



Annual Diving Incident Report

BSAC Incident Report 2020



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Introduction

The incident report for 2020 is impacted by the reduced amount of recreational diving occurring in the UK and overseas and consequently reduced reporting of incidents.

The majority of information contained within this report is also shown in graphical form. Please note that all data information is produced from UK data only and does not include overseas incidents unless noted as 'all incidents'.

The contents of this report are split into an overview of the year, and then the details of eight incident categories plus some historical analyses. Within each category the incidents are listed in the order of their occurrence, not necessarily that of incident reference.

They are laid out in the following format:

Month / year of incident

Incident reference

Brief narrative of incident

The nature of many diving incidents is such that there is usually more than one cause or effect. Where this is the case, the incident has been classified under the more significant cause or effect. For instance, an incident involving a fast ascent, causing decompression illness, will be classified under 'decompression incidents'.

Please browse through the details in this report and use the synopses to learn. The individuals who have provided this information have had the courage and generosity to record their experiences for publication so that we can use this information to avoid similar problems.

Finally, if you are unfortunate enough to have an incident, please help us maintain the most comprehensive recreational diving incident reporting system in the world by reporting it using our incident report form, available at bsac.com/reportanincident or from BSAC HQ. As always, your anonymity is assured, great care is taken to preserve the confidentiality of any personal information recorded in BSAC incident report database.

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Acknowledgements

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- Maritime & Coastguard Agency
- MOD Superintendent of Diving
- PADI Europe, Middle East and Africa
- Royal Society for the Prevention of Accidents
- Scottish Sub-Aqua Club
- Sub-Aqua Association
- CFT – Coomhairle Fo-Thuinn – Irish Underwater Council
- Lizzie Bird for data input
- Ron Evans for proofreading this report
- All divers and other sources who have taken the trouble to complete incident reports and share their learning experience with others

Cover photograph by Jane Morgan

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Analysis of the incident database

BSAC is the National Governing Body for the scuba diving and snorkelling in the UK; an important part of our role is that we report annually on the diving incidents in the UK. BSAC has been assembling data on recreational diving incidents for over 50 years. Most incidents are reported through the incident reporting forms which are supported by all the diving agencies in the UK and Eire and the form is now available online at bsac.com/reportanincident.

We are also extremely grateful for the very valuable contributions of the Maritime & Coastguard Agency, the RNLI, MOD Superintendent of Defence Diving, PADI Europe, Middle East and Africa, and the Royal Society for the Prevention of Accidents. The BSAC Incident Report is intended to help support diving agencies and rescue services by providing information to help inform strategic decisions. In addition to receiving reports from these sources, BSAC engages a media clippings service which gathers incidents that are reported in the press and online media.

When interpreting the BSAC Incident Report it is important to understand the parameters under which the data are collected. BSAC does not report on incidents which are wholly commercial in nature, such as incidents involving professional scallop fishermen or operational work dives in harbours. It does however include all recreational instruction dives even when a commercial instructor is involved.

In the process of closing the annual database, the reports we receive are carefully analysed to remove duplicated records. It is not unusual to have reports from two or three different sources about the same incident. Details in the reports such as location, dates and times are all helpful in the process of removing duplicated reports from the database. The data analysed to produce these graphs,

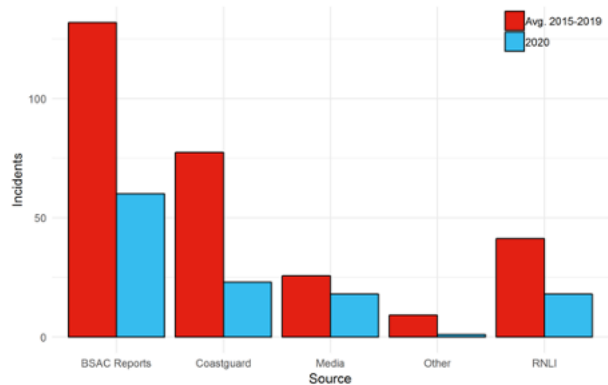


Figure 1. The source of reports contributing to the BSAC incident analysis

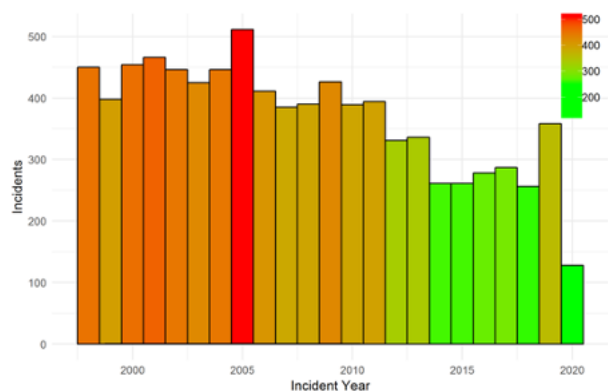


Figure 2. Total number of UK and overseas reported incidents

involve all diving affiliations and not just BSAC.

In the calendar year of 2020, we have recorded 128 incidents including 26 classified as overseas (Figure 2). The significantly reduced number of incidents reported in 2020 can be attributed to the restrictions on diving activity due to the Covid-19 pandemic. This reduction in diving incidents is, of course, a good thing but it does make it harder to draw any definitive conclusions or lessons learned from this extraordinary year. Nevertheless, for completeness we have reported in the traditional format.

