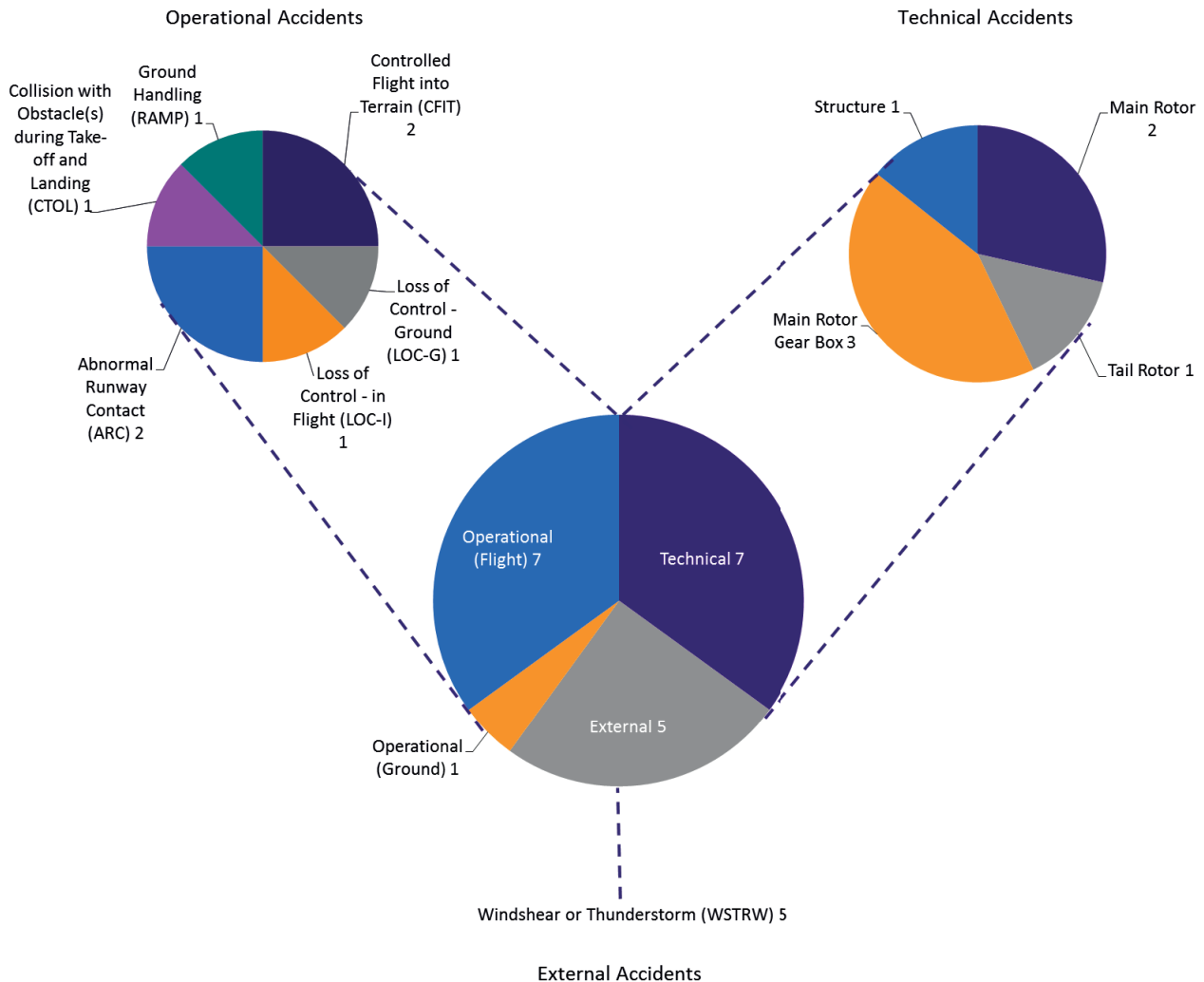
Figure 20: Fatal and All Accident Rates per 100,000 Flying Hours



Source: Oil & Gas UK

A breakdown of reportable accidents from 1996 to 2015 is provided in the following charts¹⁹.

