Safety review of offshore public transport helicopter operations in support of the exploitation of oil and gas

Progress report

CAP 1243

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Foreword

The safety of those who travel on offshore helicopter flights is, and should be, paramount. Between 2009 and 2013 there were five significant accidents in the UK sector, two of which tragically resulted in fatalities. In the light of this, the CAA Board commissioned a comprehensive review of the safety of offshore helicopter operations. This resulted in a number of wide-ranging recommendations and actions to improve safety standards, and we made clear our determination that these be implemented as swiftly as possible.

Ten months on from the publication of our Review, substantial and important progress has been made toward improvements in offshore helicopter safety. Today, flights no longer take place over the most extreme sea conditions. Every single passenger on an offshore helicopter is equipped with new improved Emergency Breathing System (EBS). Offshore workers have received new guidance and – crucially – improved safety training. We believe these changes together will contribute to lives being saved in the UK offshore industry in the years to come.

There is a strong collective commitment to change evidenced by the cooperation received from all of the parties represented in the newly formed Offshore Helicopter Safety Action Group (OHSAG), which is proving a catalyst for increased dialogue between helicopter operators, employee representatives, manufacturers and regulators. Such collective commitment was also evidenced in the manner with which helicopter operators and the oil and gas industry responded to the CAA Board challenge to ensure that all offshore workers were trained in the use of the new Emergency Breathing System in a matter of weeks. This commitment will be essential as we seek to not only improve the chances of passengers surviving a safety occurrence, but also to take real steps towards reducing the number of safety occurrences altogether.

As the Review made clear, achieving this broader, longer-term goal requires improvements in many areas, from flight crew training to helicopter design and production to ongoing maintenance. As the regulator, the CAA recognises that change in these areas will take time, to not only to agree with other interested parties but also to have a tangible impact. Yet that recognition aside, this report shows that the Review has already helped to accelerate progress on a number of industry-led safety initiatives, from those co-ordinated by manufacturers to some which are now the responsibility of HeliOffshore, the newly formed representative body for helicopter operators.

Specific actions in the Review focused on gathering evidence to assess the viability of proposed safety improvements around issues such as offshore communication and helideck certification, and on aligning standards for flight crew training. In this report, we are able to confirm that these actions are on track; the real challenge, however, is still to come as, with the helicopter industry and the wider oil and gas sector, we seek to turn the

progress made to date into to an enduring enhancement of the safety culture around offshore helicopters.

Such change of course depends on sustained engagement from helicopter operators, manufacturers and the industry. While we recognise that recommendations with regard to airworthiness certification require broad consultation before being formally introduced, we believe that faster progress could be made – giving helicopter operators and manufacturers greater clarity and certainty about what is expected of them. We will be strongly encouraging such activity, but the wider regulatory community, both domestically and internationally, must also play its part in making reforms and ensuring industry meets its commitments.

The safety of those who rely on offshore helicopter flights is our absolute priority: we all know exactly what is at stake. I hope that in our next progress report, we will be able to show that the short-term actions completed to date are being followed by the further steps needed to secure long-term change.

Mark Swan

Director, Safety and Airspace Regulation, CAA

Introduction

In February 2014, the CAA published a Safety Review ('the Review') of offshore helicopter operations. The Review examined the risks to helicopter operations to support the oil and gas industries in and around the North Sea. It was conducted in conjunction with the European Aviation Safety Agency (EASA) and the Norwegian Civil Aviation Authority and was peer-reviewed by independent experts. It identified a wide range of opportunities to improve the safety of those operations and in particular to increase the chances of passengers and crew surviving an accident.

While acknowledging that eliminating such accidents altogether is an unrealistic goal, the Review made it clear that more effort could and should be made to reduce the chance of accidents occurring. It therefore recommended that steps be taken to improve flight crew training and maintenance standards and place restrictions on operations in certain weather and sea conditions.

In total, the Review listed 32 actions and 29 recommendations that would all contribute towards the end goal of improving the safety of offshore helicopter operations. Some of these would necessitate long-term changes in areas such as helicopter design; others could be implemented almost immediately, and have an instant impact on survivability.

About this report

We stated we would report publicly on the progress of all actions and recommendations in the Review. This document fulfils that requirement – providing an update on progress as at January 2015. It highlights the areas where most progress has been made to date, and considers what that means for the offshore industry, the helicopter industry and those who work in both.

At the end of the report, there is a full table summarising progress against each action and recommendation. As this table shows, progress has been made on all actions and most recommendations. Not all are yet complete, but we are on track to complete them on schedule, unless specifically stated in the table. A further progress report will be produced in 2015.

Since the Review was published, several further reports have followed, including:

- the Transport Select Committee's *Offshore helicopter safety* report (July 2014) www.publications.parliament.uk/pa/cm201415/cmselect/cmtran/289/28902.htm
- the Air Accidents Investigation Branch (AAIB) *Report No: 2/2014. Report on the accidents to Eurocopter EC225 LP Super Puma G-REDW, 34 nm east of Aberdeen, Scotland on 10 May 2012 and G-CHCN, 32 nm southwest of Sumburgh, Shetland Islands on 22 October 2012* www.aaib.gov.uk/publications/formal_reports/2_2014_g_redw_g_chcn.cfm

Both have provided important insight and impetus to support the ongoing work to improve offshore helicopter safety, as have reports – official and anecdotal – of other incidents not just in the North Sea but worldwide. The CAA continues to monitor all AAIB reports, and those of its peers in other territories, and as well as addressing any specific AAIB recommendations actively seeks to learn from all incidents.

Chapter 1

Passenger safety and survivability

As the Review made clear, improving the protection of passengers in the event of an accident must be a priority. Evidence showed that just over half of the accidents in which offshore helicopters impacted the sea between 1976 and 2012 were potentially survivable, but led to 38 fatalities.

The Review announced several actions and recommendations aimed at increasing the chances of passengers and crew surviving after a water impact. In almost all cases these have progressed on schedule. Several were addressed through CAA Safety Directive SD 2014/001, issued on 21 May 2014, and replaced by SD 2014/002 on 14 October 2014; these mandated the changes.

As a result, we believe that several of the major risks identified in the original report have now been reduced, and therefore anticipate that, in the event of future accidents, the survival rate will be considerably higher.

Improving passengers' chances of escape

Of the 38 people who died from survivable water impacts between 1976 and 2012, 31 failed to escape from the helicopter. While these fatalities all took place before 1993, in August 2013, four passengers were killed when a CHC Helicopter Eurocopter AS332 crashed into the North Sea on approach to Sumburgh Airport. This accident was clearly 'survivable', but three passengers did not escape from the helicopter. This reinforced the view of the Review that steps should be taken to make escape from a ditched and/or capsized helicopter easier.

The first key step was to reduce the likelihood of the helicopter sinking. To this end, since 1 June 2014, helicopter operators have been required to ensure that the Emergency Flotation System – fitted as standard on all the helicopters in use offshore – is armed for all overwater departures and arrivals.

The Review also recommended that helicopter operators fitted a side-floating helicopter scheme, which previous research has identified as being a valuable additional safety measure. Due to the lack of any developed schemes for the helicopters currently in use in the North Sea, this has not yet been taken forward. However, regulators at EASA as well as the CAA remain strongly in favour of side-floating helicopter schemes or an equivalent technical solution: the issue is therefore under consideration as part of EASA's current Rulemaking Task activity around helicopter ditching occupant survivability (RMT.0120).