Incidents by month

The diving year of 2020 was impacted by restrictions on diving activity which changed throughout the year and differed across the devolved nations. Figure 3 shows how the number of incidents varied by month and how these numbers were related to the restrictions in place across the UK which prevented diving.

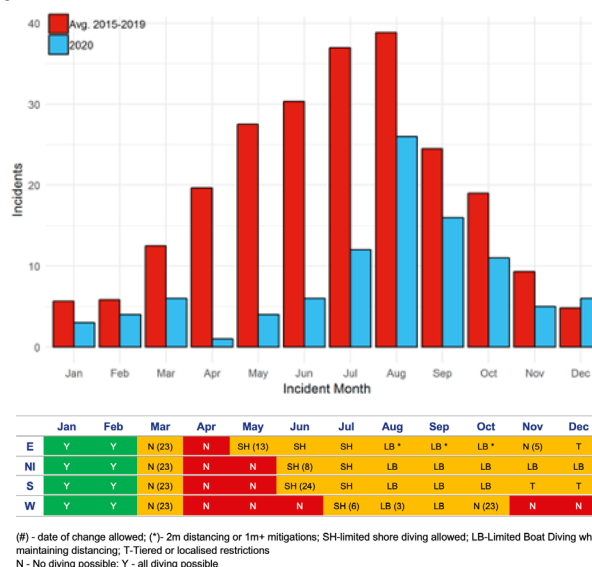
Diving was not restricted at all in January, February and early March of 2020: we do not normally see much diving in these months and consequently incidents are rare in normal years. However, on 23 March, the UK entered lockdown due to the Covid-19 pandemic and we see very few incidents for the next three months. Observant incident report readers may note the diving incident which occurred in April when the UK was in total lockdown; we invite you to read incident number **20/019** for the explanation of this.

Limited shore diving was reintroduced at different times in each of the devolved nations (Figure 3) with large boat diving reintroduced in August. However, whilst large boat diving was then possible, restrictions on accommodation and travel impacted the amount of diving throughout the rest of the year.

Incidents by category

The incident database assigns all incidents into one of eight major categories. Figure 4 shows the allocation of the 2020 incidents into these categories. The incidents are

Figure 3. Number of incidents occurring in each month of the calendar year and the related Covid-19 restrictions



classified by the most serious attributable factor; for example, if a fast ascent results in a DCI event, then the incident is reported as a DCI; however, if a fast ascent results in no serious ill effects, then the incident is classed as an ascent-related event.

In 2020, it was possible to accurately allocate every incident to an attributable factor, leaving no incidents to allocate to the miscellaneous category. The ascent category involves incidents where divers have made an abnormal ascent but avoided DCI or other injury.

In 2020, there was no great change in the pattern of distribution of incidents across the different categories, even though the number of incidents reduced across the board. There is a slight indication that there were proportionally fewer cases of DCI reported than previous years and slightly more illness/injury. This change of balance can be affected by the amount of information available to us through the reporting mechanism as incidents of medical evacuation where DCI may have been the cause but is not confirmed are reported in the illness/injury category.

Despite a significant reduction in the number of incidents in the UK, unfortunately there were six diver fatalities. More detail appears later in this report.

Incidents depths

The traditional format of the incident report provides information on the maximum depth of the dive on which the incident occurred and the depth at which the incident began.

The maximum depth of the dive during which incidents took place, categorised into depth range groupings, is shown in Figure 5. This year we see no change in the proportion of incident dives carried out at different depths (Figure 5). It is common that the symptoms of DCI become apparent on the surface and other surface incidents involve boats and boating incidents and divers who are lost. Incidents do not always occur at the deepest point of the dive.

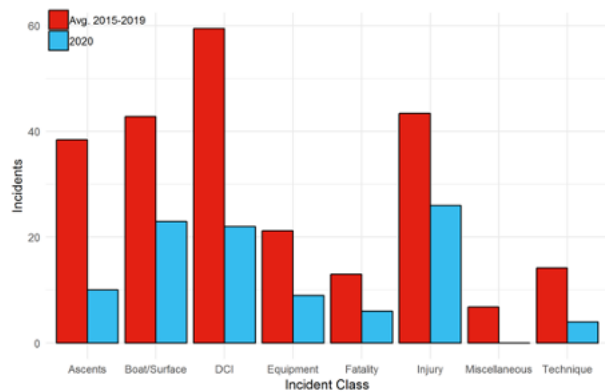


Figure 4. Reported incidents by category

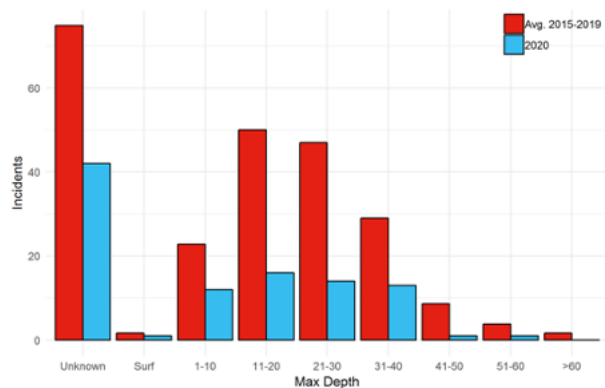


Figure 5. Maximum dive depth (m) in which the incident occurred

In five incidents in August a rescue helicopter was required (Figure 10).