Figure 21: Breakdown of Reportable Accident Causes, 1996 to 2015



From 1996 to 2015, operational causes accounted for 40 per cent of accidents, 35 per cent were due to technical failures and 25 per cent caused by external factors.

All of the operational accidents that occurred during flight were attributed to pilot error. Eighty-six per cent of the technical failures were attributed to dynamic component failures (main rotor gear box, main rotor blade and tail rotor). A structural issue accounts for the remaining 14 per cent.

For the 25 per cent of accidents due to external factors, all resulted from weather-related events, including four lightning strikes and an encounter with a water spout.

¹⁹ In order for accident events to be identified using a recognised international code, categorisation and causation follows the International Civil Aviation Organisation/Commercial Aviation Safety Team Common Taxonomy Team Taxonomy.

Operational (F) = an event related to the helicopter while in flight or abnormal contact with terrain
 Operational (G) = an event related to the helicopter while on the ground
 Technical = an event involving system/component failure or malfunction, fire/smoke
 External = an event involving icing, turbulence, wind shear, thunderstorm or bird strike

6.5 Safety Improvements and Initiatives

Since the early 1980s, many safety initiatives and improvements to UKCS helicopter operations have been funded and fully supported by industry and the regulators (CAA and HSE). Some of the major achievements in recent years are listed below²⁰.

Extension of VHF communications coverage and introduction of multilateration flight surveillance for the North Sea

In 2004, the UKOOA (now Oil & Gas UK) Aviation Safety Technical Group (ASTG) initiated a joint project with the National Air Traffic Service (NATS) to assess the efficiency and coverage of offshore helicopter VHF aeronautical communications and flight surveillance provided on the UKCS. The outcome led to a wholesale modernisation of offshore VHF aeronautical communications and the development and installation of a new multilateration flight surveillance system. This significant investment has greatly enhanced air traffic control on the UKCS.

The new systems became operational in 2010 and the wide-area multilateration was welcomed by air traffic controllers as a surveillance tool that is the equivalent of radar.

The East Shetland Basin, however, continued to rely on the radar situated on the Gullfaks platform for its flight surveillance. However, this system is being retired from service having reached its projected end of life. The Norwegian Air Traffic Control now use the alternative ADS-B system. A NATS project is now under way to extend the UK multilateration system into this offshore region.

Meteorological Project (Helimet)

In 2009, in response to a new CAA requirement, Oil & Gas UK led a project to provide the UKCS with an automatic, meteorological recording and reporting network to improve the accuracy of weather information for offshore helicopter flight crews. The Helimet project entailed installing specialist meteorological equipment and software on designated hub installations and providing training to offshore personnel in its use. The system became fully operational in 2012 and continues to develop through software updates and improved management processes, with work in 2015 to improve operator response time to equipment outages and to improve met reporter training. To date, more than 1,000 offshore personnel have received training in providing flight crews with real time met data. The system is regarded by flight crews as an excellent flight planning tool.

²⁰ For a full and detailed list of industry-led safety initiatives and CAA research projects, see appendix provided on the Oil & Gas UK website at www.oilandgasuk.co.uk/healthandsafetyreport

Helideck lighting

Green perimeter lighting was adopted as an international standard for offshore helidecks following the CAA's research on lighting systems to enhance visual cues for landing at night. Green perimeter lighting has been in use on the UKCS for the last four years in conjunction with improved floodlighting.

The CAA's research also identified the significant benefits of lighting the aiming circle and 'H' marking. Following successful trials during winter 2012-13, these new lighting systems are now being installed, with a requirement for them to be fitted on all UKCS offshore helidecks by mid-2018. Step Change in Safety is monitoring implementation and working with industry to meet this deadline.

Predicting triggered lightning strikes

Responding to industry requests, the CAA collaborated with the Met Office to investigate and demonstrate the feasibility of predicting triggered lightning strikes²¹ on helicopters. Oil & Gas UK, CAA Norway, CHC Helicopter and seven individual oil and gas companies funded the project and the initial work was completed in June 2011. In-service trials continued throughout the winters of 2011-12 and 2012-13 and, following further refinements in 2015, the system was considered sufficiently mature to be made available to the helicopter operators who can now access forecast lightning data on the Met Office OHWeb weather information system.