New EBS for all passengers

Progress in other areas around survivability has accelerated ahead of schedule. To make it easier to escape, the CAA Safety Directive SD 2014/001 prohibited the use of seats that are not next to authorised underwater emergency exits (push-out windows), unless the helicopter has an EASA approved side-floating scheme or equivalent fitted, or all passengers are wearing a suitable (Category A) Emergency Breathing System (EBS) as specified in CAP 1034 (Development of a Technical Standard for Emergency Breathing Systems). These systems can be deployed underwater and in less than ten seconds – a major improvement on previous equipment.

The CAA originally proposed that the requirement for the new EBS should come into force in April 2016, with the seating restrictions imposed from 1 June 2014 as an interim measure. We subsequently agreed to delay the implementation of the seating restrictions until 1 September 2014. This followed evidence from the oil and gas industry that reducing helicopter capacity through the resulting seating restrictions could have an adverse impact on critical safety maintenance work due to take place at offshore installations over the summer.

However, at the same time, we significantly brought forward the date from which the new EBS would be made compulsory, to 1 January 2015. In fact, the EBS approved by the CAA against CAP 1034 was introduced for passengers by industry ahead of schedule, from 1 September 2014. The EBS is built into new lifejackets which were approved by EASA in July 2014. A flight crew version of the new EBS is expected to be introduced during 2015.

EASA has included items from the CAA Safety Directive in the Comment Response Document (CRD) to its Notice of Proposed Amendment (NPA 2013-10). Based on responses received, an opinion containing the final draft regulations for Specific Approval for helicopter offshore operations will be published early 2015.

The oil and gas industry has worked hard to provide the basic training required on EBS usage to all offshore workers, with 57,000 trained in just six weeks. Oil and gas industry safety group Step Change in Safety (Step Change) reports that feedback from the workforce on the lifejackets – as monitored through social media – has been consistently positive.

Passenger size v window size

Arguably the single action that received the most publicity at the time the Review was published was around passengers' body size. Quite simply, if passengers cannot fit through the push-out windows, they are not only at greater risk themselves, but also increase the risk to their fellow passengers, whose access to an exit may be blocked.

The Review stated that from 1 April 2015, helicopter operators would not be allowed to carry passengers who could not fit through the push-out window exits. This provoked some comment from unions and from the Transport Select Committee. Changing window

size is a significant design issue and would take some time to be introduced and might prove impractical for existing helicopters. Therefore, the Review action might potentially mean that some of the offshore workforce would not be able to be carried in helicopters with small windows. Those that could not be carried to offshore locations might be made redundant as a result.

This was not the intention and we have worked closely with Step Change, helicopter operators and experts at Robert Gordon University (RGU) to find the best possible solution.

A minimum width and diagonal measurement has been established for push-out windows. The width of the opening corresponds to passenger chest depth and the diagonal to shoulder width. (It has been established that these measurements are more relevant to escape through an emergency exit than body weight or BMI.) It is anticipated that workers' shoulder width will be measured during an initial dedicated campaign and then monitored at convenient opportunities thereafter. Any passengers that would not fit through these push-out windows will be seated adjacent to the larger exits which are required under the airworthiness rules on all helicopters.

Evidence from the RGU study indicates that the proportion of passengers needing to be seated next to a larger exit is compatible with the availability of these seats. As a result, we are confident that no offshore workers should lose their job due to the body size/window size action.

Reducing the risk of capsize in a ditching

From 1 September, helicopters have not been allowed to fly to or from offshore locations when the sea state exceeds the certificated ditching performance of the helicopter. This prohibition was included in the Safety Directive 2014/001 issued in May; helicopter operators were given time to work with manufacturers to confirm the certified ditching performance of their fleet.

EASA has subsequently issued Airworthiness Directives under which the demonstrated ditching performance of all offshore helicopters must be specifically notified in the Rotorcraft Flight Manual. Since first publication, EASA has further clarified the aim of the directives which is to ensure that the helicopter demonstrated capability will be known to those operating the specified aircraft and that this capability will be accounted for by the operators when assessing the safety of helicopter dispatch in any sea-state conditions.

Longer-term improvements

The Review also made the recommendation that helicopter operators should consider fast-tracking the implementation of some of the survivability improvements under discussion for inclusion in the EASA Rule-Making Task (RMT) 0120. This would mean acting in advance of the RMT being completed. Step Change has committed to investigate the feasibility of changes in these areas, working with manufacturers and helicopter operators. However, this recommendation specifically challenged helicopter operators to address the issue,

rather than the oil and gas industry. Given that survivability is high on the agenda of HeliOffishore, the newly launched industry body formed by helicopter operators, this may represent a more appropriate forum for progressing this work.

Progress is underway to review the broader safety and survival training provided to offshore workers. The Offshore Petroleum Industry Training Organisation (OPITO) leads on this and it has stated its review will be complete by February 2015, with new standards introduced by March 2015. While this is slightly later than we initially expected, it is nonetheless well underway. Further work to review pre-flight safety briefings will follow the completion of this training review. In the meantime, we are continuing to liaise closely with representatives of the offshore workforce to ensure that any concerns regarding pre-flight briefings are addressed.

Improving passengers' chances of rescue

Escaping from a ditched helicopter is only the first step to surviving an accident; the next is to make it into a life-raft and await rescue. Strong winds and high waves, both common in the North Sea, make it harder for rescue craft and helicopters to reach an accident site and locate and recover passengers and crew; these conditions can also compromise the effectiveness of the life-rafts. To mitigate this risk, we have now prohibited offshore flights when, at the planning and pre-departure stage, the significant wave height en-route and at the offshore location exceeds six metres (sea state 6 on the World Meteorological Organisation (WMO) scale). This prohibition came into force on schedule on 1 June 2014.

New clothing policy

Another important element in enhancing survival while awaiting rescue is retaining core body warmth in the cold waters of the North Sea. To that end, a new standardised clothing policy has been set by the oil and gas industry for offshore helicopter travel in UK waters having been agreed via Step Change. This industry policy requires all passengers to wear two layers of clothing under their survival suit in summer and three layers in winter (each including one long sleeve top). The specifications for the layers and the summer/winter switch-over dates have been standardised across all oil and gas companies and came into effect on 1 October 2014.

Chapter 2
Operations

While the actions toward increased survivability have led to immediate change, in the operations sphere, the actions are focused more on the medium term. Here, the Review identified some risks and issues, but set out to work with helicopter operators and the wider oil and gas industry to agree the most effective ways to raise safety standards.

Progress has broadly continued on schedule. Helicopter operators have shared their concerns and priorities, while further research has begun around helideck safety and offshore communications.

The most rapid progress has been towards the standardisation of pilot training. The input of helicopter manufacturers is leading to greater emphasis on adhering to documented procedures, particularly for the use of complex automated systems, and training is also being revised to address the operating environment of the North Sea. Developments in pilot training should ultimately help reduce incidents related to pilot error, particularly those associated with aircraft complexity; this is therefore a crucial long-term opportunity to increase the safety of helicopter travel, not only offshore but in all operations.

The engagement of helicopter operators, manufacturers and training organisations in the work to increase standardisation is welcomed, and it is anticipated that the progress to date – largely around standard-setting – will translate into more robust training programmes.