Fatalities

Sadly, six fatal incidents occurred in the UK during the 2020 incident year. Two of the fatalities were BSAC members. One involved cave diving, one involved snorkelling and one involved the death of a diver who fell ill before diving.

Each of the fatalities was very different in their nature making it impossible to discern any common factors amongst these fatalities. However, in at least two of the fatalities, it would seem likely that a significant medical event had directly led to the death of the casualty; in others there is simply not enough information to be able to comment.

Immersion pulmonary oedema (IPO)

We now record in the database when the description of the dive indicates that IPO is a possible factor in the incident. We record the incident as a confirmed IPO when we have medical confirmation of that cause.

Figure 12 shows that there were eight incidents this year where there were one or more of the following identifying factors present:

- Divers with breathing difficulties when not exercising particularly strenuously. Breathing difficulties may be indicated by rapid, uneven, or heavy breathing, or coughing uncontrollably.
- Confusion, swimming in the wrong or random directions.
- Inability to carry out normal functions, whilst appearing to have to concentrate on

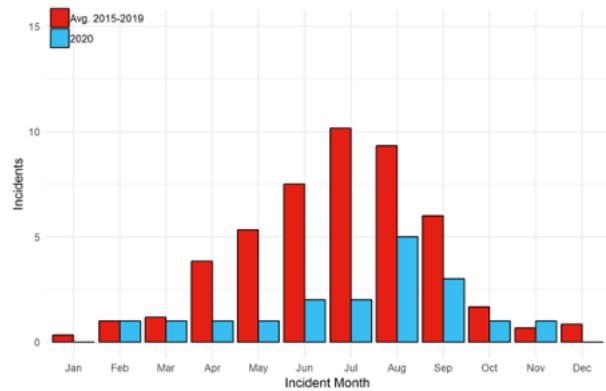


Figure 10. Divers' use of SAR helicopters in each month of the incident year

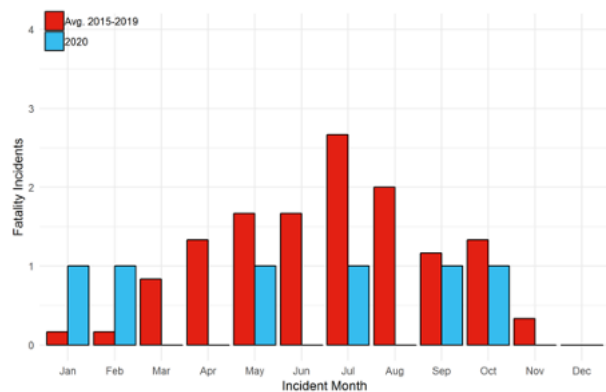


Figure 11. Fatalities in 2020 by calendar month compared to previous five years

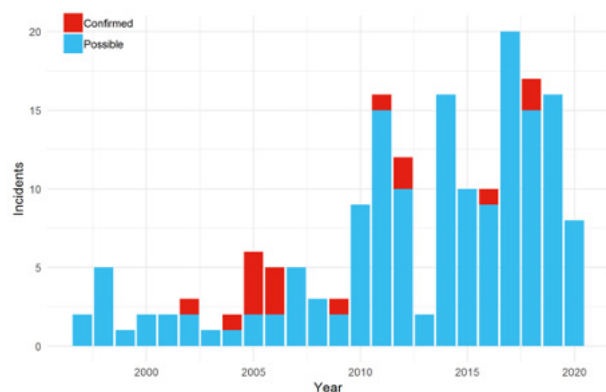


Figure 12. The frequency of confirmed and possible cases of IPO from 2010 to 2020

breathing.

- Belief that a regulator is not working properly.
- Indication of 'out of gas' when their regulator(s) are found to be working correctly and with adequate gas supplies.
- Divers refusing or rejecting an alternate source when 'out of gas'.
- Indication of difficulty of breathing when on the surface.

BSAC continues to recommend that the advice from the medical experts is followed; that if you experience breathing difficulties underwater you should terminate the dive and ascend safely and exit the water.

If you recognise any of the above factors in a buddy, then assist them from the water as quickly as it is safe to do so. Once out of the water, the casualty should sit, be given oxygen and medical advice sought.

Long term trends in the classes of incident

This year we continue the analysis of the data using BSAC membership numbers as a proxy for the level of diving taking place in the UK and then present this data using a 5-year rolling average.

Figure 13 shows that the incidence of fatalities has remained relatively stable over the analysis period. The graphs highlight the variability behind the data, however it can be concluded that there is a downward trend over time of the incidence of decompression illness, ascent-related events and boating and surface incidents.