Advanced Anomaly Detection for the Health and Usage Monitoring System

A programme began in 2009 to implement advanced anomaly detection (AAD) to the health and usage monitoring system (HUMS) data on the UKCS offshore helicopter fleet. The outcome of a successful CAA research project, AAD improves on existing HUMS data analysis using data mining techniques and enhances HUMS' sensitivity to defects without increasing the false alert rate. Since 2013, HUMS AAD has been progressively introduced for the most used helicopter types.

Enhanced Passenger Cabin Safety and Survival

In response to the CAA's CAP 1145 actions and recommendations, industry collectively embarked in 2014 on a priority programme to introduce Cat-A EBS for all passengers travelling on offshore helicopters across the UKCS. Industry's adoption of this new technology, from initial concept to the introduction of the equipment itself, was successfully completed in a matter of months, including dry training for offshore workers. More information is provided in section 5.4.

Extra broad (XBR) seat allocation has also been introduced to allow passengers to escape from a ditched helicopter regardless of size and shape.

²¹ Triggered lightning strikes occur during specific meteorological conditions. In flight, the helicopter airframe becomes negatively charged and acts as a conductor for the lightning aiding its passage to earth.

6.6 Summary

The UKCS is a major industrial sector that cannot operate without helicopters. They are intrinsic to offshore operations and alternatives, such as marine transfers, are not always operationally practical. These non-scheduled public transport operations on the UKCS take place in a hostile environment. Although the safety record is good for this type of operation, tragically there have been an unacceptable number of incidents in recent years.

Despite having a fleet of some of the most up-to-date and technologically advanced helicopters, the most recent fatal accidents on the UKCS occurred in July 2002 (Sikorsky S76 in Leman Field), December 2006 (Eurocopter AS365 Dauphin at Morecambe Bay), April 2009 (Eurocopter AS332L2 Super Puma off Peterhead) and August 2013 (Eurocopter AS332L2 Super Puma on approach to Sumburgh). These tragic accidents, as well as the non-fatal incidents, serve as a constant reminder of the need for continuous improvement to minimise the risks.

This was reinforced on 29 April 2016 when 13 offshore workers tragically lost their lives in an accident involving an Airbus EC225LP helicopter in the Norwegian North Sea. This latest incident resulted in the grounding of the EC225LP and the similar AS332L2 Super Puma airframe pending further investigation. Oil & Gas UK has set up a helicopter resilience group to discuss how logistics are being managed and to help members safely transfer the workforce on and offshore.

The UK oil and gas industry continues to work in concert with helicopter operators, helicopter and safety equipment manufacturers, and the regulators to further reduce the risks. They do this by collectively and vigorously pursuing robust operating procedures and practices, by pursuing offshore helicopter safety initiatives and research projects, as well as ensuring, where practicable, swift implementation of actions and recommendations arising from accident investigations, inquiries and reviews (such as CAP 1145).

7. Regulatory Consultations

Oil & Gas UK continued to serve as the focal point for industry responses to regulatory consultations managed by the HSE and CAA. The following consultations were completed in 2015.

7.1 Safety Case Regulations Guidance

As outlined in section 5 of this report, the Safety Case Regulations were updated in 2015 to align with the new requirements of the EU Offshore Safety Directive. Oil & Gas UK and its members supported the HSE through informal consultation in shaping the new regulatory guidance²².

7.2 Regulatory Oversight of Helidecks

In May 2015, following on from Action 13 in its CAP 1145 report, the CAA published a consultation on proposals for it to assume responsibility for certification and approval of offshore helidecks, a role currently carried out by the Helideck Certification Agency. Oil & Gas UK consulted its members and submitted a response on behalf of industry. The CAA has since developed a proposal that is supported in principle by Oil & Gas UK and its members, however, firm details and timings are still to be finalised and agreed.