Adopting a more consistent approach to safety

One of the key findings of the Review was that while helicopter operators all had their own Safety Management Systems (SMS), there were major differences in what these addressed. The helicopter operators had already recognised this before the publication of the Review, and begun their own initiative, the Joint Operators' Review (JOR), which aims to share safety data and identify and agree on best practices. This led to the establishment of HeliOffshore, a new safety organisation consisting of five of the world's largest helicopter operators, which will also assume the roles of the trade body, the European Helicopter Operators' Committee (EHOC). HeliOffshore formally launched on 21 October 2014.

To support increased collaboration around safety, we held an SMS symposium in Aberdeen on 2 July 2014. This was attended by the main UK offshore helicopter operators, the Helideck Certification Agency, the Belgium CAA and the Danish Transport Authority.

At the symposium, we presented a detailed analysis of offshore helicopter safety occurrences and invited the industry to share their view on the risks affecting their

operation. There were open and frank discussions on safety, which led to the identification of a top ten list of issues, suggestions for their mitigation and meaningful measures of their performance. The top ten issues identified were:

- Night Operations to Helidecks
- Bow Deck Operations
- Training & Experience
- Oil & Gas Intrusion (including commercial pressure)
- Flight Deck Automation
- Operations to NUIs
- Fatigue (flight crew, engineering, ground operations staff, management)
- Helideck Standards (obstacles/collision/Fuel/HLO)
- Aircraft Design & OEM Support
- Weather (including lightning, weather information, visibility).

We are working with operators to refine these outcomes from the symposium and check that the suggested risk mitigations are appropriate.

Since the symposium, a member of our Safety Performance team has visited the three Aberdeen-based offshore helicopter operators to launch a collaborative project to raise the quality of reported safety data and its subsequent analysis. This will lead to improved ability to identify safety issues and measure safety performance (including the effectiveness of actions or controls to mitigate safety risk), which will contribute to a more effective SMS. The collaborative work will also include the development of bowtie safety risk models to target specific safety issues raised at the symposium, and any further concerns that emerge. The bowtie models will then provide the foundations for improvements that address the specific safety issues raised by the industry.

A further step towards consistency is a project being led by Oil & Gas UK which aims to harmonise processes for flight safety auditing. The project aims to identify and agree best practice standards for such audits, so that instead of undergoing multiple audits with slightly different demands for each customer, helicopter operators will increasingly be asked to demonstrate how they meet common standards. This will reduce the burden for helicopter operators but also help clarify the prime safety issues for customers.

The project is taking place in conjunction with the International Association of Oil and Gas Producers (OGP) with the aim of setting harmonised requirements. The OGP's Aviation Sub-Committee (ASC), the CAA and the helicopter operators are fully engaged with it.

The first phase outcomes will see the development of a standard Pre-Audit Questionnaire and Audit Template, available for download from Oil & Gas UK. Longer term work will

focus on improving audit management and quality, including performance measurement and auditor competence. These are important elements of addressing the commercial concerns flagged by the Transport Select Committee in its report, and are areas where we believe the industry is best placed to act collectively rather than the CAA alone. It is expected that the issue of harmonising safety audits will also be addressed in this way.

Reviewing and reducing risks around helidecks

The Review set out a longer term intention to improve safety on helidecks, in particular through the CAA taking responsibility for certifying them. The SMS symposium in July emphasised the view that a number of the most significant risks are helideck-related: by putting certification of helidecks on a more robust legal footing, safety standards on offshore helidecks should rise significantly.

Already, as per the Review's actions and recommendations, work has begun to review certain specific aspects of operations to offshore helidecks, to identify safety measures that can be taken in the shorter term.

Minimising the risk of fire

The Review endorsed our long-held position that post-crash fire is a reasonably foreseeable event and as such presents a major risk for helicopter accidents. Even though no post-crash fire is known to have occurred on an offshore platform in the UK sector, there have been isolated 'crash and burn' incidents in other offshore sectors dating back to the 1970s. CAA enforcement of good practice has not been possible due in part to the unlicensed status of helidecks, coupled with the fact that CAP 437 represents best practice standards for industry but is not applied in offshore regulation.

As a result, helicopter operators, supported by the CAA, raised the concern that fire-fighting provisions on a significant number of helidecks (those located on Normally Unattended Installations (NUIs)) is insufficient to address a worst case crash and burn event. In 2011, we wrote to Oil and Gas UK, requiring the companies that own and manage the NUIs to install additional automated fire protection equipment.

The Review reinforced our position, with recommendations specifically addressed at the oil and gas industry – to incorporate the fire-fighting provisions previously set out by the CAA for all offshore helicopter landing areas on NUIs, without delay – and at helicopter operators, to apply the same risk-reduction methodology they would use elsewhere to NUI operations too.

However, there remains significant debate between aviation regulators, helicopter operators and the oil and gas industry about what additional standards and equipment should be applied for NUIs. To bring the matter to a conclusion, we have commissioned Cranfield University to undertake a detailed review of the cases for and against improved fire-fighting services on normally unattended helidecks. The detailed study was completed in early 2015 and is presently under review. It is anticipated that the study will deliver a

series of conclusions and recommendations to inform a way forward and resolve the present impasse.

Reviewing operations at smaller helidecks

We have completed our review of whether operations should be permitted to continue at helidecks where the overall dimensions and/or loading areas are technically insufficient to accommodate the helicopter types now in use. Findings were shared with helicopter operators and the Helideck Certification Agency, and a paper was then presented to OHSAG in October 2014. The paper recommended that operations should be permitted to continue subject to certain conditions as specified in a risk assessment prepared by the CAA and endorsed by the helicopter operators.

Work to review the approval process for operations without a safe forced landing capability has continued as scheduled and further recommendations are expected in the next few months. The Cranfield University study into fire-fighting arrangements at NUIs is expected to have a particular impact on these recommendations.

Reviewing night operations

A specific risk was identified in the Review around night operations to helidecks, particularly those which take place to moving helidecks. Following a meeting with the Helideck Certification Agency in July, attended by helicopter operators, night operations to helidecks on small vessels where the visual references are known to be poor – such as operations to a bow-mounted helideck where the vessel is heading into wind or to a helideck on the stern that is heading downwind – will no longer be permitted to take place.

However, given the relatively small number of operations that take place in general to helidecks at night, and the limited exposure of the offshore pilot workforce to some types of operation, discussions have begun around extending the night prohibition to other types of floating facility, such as to larger floating production, storage and offloading (FPSO) vessels.

To inform this decision, we have convened a group, with the support of technical specialists from the helicopter operators, which will meet early in 2015 to conduct a bowtie study into helideck operations at night, together with other hazard scenarios. This will be complete by June 2015.

Raising the standards of pilot training

The Review identified a number of areas where pilot training could be improved, with the aim of reducing the number of accidents and near-accidents that occur as a result of human factors. These can be divided into a handful of themes:

- increasing collaboration between manufacturers and helicopter operators, to improve training and operating manuals and syllabi and ensure manufacturer recommended practices are produced and adopted

- ensuring that training programmes have the right balance between basic instrument flight skills and the use of automation, such as Electronic Flight Instrument Systems (EFIS)
- ensuring that training programmes specifically address the challenges of working offshore
- ensuring that each crew member's role is clearly defined and set out within helicopter operators' policy
- improving instructor training, and
- gathering information about training and candidate performance, to identify any trends in common failings.