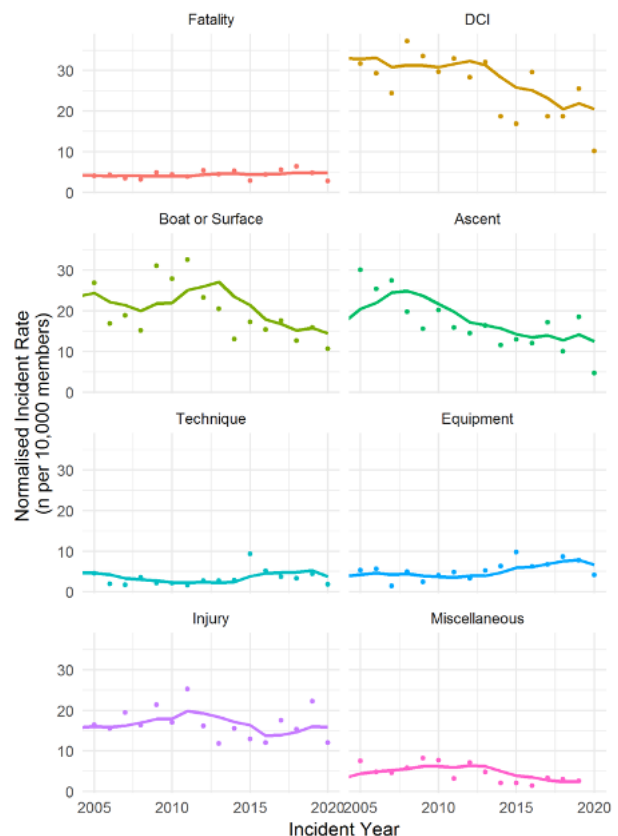


Figure 13. Incident rates by incident class using BSAC membership as a proxy for estimated participation in the sport. Trendlines are a five year rolling average.

Conclusions

Key conclusions of the 2020 incident report are:

- As a consequence of lockdown and restrictions due to the Covid-19 pandemic many divers found their diving limited in 2020. We have always strongly suspected that the number of incidents is closely linked to the amount of diving occurring. The incident year 2020 shows, somewhat unsurprisingly, that when diving activity decreases, we have fewer incidents.
- In addition to the overall number of incidents, the monthly incident frequencies are very closely linked to the restrictions on diving in place in the UK each month.
- Very sadly, despite a reduction in the number of incidents there were six fatalities in the UK. Of these six, one involved cave diving, one involved snorkelling and one occurred prior to diving.
- Some of the incidents reported within this document could possibly have been avoided had those involved followed a few basic principles of safe diving practice. In addition, many of the unavoidable incidents are prevented from escalating into something more serious by the prompt utilisation of rescue skills and the rapid support of the rescue services. BSAC publishes online advice on 'Safe Diving' (bsac.com/safediving) summarising all the key elements of safe diving practice.

Fatalities

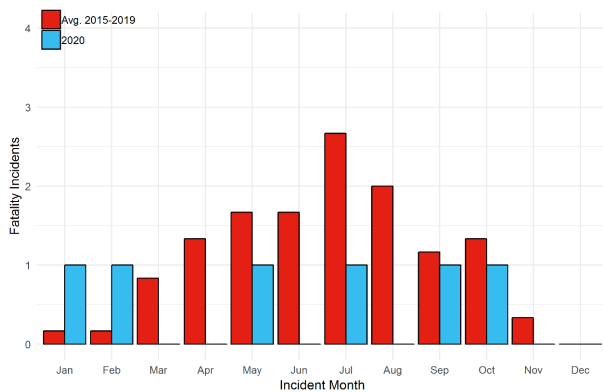


Figure 14. The month of occurrence of fatalities

January 2020

20/001

On a late Saturday afternoon, the Cave Rescue Organisation (CRO) were called by Police who reported an overdue diver on a fell cave dive. 40 CRO team members and members of a section of the Cave Diving Group (CDG) responded and searched that night and into the early hours of Sunday from the point where the diver had entered the cave. Other entrances and possible exits were also searched.

Whilst conducting an underwater search, a safety diver found the missing diver approximately 60m into a sump. The diver was immediately brought back to the sump pool chamber, removed from the water but it was apparent he was deceased. All team members conducted a lengthy and difficult extraction of the diver back to the surface of the fell and handed him over to the care of the Police. (Media report).

February 2020

20/009

A group of four divers entered the water to carry out a shore dive from a bay in relatively calm conditions. Staff at a dive centre were alerted by members of the public who had spotted two divers who appeared to be in distress on the surface. The dive centre's rescue boat was launched as it was initially reported that another diver was missing.

Meantime, a shore party with one of the staff from the dive centre and two members of the public who volunteered to assist, climbed over

rocky ledges to where the two distressed divers had been spotted. Neither diver had been underwater as they were preparing to descend when one of them became ill and was towed by his buddy to the nearest rocky shore point where the shore party recovered them. The diver was unresponsive and not breathing and CPR commenced. The buddy was exhausted but began to recover.

The other two divers were located by the rescue boat and in rapidly deteriorating weather condition were returned to the dive centre's slipway. The conditions where the shore party had recovered the two divers was now being affected by increasing wave action and wind which made evacuation from the edge of the rocky shore difficult as they were exposed to constant spray and the strengthening wind.

The Coastguard had been contacted and they tasked a lifeboat and helicopter to attend the scene as there had been a report, which turned out to be incorrect, of a missing diver. One of the crew members from the dive centre's rescue boat and two students, who were undertaking commercial diver training at the centre, had joined the shore group to assist with CPR about 20 min after it had commenced. A Coastguard rescue team member arrived to assist and he was soon joined by other Coastguard colleagues, the police and paramedics from an ambulance. The lifeboat arrived in the worsening weather conditions to assist by which time the unconscious diver had been moved over the difficult rocky terrain to a position where CPR could continue.

The lifeboat received a further report of another diver drifting out of the bay but upon investigation it was found that the object was the dive equipment from one of the recovered divers. As the emergency services on shore were now dealing with the incident the lifeboat returned to its station. With the combined efforts of the shore party and emergency services the unconscious diver was recovered over the rest of rocks to an area where he could be transferred to the ambulance. It was later reported that the diver had died. (Coastguard & RNLI reports).