²² See www.hse.gov.uk/pubns/books/l154.htm

8. Publications

A key function of Oil & Gas UK is to lead or support the development of industry guidelines and to promote sharing of good practice and information. Guidelines are typically developed by appropriate technical experts drawn from member companies and supported by Oil & Gas UK staff. This section summarises recent health and safety related publications.

8.1 Cumulative Risk Guidelines

Understanding cumulative risk and the interactions and interdependencies of systems and how they might impact the risk profile is an essential part of risk management offshore.

If a piece of equipment, a procedure, or a person does not function as intended and there is the increased potential for adverse consequences, all practicable alternative or additional measures must be identified and implemented so that the risk remains as low as reasonably practicable (ALARP).

However, while this is well-understood for a single adverse situation or deviation, the significance of the threat from the cumulative effect of a number of deviations has become more apparent in recent years. It is recognised that managing each deviation individually may not mitigate the overall risk of these acting together.

The *Cumulative Risk Guidelines, Issue 1*, due to be published during summer 2016, aims to increase awareness of the need to manage cumulative risk and provides guidance on developing a framework to do this. The framework covers assessment of cumulative risk and suggests a number of approaches and methods, recognising that different cumulative risk issues may require varying assessment methods.

8.2 Ageing and Life Extension Guidelines

The Oil & Gas UK Ageing and Life Extension (ALE) Steering Group agreed to develop further guidelines as part of the industry's response to the HSE's Key Programme 4 initiative on ALE.

It established three technical work groups to produce guidance on specific aspects of ALE. In 2015, work focused on subsea pipelines and associated systems, incorporating significant input from the independent Pipeline User Group (PLUG).

The resulting publication, *Guideline on Ageing and Life Extension of Subsea Pipelines and Risers*²³, is intended to offer practical guidance to pipeline/subsea technical authorities, engineering/operations managers, design teams, support functions, subsea intervention teams, inspection contractors and ICPs alike.

It adds to the suite of three existing Oil & Gas UK ALE guidelines published in 2014 on offshore structures²⁴, electrical, control and instrumentation equipment²⁵, and floating production installations²⁶. It also supplements *Guidance on the Management of Ageing and Life Extension for UKCS Oil and Gas Installations, Issue 1 April 2012*²⁷.

8.3 HCR Supplementary Guidance

The *Supplementary Guidance on the Reporting of Hydrocarbon Releases, Issue 3*²⁸, was published in December 2015 with improvements to ensure ease of use and clarity of content. The document also reflects regulatory changes following implementation of the EU Offshore Safety Directive last year (see section 5.1). The guidance sets out the means by which HCRs must now be assessed under RIDDOR and the new EU Implementing Regulation.

²³ The *Guideline on Ageing and Life Extension of Subsea Pipelines and Risers* is available to download at <http://oilandgasuk.co.uk/product/hs096/>

²⁴ The *Guidelines on the Management of ALE of Offshore Structures* is available to download at <http://bit.ly/ALEoffshoreinstallations>

²⁵ The *Guidelines on ALE aspects of Electrical, Control and Instrumentation* is available to download at <http://bit.ly/ALEECI>

²⁶ The *Guideline for Management of ALE for UKCS Floating Production Installations* can be downloaded at <http://bit.ly/HS085>

²⁷ The *Guidance on the Management of Ageing and Life Extension for UKCS Oil and Gas Installations* is available to download at <http://bit.ly/ALEinstallations>

²⁸ The *Supplementary Guidance on the Reporting of Hydrocarbon Releases* is available to download at <http://oilandgasuk.co.uk/product/hs095/>

9. 2016 Focus Areas

In 2016, Oil & Gas UK carried out a business review and restructured to ensure it continues to promote and serve its members' interests. As part of this review, the Health & Safety and Environment Directorates have been merged to form the new Health, Safety and Environment Team led by Mick Borwell. The team will support members in maintaining their licence to operate in a safe and responsible manner and engage with the relevant regulators and stakeholders on these issues.

9.1 EU Offshore Safety Directive²⁹

Oil & Gas UK will continue to facilitate industry engagement with the regulators as the sector moves to full compliance with the new European Regulations. It will also respond to any industry-wide issues arising from their implementation.