Progress around actions and recommendations in all of these areas is firmly on track; indeed, in some areas work was well underway before the Review was complete. In February 2014, EASA implemented the new concept of Operational Suitability Data (OSD), to succeed Operational Evaluation Boards (OEB). OSD encourages manufacturers, helicopter operators, training organisations and EASA to work together to provide adequate type rating training for all aircraft – including helicopters – and allows the highlighting of Training Area of Special Emphasis (TASE) for specific types.

Manufacturers have provided strong support for the ongoing improvement of training manuals, which has meant progress has been faster than expected. Sikorsky, Airbus Helicopters and Agusta Westland are working closely with helicopter operators to standardise training and enhance Flight Crew Operating Manuals (FCOMs). The latter two are also progressing activities to produce a dedicated FCOM primarily addressing automation in the oil and gas operational context, which will take into account helicopter operators' best practices.

Together, these changes should enable helicopter operators to enhance training.

Helicopter operators are continuing to review training programmes, and have requested that the CAA provide further guidance around requirements for training in the use of Electronic Flight Information Systems (EFIS) and other automated systems. Work in collaboration with the European Helicopter Safety Team (EHEST) will see the development of an automation leaflet for use by the industry in setting best practice.

New EASA rulemaking activity, scheduled for 2015, is set to address the concern raised by crews that training and checking did not reflect real operating environments. We have agreed to draft a paper to EASA to explain the case for the adoption of Evidence Based Training within pilot licensing. Clearly, this requires improved information about the kinds of challenges flight crews face: to that end, future EASA legislation to address the need to improve flight data monitoring (FDM) will prove of considerable use. This is discussed further in Chapter 4.

With regard to instructor training, we have submitted further recommendations to EASA with the aim of increasing standardisation in this area. This has already led to improved guidance being developed, which is applicable to helicopter operators and approved training organisations. Helicopter operators have indicated that the synthetic flying instructors they work with have current operational knowledge of the helicopters on which they instruct, and that crews are invited to feed back to instructors around operational matters.

We have set out our proposals for improving information gathering on testing candidates' performance, and work is underway to put these into practice.

All of these separate workstreams point towards the same overarching goal: increasing the resilience, competence and confidence of offshore helicopter flight crews. They are the foundations for improvements in training programmes, rather than the improvements themselves, and their impact will only be seen over the longer term. Ongoing dialogue between all parties, but particularly helicopter operators, manufacturers and training organisations, is essential to delivering the higher standards that are required. This is an area therefore which will remain under considerable scrutiny over the coming years, and it is strongly hoped that the industry takes the initiative here rather than waiting for legislation and regulation.

Chapter 3
Airworthiness

Across Europe, airworthiness standards are established and the certification of aircraft is carried out by EASA. The Review focused on examining the process that maintains airworthiness and identifying any particular issues that relate to offshore helicopter operations. It made a number of recommendations to EASA, and to manufacturers, which if implemented could ultimately lead to higher levels of safety in offshore operations.

Clearly, any changes to design can only happen in the long term; however, the Review did pinpoint a number of opportunities for short- and medium-term actions to reduce risks, particularly around helicopter maintenance processes and standards. The immediate step, in several cases, is to conduct further research or formally review existing certification requirements; progress against these actions is largely on track. Where changes to type certification processes have been recommended, progress has understandably been slower, but we are working closely with EASA to examine these further.

Understanding technical failures and failure alerts

Ditching a helicopter in the waters surrounding the UK can be a highly risky exercise due to the potential difficulties with rescue and survival in low water temperatures. However, the required action in response to some significant technical failures is to land immediately; thus in an offshore setting, this would often involve ditching in the sea. Several recommendations and actions sought to propose changes that could help to reduce the likelihood of such ditching taking place unnecessarily.

Anecdotally, crews have reported that there have been numerous cases of false alerts, in particular in regard to engine fire warnings. Crews have therefore taken to viewing these alerts with some scepticism, seeking confirmation before following the requirement to land immediately or shut down an engine.

While this may be a practical response in isolated incidents, it is clearly not desirable in the long term. Therefore the Review recommended that EASA and manufacturers examine these issues further, with the aim of reducing false alerts and ensuring that “land immediately” instructions are only used when strictly necessary. EASA and manufacturers are working closely together in this process and are scheduled to report in the next few months; Airbus Helicopters has stated its intention to hold a seminar for pilots in January 2015 as part of its established Safety Partnership with the helicopter operators.

We have reviewed the issue of crew response to engine fire warnings, and confirmed that helicopter operators and crews are aware of the false alerts. Helicopter operators have now changed procedures to ensure crews take a measured response to any warning – checking for confirmatory signs rather than immediately shutting down an engine. Manufacturers are continuing work to modify their systems to improve reliability. On newer

models, some now offer tailfin mounted cameras to assist with in-flight confirmation of fire indications or other problems. Such developments are welcomed, but as well as improving new designs consideration should be given to how similar tools could be retro-fitted onto older models.

Redefining critical parts

The Review recommended several changes to the way that critical parts are identified and classified for helicopters that operate in the North Sea, and for how their performance is monitored in-service. We are working with EASA to provide further evidence for the Review's recommendations and discuss potential changes. In the interim, EASA has drafted a Certification Memorandum, under which CS-29 type certification (the main certification specification for large rotorcraft) now requires that manufacturers must agree a programme for ongoing verification of Critical Parts.

Ensuring Vibration Health Monitoring is applied consistently

Transmission failure was identified as a cause of several fatal accidents. Vibration Health Monitoring (VHM) is an established way of detecting wear and deterioration to transmission systems. However, the Review found evidence to suggest that our guidance regarding helicopter VHM (CAP 753) is not being applied consistently, and so set an action for the CAA to carry out focused audits into helicopter operator use of VHM data.

These audits have now been conducted, and we also looked at how alerts are handled. Results have been shared with helicopter operators, and identified improvements will now be progressed for each aircraft type and VHM system. We are reviewing our guidance on VHM and plan to publish updated guidance. EASA has already drafted a Certification Memorandum to clarify the need for and application of both red and amber VHM indicator alert thresholds.

Continuing Airworthiness

Improving maintenance standards

Though the Review found that maintenance was only involved in 7% of the accidents related to airworthiness, it is an area where there is clear scope for improvement. We have formed an Offshore Maintenance Standards Improvement Team with the offshore helicopter operators and manufacturers. It was clear during an initial workshop that this issue was also a concern within the fixed wing industry, so the scope of the team has been widened to include representatives from aeroplane operators too.

Four key workstreams were agreed for the team. These are:

- improving supervision and production planning
- implementing a safety culture and ensuring engineering responsibility
- improving the effectiveness of procedures

- improving training, induction and competency assessment.

In each area, the team is expected to deliver specific proposals that will enable a step-change in maintenance standards. Further meetings are already scheduled.

This builds on existing work by manufacturers to raise standards. For example, Airbus Helicopters as part of its Safety Partnership has held maintenance seminars and has now appointed a maintenance mentor to work in each of the helicopter operators' maintenance organisations.

Delayed progress around strip reports

While the improvements above indicate solid progress, progress has been slower elsewhere, in particular towards the goal of ensuring detailed component condition reports (known as strip reports) are provided when required.