May 2020**20/020**

A snorkeller was last seen around 5pm diving in the area of a sea cove. He was with one other person when he went snorkelling and the alarm was raised by a third party on behalf of the family around 2 hours 30 min later. A Coastguard rescue team, three lifeboats and a Coastguard rescue helicopter were sent to the scene. A Royal Navy helicopter, two Royal Navy warships, police helicopter and police were also involved in the two-day search.

Three weeks later the police received a report of what was believed to be a body in the water off the coast which was recovered with the help of the Coastguard and a lifeboat. The body was confirmed to be that of the snorkeller. (Coastguard and RNLI reports).

July 2020**20/033**

Salmon farm workboats were alerted by the Coastguard to a 'Mayday' call they had received concerning a diver in difficulties on the shore. The boats set off in different directions to try and locate the diver. One of the boats soon spotted a beached dive boat and two divers on the beach one of whom was performing CPR on the other.

The salmon farm staff were all trained first aiders and one of them took over the CPR while another staff member comforted the other diver until Coastguard rescue teams, the police, paramedics, and a rescue helicopter arrived at the scene. The diver was pronounced dead at the scene. (Media report).

September 2020**20/050**

A group of divers were aboard a dive charter boat with a shallow scenic dive planned prior to a 30m wreck dive.

Whilst travelling to the site, one of the divers was putting his equipment together comprising twin manifolded 10 lt cylinders and a stage cylinder. They fell from the bench they were standing on damaging the cylinders valves and prevented the diver taking part in the first dive. He borrowed a spare 10 lt twinset from another diver and was

helped to attach these to his wing BCD and back plate. The diver also borrowed an alternative first stage regulator in place of one that had also been damaged and switched over his second stage and inflator hoses from the damaged first stage to the borrowed one.

As the diver's buddy had not turned up, he asked if he could buddy with two other divers which he knew on the boat. They were at the back of the boat and did a buddy check, but the diver was at the other end of the boat so did not buddy check with them. Prior to entering the water, the diver confirmed that he had around nitrox 65 in his stage cylinder. The three entered the water, finned to the shotline, signalled, and descended together.

At 7m the diver, who was ahead on the shotline, came to a stop and rolled from side to side. One of his buddies descended alongside him and saw the shotline was caught between the diver and his stage cylinder and he had no regulator in his mouth. This was on the hog-looped long hose and looked as though it had come over the diver's head and was out of reach. The buddy put the regulator in the diver's mouth and freed him from the shotline. The diver took a few seconds to compose himself, re-configured his hose, signalled 'OK' and to descend. Whilst descending the diver turned round, checked his buddies, and gave the 'OK' signal again.

The divers reached the bottom at 30m and the diver moved off the shotline and knelt down. One of the buddies thought this a little strange as the diver usually came to a stop above the bottom in a neutrally buoyant horizontal position. Both buddies descended in front of the diver to see what was happening. He looked heavy, was clearly squeezed by his drysuit and trying to inflate it. They asked if he was 'OK' and the diver pointed to the drysuit's inflate valve, shrugged, and then signalled he was aborting the dive and ascending.

He began swimming up, got onto the shotline then rolled sideways and fell to the bottom on his back. His regulator was not in, his arms out to the side and he was motionless. The buddies swam to him, and one tried to replace the regulator but was unsuccessful. The other

buddy grabbed the diver's shoulder harness and tried to lift him but the diver seemed very heavy, so the buddy put more air into the diver's BCD, but this didn't seem to work. The buddy inflated his own wing BCD to try and lift them both, but this also did not work and whilst trying to re-position himself he let go of the diver, lost buoyancy control and ascended a few metres. The other buddy tried again to put a regulator in the diver's mouth and pressed his suit inflator valve which initially did not work and then quickly filled the diver's drysuit and seemed to stick open. The diver began to rise quickly, and the buddy tried to grab a fin but could not stop the ascent.

Both buddies then quickly ascended, surfaced with a dive duration of around 7 min, saw the diver about 7m away and shouted and signalled distress to the boat. The buddies were recovered aboard, were sat down and breathed from their nitrox 50 decompression cylinders and one buddy's computer indicated a rapid ascent but neither had symptoms of DCI. As the buddies were recovered aboard their boat another dive boat on the site had recovered the diver, unresponsive with no pulse and not breathing. CPR was given and an AED used on the diver for nearly 20 min. 'Mayday' calls had been made to the Coastguard and a lifeboat tasked to the site.

The boat that had recovered the two buddies stayed on the site to recover any surfacing divers from the second dive boat which rendezvoused with the lifeboat and transferred the diver into their care. Both dive boats made their way back to shore where the two buddies were transferred to an ambulance and after doctors from a hyperbaric chamber had spoken to them, they were taken by helicopter to the chamber. They did not undergo recompression treatment but were put on oxygen, monitored overnight, and discharged the following day.

October 2020

20/065

A pair of divers were on a liveaboard diving trip and had completed three days of diving together with two dives per day. On day four, the pair entered the water to dive a wreck in a depth of approximately 44m to the seabed. One diver

was using twin independent 12lt cylinders with nitrox 27 and stage cylinders of nitrox 40 and nitrox 80 for decompression. His buddy was using a rebreather with trimix 12/60 as diluent and bailout gas of nitrox 28.