Oil & Gas UK has been appointed vice-chair of OMAHAC, which met for the first time in March 2016. Further work is on-going to develop the strategic focus areas for this committee with the main priority being to influence the management and control of major hazards.

The HSE's focus has also turned to developing a permanent web-based version of the *ROGI* form to replace the interim word document. Oil & Gas UK will promote industry roll-out of this new online reporting tool in the second half of 2016.

9.2 Maintenance Optimisation

In December 2015, Oil & Gas UK formed a work group bringing together technical specialists in the fields of maintenance and asset integrity to share experience and learnings on the topic of maintenance optimisation.

In the run-up to the formation of that group, Oil & Gas UK engaged with a number of operators to discuss maintenance improvement efforts and the need to tackle the rise in safety-critical maintenance backlog in 2014, described in section 4.3.2.

It became evident during those discussions that a number of operators had already initiated or completed maintenance optimisation reviews. To capture and share that experience, the work group was formed to produce a document on *Maintenance Optimisation Reviews – Sharing Experience and Learning*, which is due to be published in summer 2016. The document describes how companies are carrying out structured reviews of safety and business critical equipment maintenance to make sure that those maintenance regimes are fit for purpose and support safe, reliable and sustainable operations.

Maintenance optimisation remains a focus area for the industry to improve major accident hazard management processes and operational efficiency. The intention is to monitor uptake of the document and gauge the ongoing effectiveness of efforts in this area.

²⁹ As Oil & Gas UK went to print with this report, the UK voted to leave the EU. Oil & Gas UK will work with its members to make this transition as smooth as possible and to maintain our world-class and robust safety regime on the UKCS.

9.3 Asset Integrity Key Performance Indicators

The current KPI scheme on asset integrity discussed in section 4.3 is being reviewed to ensure that it remains aligned with current good practice in performance monitoring and measurement to manage asset integrity risks effectively.

Oil & Gas UK has established a work group of technical experts to identify workable improvements to the KPI scheme. The group will complete this review in the second half of 2016 with the aim of having the revised metrics in place for reporting from the beginning of 2017.

9.4 Basic Offshore Safety Induction and Emergency Training

Industry, regulators, training providers and workforce representatives worked together on an interim UK standard for offshore survival training using the Cat-A EBS (see section 5.4). The new standard provides the offshore workforce with knowledge and understanding of the system and the appropriate emergency response actions to take. In the longer term, all industry stakeholders in the UK will continue to work towards providing in-water training exercises using Cat-A EBS equipment.

9.5 Fire and Explosion

Oil & Gas UK's *Fire and Explosion Guidance* is being reviewed to ensure it continues to remain current and useful for industry. The guidelines advise on good practice for designing offshore installations to prevent and mitigate the impact of fire and explosions, and seek to set a realistic and simplified philosophy for design and assessment. The document will be restructured, highlighting the latest best practice. Publication is scheduled for the end of 2016.

9.6 Unmanned Aerial Systems

The use of unmanned aerial systems (commonly referred to as drones) is an emerging technology for the inspection and maintenance of offshore oil and gas installations. Standards and guidelines are being developed for their application in line with the high safety and operating standards on the UKCS. Publication is expected by the end of 2016.

9.7 Aviation Operations Management

The *Guidelines and Standards on the Management of Aviation Operations* are being updated for publication of Issue 7 this year. The revision takes into account recent changes in legislation as well as feedback from industry to ensure continuous improvement in the safety of operations. The document will also be restructured for ease of use and to align better with the IOGP's related aviation guidelines.

9.8 Helifuel Supply Chain Auditing

Helicopters have to refuel offshore for many of the longer flights by uplifting fuel from helidecks. However, the helifuel supply chain facilities, practices and procedures are currently not audited by fuel specialist auditors. Work has commenced in 2016 to develop a joint industry audit programme to:

- Verify compliance with agreed standards
- Recommend improvements where necessary
- Share findings and observations with participating members for continuous improvement on all assets providing helifuel
- Introduce training courses on aviation fuel product quality and operations

9.9 Helidecks on Normally Unmanned Installations

The CAA CAP 1145 report included recommendations about fitting automatic fire-fighting equipment to normally unattended installations. Prompted by discussions with Oil & Gas UK, CAA commissioned Cranfield University in 2014 to examine whether the recommendation was valid and proportional and to provide proposals on the way forward.