We had intended to clarify by the end of June 2014 exactly when such reports should be provided; however, this task has proved to be more complex and involve more parties than had been expected. We are working with helicopter operators to use their influence to encourage maintenance providers to participate so that the revised target date can be met.

Further impetus to do so will come with the introduction of EASA's new Maintenance Review Board process, which is currently being formalised.

Human Factors errors

We have carried out a further review of the human factors maintenance error data and are on track to publish a report on schedule.

Chapter 4

Improving knowledge and facilitating change

As is clear from the discussions above, a lot of work at this stage has focused on improving the quality and depth of information about different aspects of offshore helicopter operations. This can then be the precursor to proportionate regulation, and to effective, relevant safety improvements.

Progress on actions to improve knowledge has been solid. As well as the specific research projects and reviews considered above, there has also been a commitment to ensure information about offshore helicopter operations is tracked more systematically and that safety reporting data is reviewed in greater depth. With regard to the former, a CAA Flight Data Monitoring (FDM) specialist is now working with helicopter operators to identify opportunities to improve their FDM programmes. This is in addition to more general collaborative work that aims to raise the quality of reported safety data and its subsequent analysis, referred to in Chapter 2.

To enhance the rigour of occurrence reporting – essential to information gathering and accident prevention – a new EU regulation 376/2014 on Reporting, Analysis and Follow-up of occurrences in Civil Aviation will come into force on 15 November 2015. This is a significant enhancement of the previous directive 2003/42/EC on occurrence reporting, and introduces specific requirements for follow-up and analysis of occurrence reports on several levels – helicopter operator, national aviation authority and EU level. This is also addressed through the implementation of Just Culture, which ensures protection of information and informants (in particular between organisations and NAAs).

We are also studying the Norwegian occurrence reporting system to help identify opportunities to improve occurrence reporting for this sector in the UK. As stated in the Government's response to the Transport Select Committee, findings of this study will be reported by 30 June 2015.

As part of the EASA programme, work is underway to improve the taxonomy used for classifying and coding of occurrences, so that the data gathered can be searched and applied more effectively. Analysis and classification on a European level is led by EASA, assisted by the Network of Safety Analysts (NoA) and Classification and Analysis Groups (CAGs), consisting of experts within the scope of each CAG domain. The CAGs are formed to improve the coding of events and to draw conclusions on the key issues identified. The Helicopter Accident Data Classification and Analysis Group (HADCAG) was launched in 2013.

A specialised sub-group of the HADCAG, which includes representatives from national aviation authorities, helicopter operators, manufacturers, safety investigation authorities and the European Cockpit Association, met in November 2014 to conduct an in-depth

analysis of offshore helicopter accidents in the North Sea in the period 2009-2013. The results are expected to be presented in a report in early 2015. This is part of the ongoing work that addresses the Review recommendation that EASA should lead the development of a management system that provides a structured review of all accident and serious incident reports.

Gathering this information is of course only the start; it then needs to be applied effectively to underpin relevant safety improvements and gain the buy-in of the industry. The Offshore Helicopter Safety Action Group (OHSAG) is a key forum for reviewing such information and agreeing actions. Several meetings have now been held and the minutes are available on the CAA website.

Learning from survivors

As well as improving formal data collection, it is recognised that there are important insights to be gained from the personal experiences of crash survivors. In its report, the Transport Select Committee made a recommendation (number 2) that the AAIB must keep crash survivors informed on the progress of its investigations; however this is a matter for the AAIB and not the CAA.

The Committee also suggested that the CAA could learn a great deal by meeting survivors and considering their experiences. We met with a few of the relatives and survivors on the 19th January 2015 to update them on progress made to date and to listen to their views on what more needs to be done that we can assist in. We have undertaken to meet again in 2015.

Chapter 5

Next steps

This report has examined progress to December 2014 against the actions and recommendations of the Review. In some areas, progress has been rapid – as it needed to be – to increase survivability and mitigate risks where it was comparatively simple to do so. In other areas, progress thus far has consisted mostly of building the evidence base to inform further action.

Over the next few months, we will consult on our proposal to assume responsibility for the certification of UK helidecks and act on the outcomes of our review of offshore communication and air traffic control. It is expected that Approved Training Organisations will build on the work completed to date to review pilot training materials by updating their syllabi, and that audit and inspection practices will be streamlined as per the recommendation.

It is expected that several of the actions taken to improve survivability will be underpinned by the ongoing EASA Rule Making Task (RMT.0120), which is scheduled to publish its proposals (Notice of Proposed Amendment – NPA) in June 2015 for industry consultation. The EASA final decision on rule changes is expected to be issued in June 2016, and should address the Review's recommendations as well as the actions both for new helicopters and existing aircraft.

But as well as these specific actions, it is strongly intended that the momentum built over this year should continue. In particular, the working relationships established between helicopter operators, regulators and manufacturers should lead to further safety improvements and the embedding of a stronger safety culture across the offshore helicopter industry. In practice, this should lead to consistently high-quality maintenance processes, more rigorous and appropriate crew training and above all increased information flow from helicopter operators to manufacturers so that issues encountered in flight can be addressed in production.

The ability to change, rapidly, and to address pressing issues has been amply demonstrated; rather than prioritising survivability, the focus now must be on continuous improvement so that the likelihood of incidents occurring decreases.

APPENDIX A

Progress at a glance

Actions

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A01	The CAA will establish and lead a new offshore operations safety forum to work for a substantial improvement in the safety of helicopter operations on the UK continental shelf.	Q3/2014	Complete		OHSAG established – see Improving knowledge and facilitating change, page 21
A02	The CAA will accelerate its work with industry to develop and apply Safety Performance Indicators to improve the effectiveness of helicopter operators' Flight Data Monitoring programmes.	Q3/2014	Initial action complete; revised delivery date for expanded scope Q2/2015	Q2/2015	Expanded scope to improve safety performance monitoring capability of helicopter operators' SMS – see Adopting a more consistent approach to safety, page 12
A03	The CAA will analyse lower risk occurrences (i.e. serious incidents and incidents) for the main areas of risk, technical and external cause occurrences in particular, in order to increase the 'resolution' of the analysis. This analysis will take the form of a rolling annual review of the last five years of occurrence reports.	Q3/2014	Complete		Detailed analysis presented at SMS Symposium, July 2014 – see Adopting a more consistent approach to safety page 12

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A04	The CAA will work with the helicopter operators via the newly established Helicopter Flight Data Monitoring (FDM) User Group to obtain further objective information on operational issues from the FDM programme.	Q4/2014	Initial action complete; revised delivery date for expanded scope Q3/2015	Q3/2015	Revised scope to first identify opportunities to improve helicopter operators' FDM programmes, before being able to use them to obtain information on operational issues. See Improving knowledge and facilitating change page 21
A05	With effect from 01 June 2014, the CAA will prohibit helicopter operators from conducting offshore flights, except in response to an offshore emergency, if the sea state at the offshore location that the helicopter is operating to/from exceeds sea state 6 in order to ensure a good prospect of recovery of survivors.	01-Jun-14	Complete		Prohibition in force – see Improving passengers' chances of rescue page 11
A06	With effect from 01 September 2014, the CAA will prohibit helicopter operators from conducting offshore flights, except in response to an offshore emergency, if the sea state at the offshore location that the helicopter is operating to/from exceeds the certificated ditching performance of the helicopter.	01-Sep-14	Complete		Prohibition in force – see Reducing the risk of capsize in a ditching, page 10