The pair entered the water and began their descent pausing for a bubble check at 3-4m and on reaching the wreck headed towards the stern and then followed the hull down to the seabed reaching a maximum depth of 43m. The pair headed towards the bow drifting in a slight current running from stern to bow noting a number of guns alongside the wreck on the seabed. On reaching the bow of the wreck, they realised they had missed a landmark for the shotline and ascended to the top of the wreck and then made their way aft into the current.

After about 10m, the diver on open circuit was seen by his buddy to deploy his DSMB with not too much gas in it. The buddy decided to deploy his own DSMB whilst he was 3-4m above the wreck and once he had deployed it, he noticed the diver was 2m above him and although he tried to ascend quickly to catch up the diver appeared to be ascending quite quickly and the buddy was unable to keep up. The buddy slowed his own ascent around 25m and then made a normal ascent whilst unable to see the diver assuming he would stay in sight of his DSMB line and they would subsequently meet up around 12m.

The buddy ascended to 12m and realised the pair were now separated and so began his decompression stops. On clearing his decompression requirements, the buddy surfaced and regained the dive boat not expecting to find his buddy aboard as his decompression requirements would have been greater being on open circuit. The diver's DSMB was clearly visible standing upright and about 50% being submerged. However, after approximately 109 min the buddy became concerned and after asking for the boat to move closer no bubbles could be identified.

The buddy donned a mask and fins and entered the water and swam to the DSMB about 20m away. The buddy could see the DSMB reel but there was no sign of the diver

and so informed the boat there was “no diver”. On recovering the reel, it was found to have approximately 8m of line reeled out. The dive boat skipper had made a ‘Mayday’ call and began a surface search assisted by other local charter boats. In total some 18 vessels were involved in a surface search including two RNLI lifeboats and a ferry. One of the other charter vessels deployed divers onto the wreck after a sonar scan located a target off the bow of the wreck and the missing diver was located some 20m off the bow and recovered to the surface and onto the lifeboats. The diver was found with gas in all cylinders and regulators were functioning correctly. The diver was returned to shore where he was declared deceased.

Decompression incidents

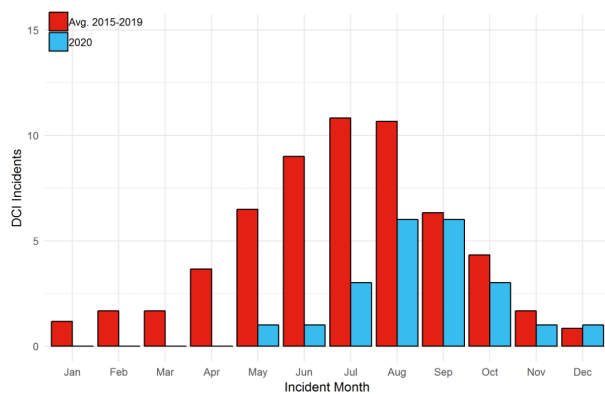


Figure 15. The month of occurrence of decompression incidents

May 2020

20/021

A diver and his buddy, both using nitrox 29, carried out a shore dive on a hot sunny day. They swam 30m on the surface to a marker buoy and descended to the bottom of the line at 7m.

Although the diver had not dived for a while, he was comfortable and happy, and the pair dropped over a wall to around 15m. They continued to descend down the wall and the diver signalled that he was happy to go deeper. They followed the wall for approximately 12 min reaching their maximum depth of 32m before ascending to 25m where they spent 12 min.

They had accrued approximately 4 min of decompression and made a slow underwater swim back to their exit point. Their decompression requirement had cleared at 8m and 45 min into the dive, they ascended from 6m taking 10 min to surface with a dive duration of 62 min. Both divers felt well on the surface, drank water, and left the dive site.

That evening the diver called the buddy to say he had a rash like bruise on his stomach together with mild pain. It was hard to detail the pain as it was in an area of previous scar tissue which had left numbness, but the diver was advised to contact a hyperbaric chamber.

The diver attended an A&E department for a Covid test and was then admitted to the chamber where a skin DCI was diagnosed, and he received 6 hours of recompression treatment.

June 2020

20/022

A diver and his buddy, both using air, carried out a shore dive which was their first following the Covid-19 lockdown. The pair carried out a buddy check and dive brief which included the agreement to keep the dive to a maximum depth of 15m. A condition by a medical referee was that the buddy was not to exceed 20m on dives.

They descended along a shallow sloping bank and at 15m reached the edge of a drop off to an unknown depth. The buddy started to descend quickly over the edge and believing he had gone into an uncontrolled descent; the diver dumped his air and at 23m caught up with the buddy who realised he had exceeded the agreed depth limit and had tried to add air to his BCD with little effect. The diver took hold of the buddy's shoulder strap and inflated his own BCD to stop the descent. They ascended to 20m, exchanged 'OK' signals and holding onto each other began a controlled ascent but lost buoyancy and ascended quickly to the surface.

Following a short discussion on the surface the pair decided to try again. Buoyancy problems continued to be encountered which resulted in a saw-tooth profile involving a series of rapid descents and ascents to and from 9m, 18m and 7m. The diver took the decision to abort the dive and they surfaced with a dive duration of 26 min to a maximum depth of 23m.

Shortly after de-kitting the diver began to feel dizzy and sick with 'tingling' in his toes on both feet. The dive manager put the diver on oxygen, gave him fluids and called a DCI helpline. They advised calling the emergency services to evacuate the diver to a recompression chamber.