The Cranfield Report was shared with industry in 2015, together with a CAA paper proposing a constructive way forward. Discussion between industry and the CAA means the proposal has since been developed to ensure it addresses all potential causes of accidents. The key tenets of the proposal now relate to visual cueing for night flying from circle and H lighting; the availability of fire-fighting equipment when the platform is both attended and unattended; and limiting exposure by restricting the number of landings. Industry will continue to work with the CAA to agree the details of this proposal and start dates, as well as the processes required for implementation.

9.10 Offshore Helideck Team Training and Competency

Discussions with relevant stakeholders, including oil and gas operators, contractors and training providers, highlighted a need to improve the standards of training and competence assessment for helideck crews and other offshore helicopter support staff. Work is ongoing to revise the existing industry guidelines and standards to better define the requirements for initial and ongoing training and competency. This project is being led by OPITO and supported by relevant industry stakeholders.

10. Glossary

AAD	Advanced Anomaly Detection
ALARP	As Low As Reasonably Practicable
ALE	Ageing and Life Extension
ASTG	Aviation Safety Technical Group
BOSIET	Basic Offshore Safety Induction and Emergency Training
CAA	Civil Aviation Authority
Control of Work	Includes hazard identification and risk assessment, permit to work systems and the arrangements for the safe isolation and reinstatement of plant
Dangerous Occurrences	Certain specified events as defined in RIDDOR 2013, include such events as hydrocarbon releases, fires or explosions
DECC	Department of Energy & Climate Change
Duty Holder	In relation to a production installation, this means the operator, and in relation to a non-production installation, the owner
EBS	Emergency Breathing System
EU	European Union
FOET	Further Offshore Emergency Training
HCR	Hydrocarbon Release(s)
HSE	Health and Safety Executive
HUMS	Health and Usage Monitoring System
ICP	Independent Competent Person
IOGP	International Association of Oil & Gas Producers
KP	Key Programme
KPI	Key Performance Indicator
LFS	Labour Force Survey
LTIF	Lost Time Injury Frequency (fatalities and lost work day cases per million man-hours)
MOR	Mandatory Occurrence Report
NATS	National Air Traffic Service
NUI	Normally Unattended Installation
OIAC	Offshore Industry Advisory Committee
OIR	Offshore Incident Report
OMAHAC	Offshore Major Accident Hazards Advisory Committee
OPITO	Offshore Petroleum Industry Training Organisation
OSDR	Offshore Safety Directive Regulator
Over-Seven-Day Injuries	Accidents that cause an employee to be away from work or unable to perform their normal work activities for more than seven consecutive days
PFEER	Prevention of Fire and Explosion, Emergency Response
PLUG	Pipeline User Group
POB	Personnel on Board
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations

ROGI	Report of Oil and Gas Incidents
Safety Case	A document that states to operators, owners, workers and the competent authority that the duty holder has the ability and means to manage and control major accident hazards effectively. The safety case is a live document that should be reviewed and, where necessary, revised throughout the life cycle of the installation
SC	Safety-Critical
SCE	Safety-Critical Elements Parts of an installation and such of its plant (including computer programs), or any part of those – (a) the failure of which could cause or contribute substantially to a major accident or (b) the purpose of which is to prevent, or limit the effect of, a major accident
SECE	Safety and Environmental Critical Elements Parts of an installation and such of its plant (including computer programs), or any part of those – (a) the failure of which could cause or contribute substantially to a major accident or (b) the purpose of which is to prevent, or limit the effect of, a major accident
Specified Injuries	Defined list of injuries detailed in Regulation 4 of RIDDOR 2013
UKCS	UK Continental Shelf
XBR	Extra Broad