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A07	With effect from 01 June 2014, the CAA will require helicopter operators to amend their operational procedures to ensure that Emergency Floatation Systems are armed for all overwater departures and arrivals	01-Jun-14	Complete		Requirement in effect – see Improving passengers' chances of escape page 8
A08	With effect from 01 September 2014, the CAA will prohibit the occupation of passenger seats not adjacent to push-out window emergency exits during offshore helicopter operations, except in response to an offshore emergency, unless the consequences of capsize are mitigated by at least one of the following: a. all passengers on offshore flights wearing Emergency Breathing Systems that meet Category 'A' of the specification detailed in CAP 1034 in order to increase underwater survival time; b. fitment of the side-floating helicopter scheme in order to remove the time pressure to escape.	01-Sep-14	Complete		Action complete, but effectively superseded by progress on A10 – see New EBS for all passengers page 8-9

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A09	With effect from 01 April 2015, the CAA will prohibit helicopter operators from carrying passengers on offshore flights, except in response to an offshore emergency, whose body size, including required safety and survival equipment, is incompatible with push-out window emergency exit size.	01-Apr-15	On track		New rules agreed with industry; workforce to be measured – see Passenger size vs window size page 9-10
A10	With effect from January 2015, the CAA will prohibit helicopter operators from conducting offshore helicopter operations, except in response to an offshore emergency, unless all occupants wear Emergency Breathing Systems that meet Category 'A' of the specification detailed in CAP 1034 in order to increase underwater survival time. This restriction will not apply when the helicopter is equipped with the side-floating helicopter scheme.	01-Jan-15 01 -Apr-16	Revised for passengers; completed On track for flight crew		Oil and gas industry brought effective date for passengers forward to 1 September 2015. All passengers now wear EBS – see New EBS for all passengers page8-9; action on track in respect of flight crew
A11	The CAA will organise and chair an operator symposium on Safety Management to identify generic hazards, mitigations and Safety Performance Indicators for offshore operations.	Q2/2014	Complete		Symposium took place 2 July 2014 – see Adopting a more consistent approach to safety page 12

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A12	The CAA will review whether operations should continue at helidecks where the overall dimensions and/or loading values as notified for the helideck are insufficient to accommodate the helicopter types in use and take the necessary action.	Q3/2014	Complete		Review completed – see Reviewing operations at smaller helidecks page 14
A13	The CAA intends to assume responsibility for the certification of UK helidecks and will consult with industry to achieve this.	Q1/2015	On track		The CAA is presently drawing up a consultation paper intended to present options to OHSAG early in 2015.
A14	The CAA will review the conditions applicable to the issue of offshore 'exposure' approvals with a view to making them appropriate to the intended types of operation.	Q3/2014	Revised delivery pending review output	Q1/2015	Response subject to the output from the Cranfield University study addressing fire-fighting provision on NUIs which is due to deliver a final report on 9 January 2015 - see Reviewing operations at smaller helidecks page 14
A15	The CAA will commission a report to review offshore communication, handling and flight monitoring procedures from an air traffic control perspective and act on its outcomes.	Q4/2014	Revised delivery report for January 2015	Q1/2015	The report to review offshore communication has been commissioned through a meeting during December 2014 however the complexities of the actions required has resulted in a short delay. The report will be delivered in January 2015.

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A16	The CAA will, with industry, review the instrument flying training element for all EFIS-equipped offshore helicopter type rating courses to be satisfied that candidates have a firm understanding of the displays and techniques required for basic instrument flight. The CAA will propose to EASA any necessary improvements to the syllabus requirements.	Q4/2014	Revised delivery in line with EASA rulemaking activity	Q2/2015	Review underway: draft findings presented to EASA in April 2015. EASA rulemaking activity to commence in 2015. See Raising the standards of pilot training page 15-16
A17	The CAA will review all helicopter AOC recurrent training programmes to ensure that basic instrument flight skills are maintained so that crews can readily deal with manual flight if required.	Q2/2014	Complete		Review of recurrent training programmes complete; findings shared with helicopter operators, who are continuing to review their programmes. See Raising the standards of pilot training page 15-16
A18	The CAA will review the requirement for instructor tutor training and, if appropriate, make proposals to EASA to incorporate within Part-Aircrew.	Q4/2014	Complete		Proposals made to EASA – see Raising the standards of pilot training page 15-16
A19	The CAA will examine the output of its review into the safety of large UK commercial air transport aeroplane operations for relevance and applicability to ensure that any appropriate safety initiatives have been extended to the offshore helicopter environment.	Q4/2014	Revised delivery	Q3/2015	This is progressing through the CAA's Loss of Control Working Group.

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A20	The CAA will amend its examiner assessment protocols (CAA Standards Document 24) to require specific 'de-identified' candidate performance indicators so that any trends in common failings are visible for proactive attention.	Q4/2014	Revised delivery	Q1/2015	Proposals shared and under discussion. See Raising the standards of pilot training page 15-16
A21	The CAA will review the pilot recency requirements for helideck operations that have been incorporated into the draft requirements for the EASA Ops Specific Approval for Offshore Helicopter Operations and require operators to implement them to an agreed schedule.	Q3/2014	Revised delivery	Q1/2015	Review in progress with helicopter operators. Some have already implemented the requirements.
A22	The CAA will review helicopter operators' safety cases for night operations to bow decks to assess operator procedures and mitigations and determine whether such operations should continue.	Q2/2014	Revised target date for full assessment	Q2/2015	Night operations to helidecks on small vessels are now prohibited. An additional bowtie study group to include the wider issue of night operations in general, is expected to convene in January 2015. See Reviewing night operations page 15

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A23	The CAA will continue to develop its working relationship with EASA, in particular in the areas of sharing airworthiness information and the management of operator in-service issues. This will be achieved by periodic meetings and reviews with the appropriate EASA and CAA technical staff.	Ongoing	On track		Following an initial meeting to discuss the actions and recommendations of the Review, regular meetings have continued around specific topics, as illustrated throughout this report. EASA also supports OHSAG.
A24	The CAA will review CAA Paper 2003/1 (Helicopter Tail Rotor Failures) to determine how well the recommendations have been taken forward and to assess if further action is necessary. The conclusions of this review will be discussed with EASA.	Q3/2014	Revised delivery	Q1/2015	Review in progress: currently in correspondence with manufacturers and helicopter operators to establish the status and effectiveness of actions taken. Some submissions will not be completed before end of 2014.
A25	The CAA will review the human performance aspects of flight crew responses to engine bay fire warnings, specifically within the offshore operations environment.	Q3/2014	Complete		Review completed. Discussions with manufacturers and helicopter operators underway - see Understanding technical failures and failure alerts page 18
A26	CAA Airworthiness will meet with offshore operators periodically to compare the trends of MORs with operator in-service difficulty / reliability data to ensure that the complete risk picture is captured, addressed and that the desired outcomes are being achieved.	Q2/2014	Complete		Initial meetings with helicopter operators held; regular meetings now scheduled. See Improving knowledge and facilitating change page 21