The emergency services arrived and following an assessment of the pair the diver was airlifted to the chamber. The buddy was showing no symptoms.

The diver underwent five hours of recompression treatment and made a full recovery but was advised not to dive for four weeks.

July 2020**20/031**

A diver – using nitrox 32 and carrying a nitrox 80 decompression cylinder and his buddy using air – carried out a drift dive on a humid then sunny day. They reached a maximum depth of 32m with a dive duration of 28 min including a 3 min safety stop at around 6m.

The safety stop was slightly extended as the buddy could not maintain buoyancy at 6m but did not descend below 7m or ascend above 4m, during which the diver carried out a gas switch.

Back aboard their RHIB the buddy mentioned the safety stop felt slightly like being in ‘a washing machine’ caused by wave action. The buddy assisted with shot recovery and preparation as the boat, with the diver as cox’n, made its way to another drift dive site. The buddy said to the diver that he felt unwell and was then sick overboard.

The diver took over from the less experienced dive manager, laid the buddy down and put him on his nitrox 80 decompression cylinder while the oxygen kit was prepared for use and made contact with a diving doctor. The diver appointed the next most experienced cox’n to head towards the marina which was their shore base. The buddy explained he was suffering from ‘pins and needles’ in his arms but had no joint pain.

The diver carried out a neurological assessment and concerned with the buddy’s slow response to questions he made a ‘Pan Pan’ call to the Coastguard. The buddy was given water and then complained about visual disturbance, and this was passed to the Coastguard.

After approximately 15 min the buddy felt better, wanted to come off the oxygen and sit up but the diver would not let him. The Coastguard requested the RHIB’s arrival time at the marina to meet with an ambulance and a Coastguard rescue team.

The buddy was handed over to the ambulance and transferred to a hyperbaric chamber where he underwent 7-hour 30 min of recompression treatment. The buddy was discharged early the following morning.

July 2020**20/123**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

July 2020**20/124**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

August 2020**20/125**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

August 2020**20/126**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

August 2020**20/127**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

August 2020**20/038**

A diver and his buddy, both using air, were on a 3-day diving trip aboard a charter boat. On the Saturday they had carried out a dive to a maximum depth of 23m with a dive duration of 57 min including a 3 min stop at 3m.

On the Sunday they had carried out their first dive to a maximum depth of 28m with a dive duration of 50 min including a 3 min stop at 6m. After a 2-hour 10 min surface interval they carried out their second dive, a drift dive on an underwater reef, and reached a maximum depth of 34m.

On their ascent they decided to end the dive with a 2 min stop at 10m and the buddy indicated he would deploy his dSMB. He used his alternate source regulator to inflate the dSMB and it went into free flow as the buoy went to the surface. As the buddy concentrated in trying to resolve the free flow, he lost buoyancy control and slowly ascended to the surface where the regulator continued to free flow.

The diver decided to surface to encourage the buddy to re-descend in order to carry out their safety stop but the buddy said he was unable to do

so. The diver noticed that the dive boat had come to pick them up so knowing his buddy would be safe he re-descended and carried out a safety stop of 4 min at 6m as indicated on his computer, ascended, and surfaced with a dive duration of 42 min.

Around 15 min after using the boat's lift and back aboard the diver noticed his left leg was numb from his buttock down to his calf. He alerted the skipper and was put on oxygen while he elevated his leg and rested. The skipper contacted a hyperbaric chamber who suggested the diver attend as an emergency patient. Still on oxygen the diver was driven to the chamber by which time his symptoms had disappeared.

After a neurological assessment the diver was given four hours of recompression treatment and was discharged the following day.

August 2020 **20/046**

A diver and his buddy, both using rebreathers with air diluent, carried out a boat dive. They descended to a wreck and reached a maximum depth of 38m.

At around 60 min they began their ascent and carried out a 1 min decompression stop at 9m and a second stop for 20 min at 6m, but due to rough water this included 10 min of a planned stop at 3m and an extra 4 min whilst the diver waited for his buddy. They then took approximately 7 min to ascend to the surface with a dive duration of 91 min.

The diver was well immediately after the dive but later felt rather tired, dizzy, a little nauseous, had patchy vision, a headache and itchy skin. When he had a shower, he noticed a rash over his torso so contacted a DCI helpline who advised the diver to contact his nearest hyperbaric chamber. The diver attended and received recompression treatment.

August 2020 **20/082**

A student and her instructor had completed a previous training dive to a maximum depth of 6m for a total duration of 27 min. After a surface interval the pair conducted a further training dive to a maximum depth of 6m with a total dive time

of 31 min.

At the end of the day's diving the student was debriefed which included advice about the local recompression chamber.

Five hours after the completion of diving the student experienced symptoms of a skin DCI. She attended the local recompression chamber and received recompression treatment.

September 2020 **20/128**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

September 2020 **20/052**

A diver using nitrox 28 and his buddy using nitrox 27 carried out a boat dive. They reached a maximum depth of 39m on a wreck with a dive duration of 40 min which included a 5 min stop at 6m and an additional 2 min not required by computer.

The diver had symptoms of skin DCI on his back two hours after surfacing. He went to a local hyperbaric chamber who confirmed DCI.

He was advised not to dive for the next seven days, and the chamber recommended the diver see a specialist to check for a PFO and the diver made an appointment.