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A27	The CAA will focus on Vibration Health Monitoring (VHM) download procedures, system/component reliability, the handling of VHM alerts and defects during audits of UK offshore operators.	Q2/2014	Complete		VHM audits have been carried out and specific improvements are being taken forward. See Ensuring Vibration Health Monitoring is applied consistently page 19
A28	The CAA will review CAP 753 to clarify alert generation and management, to ensure it is consistent and a system of amber/red warning thresholds is established to allow maintenance staff to identify the severity of the alert.	Q4/2014	Revised delivery	Q1/2015	Review complete; EASA have raised a draft Certification Memorandum to address R27, which is linked to this item. This will reviewed and CAP753 will be updated as required. See Ensuring Vibration Health Monitoring is applied consistently page 19
A29	The CAA will work with operators and their contracted engine and component maintainers to review processes that define when strip reports are required and determine necessary improvements to assure these are provided and thus ensure that potential safety information is not lost.	Q2/2014	Revised delivery	Q1/2015	Progress has been delayed as the Original Equipment Manufacturers are reviewing their procedures and then discussions will be held, leading to a revised target date. See Delayed progress around strip reports page 20
A30	The CAA will carry out a further review of Human Factors Maintenance Error data referred to in this report and publish the results to seek improvements in this important area.	Q4/2014	Revised delivery	Q1/2015	Review of data completed – report being drafted and will be circulated during January 2015.

Action	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
A31	The CAA will form an Offshore Maintenance Standards Improvement Team with the offshore helicopter operators with the objective of reviewing the findings at Annex F to the CAA Strategic Review of the Safety of Offshore Helicopter Operations and making proposals to achieve a step change in maintenance standards.	Q3/2014. Report Q1/2015	On track		The Scope and Terms of Reference for the Improvement Team has been defined and initial group meetings have been held. The four working groups, formed of operators and the CAA have all held and arranged further meetings. A review meeting will take place in January 2015 to review progress. See Improving Maintenance Standards page 19.
A32	The CAA will: · promote and support the implementation of the results of the research on helideck lighting, operations to moving helidecks, Differential GPS-guided offshore approaches and helicopter terrain awareness warning systems (HTAWS); · seek to ensure funding for the research on operations to moving helidecks, Differential GPS-guided offshore approaches and helicopter terrain awareness warning systems to allow timely progress to completion and once completed promote and support the implementation of the results.	Ongoing	On track		Retrofit of new helideck lighting in progress with a compliance date of 31 March 2018. Contract let for prototype deck motion monitoring system for validation trials. Discussions in progress with helicopter operators on moving forwards with in-service trials of DGPS-guided offshore approaches. Work on developing new HTAWS warning envelope progressing well.

Recommendations

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R01	It is recommended that EASA leads the development of a management system that provides a structured review of all accident and serious incident reports and recommendations of helicopters operating offshore or events which could have led to a ditching if the helicopter had been over water. This should be done in collaboration with other North Sea NAAs and the CAA to ensure a cohesive assessment of both accident causes (looking for trends) and remedies (looking for suitability and effectiveness) in order to prevent the segregated nature of accident reviews and ensure there is continuity to the safety reviews.	Q4/2014	Revised delivery	Q2/2015	Sub-group of HADCAG established to review accidents and serious incidents in offshore operations. See Improving knowledge and facilitating change page 21-22
R02	It is recommended that EASA involve NAAs annually in a forum to agree and exchange information on the performance of safety actions taken in line with accident and serious incident investigation recommendations and potential other improvements that could be adopted, where appropriate.		Complete		Two forum events held to date (April 2014, November 2014). Further meetings scheduled.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R03	It is recommended that EASA introduces procedures to monitor and track the efficiency and reliability of maintenance interventions when these are used during the certification activity to assure the safety target of the rotorcraft.		On track	Q2/2015	A rotorcraft specific MRB/MTB process is being formalised. EASA will also assess practicality of other approaches to monitor and attract efficiency and reliability of maintenance tasks.
R04	It is recommended that EASA ensures that the Type Certificate Holder completes a design review following a failure or malfunction of a component or system on any other similar feature on that aircraft type or any other type in their product line and defines appropriate corrective actions as deemed necessary.		Complete		This is already addressed under existing continuing airworthiness processes and procedures.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R05	CAA expects that offshore helicopter operators will address the following key items from the EASA RMT.0120 (27 & 29.008) draft NPA without delay: • Fitment of the side-floating helicopter scheme. • Implementation of automatic arming/disarming of Emergency Floatation Equipment. • Installation of hand holds next to all push-out window emergency exits. • Standardisation of push-out window emergency exit operation/marking/lighting across all offshore helicopter types. • Ensure that external life rafts can be released by survivors in the sea in all foreseeable helicopter floating attitudes. • Ensure that all life jacket/immersion suit combinations are capable of self-righting		On track for provisional target of Q3/2015	Q3/2015	This recommendation has been included in the Terms of Reference for the Step Change Passenger Size working group, but, due to the higher priority accorded to Action A09, work has yet to start. It is possible that the newly formed helicopter operators' group, HeliOffshore, may represent a better forum for progressing this recommendation. Progress on some of the items is understood to have been made at Airbus Helicopters.
R06	It is recommended that the EASA Helicopter Ditching and Survivability RMT.0120 consider making safety and survival training for offshore passengers a requirement.	Q2/2016	On track		Under consideration, pending discussion with industry and participating authorities.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R07	The CAA expects that OPITO will review and enhance its safety and survival training standards with regard to the fidelity and frequency of training provided.	Q4/2014	Revised delivery date	Q1/2015	OPITO is addressing this as part of its current (scheduled) review of industry training standard. It has commissioned formal research so that any conclusions are based on sound evidence. It is expected that the revised Standard will be published in March 2015.
R08	The CAA expects the oil and gas industry to incorporate the fire-fighting provisions detailed in CAP 437 (Standards for Offshore Helicopter Landing Areas) for Normally Unattended Installations without further delay.	Q3/2014	Revised delivery date	Q1/2015	A decision has been put back to Q1 2015 to allow for the completion of research by Cranfield University into safety at NUIs. A report was delivered to the CAA in draft form during January 2015. See Minimising the risk of fire page 14.
R09	The CAA expects the offshore helicopter operators to apply the risk-reduction methodology detailed in CAP 437 (Standards for Offshore Helicopter Landing Areas) for operations to Normally Unattended Installations to ensure that the foreseeable event of a crash with fire is appropriately mitigated.	Q3/2014	Revised delivery date	Q1/2015	A decision has been put back to Q1 2015 to allow for the completion of research by Cranfield University into safety at NUIs. A report was delivered to the CAA in draft form during January 2015. See Minimising the risk of fire page 14.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R10	It is recommended that offshore helicopter operators identify a set of 'best practice' standard procedures and engage with their customers to agree how these may be incorporated into contractual requirements.	Q1/2015	On track		Oil & Gas UK is leading on this, supported by OGP ASC, Heli Offshore (the organisation formed following the outcomes of the JOR) and the CAA. See Adopting a more consistent approach to safety page 12-13
R11	The CAA expects that the oil and gas industry will review its audit and inspection practices to harmonise and pool audit schemes to reduce the impact on helicopter operators following the principles described in the Oil & Gas UK Guidelines for the Management of Aviation Operations.	Q1/2015	On track		Oil & Gas UK is leading on this, supported by OGP ASC, Heli Offshore and the CAA. See Adopting a more consistent approach to safety page 12-13.
R12	It is recommended that EASA require helicopter manufacturers, in conjunction with the major operators of the type and NAAs, to review their recommended training material so that pilots are better prepared for operating modern highly complex helicopters.		Complete		This is covered within the OSD, which was introduced in February 2014. See Raising the standards of pilot training page 15-16

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R13	It is recommended that Approved Training Organisations (ATOs) and helicopter AOC holders adopt the aircraft manufacturers' operating philosophies and recommended practices, where available, within their type syllabi and current training and checking programmes with particular emphasis on automation. This information should also be reflected in instructor guidance so that specific learning points for the automated systems are addressed in a standard manner.	Q3/2014	On track – with Joint Operators Review (JOR)	Q4/2015	Manufacturers and helicopter operators are working together on this. Airbus Helicopters has now produced a flight crew operating manual (FCOM) for the EC225. See Raising the standards of pilot training page 15-16
R14	It is recommended that Approved Training Organisations and helicopter AOC holders review their type rating syllabi and recurrent training programmes to ensure that Standard Operating Procedures and monitoring pilot techniques are included at all appropriate stages of the type rating course, operator conversion courses and recurrent training/checking.	Q3/2014	Complete		ATOs and AOC holders have reviewed their syllabi and are making any necessary changes. See Raising the standards of pilot training page 15-16
R15	It is recommended that Approved Training Organisations and helicopter AOC holders review their training syllabi to ensure that the correct use and emphasis upon Standard Operating Procedures is impressed upon crews throughout all stages of flight and simulator training.	Q4/2014	Complete		ATOs and AOC holders have reviewed their syllabi and are making any necessary changes. See Raising the standards of pilot training page 15-16

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R16	It is recommended that Approved Training Organisations and helicopter AOC holders address with aircraft manufacturers any shortfall in the Operational Suitability Data training syllabi for those destined to operate the type offshore.	Q1/2015	Complete		Manufacturers and helicopter operators are working together on this and will continue to do so under the new OSD requirements. See Raising the standards of pilot training page 15-16
R17	It is recommended that AOC holders, in conjunction with the CAA, develop an Alternative Means of Compliance to introduce the option of Alternative Training and Qualification Programme, as permitted for aeroplanes in accordance with ORO.FC.A.245.	Q1/2015	Complete		This is now being undertaken by EASA, in accordance with 4 year rulemaking programme.
R18	It is recommended that Approved Training Organisations work with AOC holders to ensure that their Synthetic Flying Instructors have current operational knowledge of the type(s) on which they instruct.	Q4/2014	Complete		Most helicopter operators have confirmed that this is already standard procedure. See Raising the standards of pilot training page 15-16
R19	It is recommended that Approved Training Organisations and helicopter AOC holders establish a requirement for training record narratives.	Q3/2014	Complete		This is in development with ATOs and AOCs.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R20	It is recommended that EASA / Type Certificate Holder confirm the number of false engine fire warnings on offshore helicopters, investigate the reasons for them and determine what actions to take to address this important safety issue.		On track	Q2/2015	Manufacturers are working to address false warnings, and improve fire detection capabilities – see Understanding technical failures and failure alerts page 17. In conjunction with the national aviation authorities, EASA will conduct an analysis of known engine fire warning occurrences on Public Transport Large Helicopter Operations.
R21	It is recommended that the helicopter Type Certificate Holder identify all major components or systems that lead to a land immediately condition to ensure themselves that the actual reliability data available from the operators is validating the assumptions made at the time of certification. This review should be overseen by the regulator for the State of Design.	Q1/2015	Delayed		Awaiting clarification from CAA to OEMs

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R22	It is recommended that EASA initiate a rulemaking task to adopt the critical parts life monitoring and assessment requirements of Certification Specifications for Engines (CS-E) for large transport rotorcraft, currently subject to CS-29, including retrospective application. This should cover at least for the following areas: i. Residual stress assessments ii. Vibratory stress measurements iii. Manufacturing plan iv. Laboratory examination of time expired part	Q2/2015	On track		The relevant sections of CS-E will be reviewed to determine if additional guidance on critical parts would be beneficial, in particular the control throughout the life cycle. If so, either a Certification Memorandum (CM) or a revision to the AMC will be considered.
R23	It is recommended that EASA revise CS-29.602 for large transport rotorcraft intended to operate over hostile sea conditions for extended periods of time, to ensure the failure mode effects and criticality analysis process used to identify critical parts recognises that a safe ditching may not always be possible.		Complete		It has been agreed that the recommendation would not yield a measurable increase in safety based on the accidents and incidents considered in the report. Nonetheless in the wider context of offshore operations, EASA will continue to evaluate whether additional airworthiness requirements may be of benefit. See R25 below.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R24	It is recommended that EASA provide additional guidance material to improve standardisation in approach to the classification of critical parts to minimise inconsistencies in the instructions for continuing airworthiness and where appropriate to require revisions to existing Instructions for Continued Airworthiness.	Q2/2015	On track		The relevant sections of Instructions for Continued Airworthiness will be reviewed to determine if additional guidance on critical parts would be beneficial. If so, either a Certification Memorandum (CM) or a revision to the AMC will be considered.
R25	It is recommended that EASA consider developing requirements that could be applied to helicopters which carry out Offshore Operations in hazardous environments in a similar fashion to those used for aeroplane Extended Operations and All Weather Operations.	TBA	On track	Q2/2015	EASA will evaluate whether further rulemaking is justified to address this. This is linked to R22.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R26	It is recommended that EASA establish a forum for discussion for best practice and developments on Vibration Health Monitoring (VHM). This forum should include NAAs, operators and VHM manufacturers. The CAA expects that this could be achieved by the end of 2014.		Rejected		Several groups already exist to address this, such as the Society of Automotive Engineers (SAE) HM-1 Integrated Vehicle Health Management Committee in which EASA is involved, and other initiatives by Type Certificate Holders. EASA believes that any new forum would be best sponsored by the manufacturers, helicopter operators and in association with the EHEST, and major highlights could be presented for a wider audience during the EASA Rotorcraft Symposium.
R27	It is recommended that EASA review AMC 29.1465 to clarify alert generation and management, to ensure it is consistent and a system of amber/red warning thresholds is established to allow maintenance staff to identify the severity of the alert.	Q4/2014	On track		A draft Certification Memorandum (CM) has been prepared to address this, drawing on input from helicopter operators at a meeting in August 2014. The CM will be released for public comment during January, with final release planned for Q1/2015.

Rec.	Description	Delivery date (as set in the Review)	Status	Revised delivery date (if appropriate)	Details
R28	It is recommended that the UK Met Office and the helicopter operators fully implement the triggered lightning forecasting system, subject to satisfactory performance during the present in-service trials.	Q3/2014	Revised target	Q2/2015	Requires extension of trial – helicopter operators keen to progress.
R29	It is recommended that the offshore oil and gas industry, helicopter operators, helicopter manufacturers and regulators: continue to support the helicopter safety research programme establish a less labour intensive, more regularised arrangement between participating organisations for the funding of research projects establish, via Oil & Gas UK, a faster and more focused approach to implementation of successful research projects. This should be in addition to and in advance of the enhancement of the aviation rules and guidance material.		Revised target	Q1/2016	Good support continues from all parties for the Helicopter Safety Research Management Committee (HSRMC). Funding remains an issue, but the launch of HeliOffshore by the helicopter operators may provide a good way forward for this and for expediting implementation of results, where appropriate.