September 2020 **20/056**

A diver using air and his buddy had carried out a boat dive on the first day of a dive trip. They reached a maximum depth of 25m but had spent most of the dive at 15m and their dive duration was 38 min.

Shortly after surfacing and back aboard the boat the diver lost the use of his right hand and had weakness and convulsions in both legs.

Oxygen was administered and the Coastguard called. The diver was checked by paramedics and airlifted to hospital and a hyperbaric chamber where he received recompression treatment.

September 2020**20/053**

A group of four divers carried out two cold water shore dives to progress the depth experience for two of the recently qualified divers.

The first dive was to a maximum depth of 22m with a dive duration of 39 min including a 3 min safety stop at 6m. After a 1 hour 22 min surface interval the group carried out the second dive to a maximum depth of 24m with a dive duration of 45 min including a 3 min safety stop at 6m.

Back ashore one of the recently qualified divers complained of itchy skin on his left bicep and a slight ache in his left shoulder 30 min after the dive but had no other discomfort. A red blotchy rash had developed on the diver's chest and arms 60 min after the dive, and he reported a mild headache.

An instructor in the group diagnosed a possible skin DCI and contacted the dive site's manager, who agreed with the assessment. The diver was put on oxygen and a hyperbaric chamber contacted. After 45 min on oxygen and the rash reduced, the diver was taken by the group to the chamber.

The diver was provisionally diagnosed with suspected PFO which had caused the symptoms, and which would need to be investigated at a later date, but the diver was given a 5-hour 45 min session of recompression treatment. He was to have an overnight rest and then a four-hour treatment session the following morning.

September 2020**20/054**

A diver carrying out a shore dive had an equipment malfunction and made an emergency ascent. Paramedics and an air ambulance were called to the site and the diver airlifted to hospital and a recompression chamber. He was reported to have made a full recovery. (Media report).

September 2020**20/129**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

October 2020**20/131**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

October 2020**20/067**

A diver was on a week-long liveaboard diving trip and had completed two days of diving with two dives per day.

On day three, the diver and a buddy completed two dives each using a CCR rebreather. The first dive was to a maximum depth of 44m for a total duration of 61 min including decompression stops of 12m for 1 min, 9m for 3 min and 6m for 13 min.

The diver was using a diluent gas of trimix 20/40 and a gradient factor (GF) of 50/80, whilst his buddy was using a GF of 30/80.

Following the first dive the diver felt a pinch on his stomach from his suit but ignored it as it had happened before due to his undersuit folding. On the second dive the diver was using air as diluent and the pair entered the water after a surface interval of 2 hr 45 min. The pair completed a dive to a maximum depth of 34m for a total duration of 48 min including decompression stops of 12m for 1 min, 9m for min and 6m for 10 min.

On surfacing the diver again felt as if his drysuit was pinching his stomach. On returning to his accommodation and having a shower the diver noted a light pink rash over his stomach, which was itchy to touch and of a uniform colour and felt like a muscle injury.

The diver called a recompression chamber and started drinking water. He was advised to attend the chamber and placed on oxygen for 90 min whilst a Covid-19 test was taken and sent for analysis and returned. The diver was given recompression treatment and by the start of the 'ascent' from 18m the rash had almost cleared but the swelling remained. On surfacing, the rash had disappeared and the swelling was much reduced but took a further three days to clear fully.

The diver was advised that he has a suspected skin and lymphatic DCI and was advised not to dive until tested for a PFO.

October 2020**20/072**

A diver was on a diving trip and on the fifth day of diving had completed dives using a rebreather to a maximum depth of 36m for a total duration of 60 min including 9 min of stops at 6m. After a surface interval of 161 min, dived to a maximum depth of 34m for a total duration of 50 min including 4 min of stops at 6m.

The diver subsequently reported that during his decompression stops his depth had varied between 6-8 m but his computer did not register any violations.

Shortly after surfacing from the second dive and back aboard the charter boat and de-kitted, the diver experienced pain in elbow and upper arm of his left arm. Initially the diver put the pain down to having twisted his arm whilst de-kitting, having experienced similar pain when not diving, and he did not mention the pain to the charter boat skipper, however he did ask his wife to check if he had a rash, which he did not.

Several hours later the pain had not subsided, and the diver noticed signs of a skin rash on his arm.

The diver contacted an emergency number, and he was advised to attend a hyperbaric chamber. The diver was diagnosed with DCI and received recompression treatment. The treatment was delayed initially whilst the diver waited for a negative Covid-19 test before entering the chamber.

Following recompression, the pain and rash were resolved but the diver did experience swelling in his arm for two or three days after treatment. The diver reported that he had been tested for a PFO seven years previously for a non-diving related condition and the test had been negative.

of 50 min including the last 18 min spent at 5m. This was followed by a surface interval of 99 min and a dive to a maximum depth of 20m for a total duration of 38 min including 4 min safety stop at 5m practising skills.

Both dives were uneventful except for the exit being reported as requiring some exertion due to lower-than-normal water levels.

After the dives the diver had no adverse symptoms other than being tired but considered this normal. The following morning when returning to work the diver felt tired, had a gradually increasing headache and just didn't feel right. This continued until the afternoon when he began to feel dizzy and off balance, his vision becoming blurred, headache worsening, and he was experiencing 'pins and needles' in his hands and fingers.

Realising these were likely signs of DCI he contacted a local recompression chamber and was advised to attend for assessment by a doctor. Following tests, the diver received recompression treatment resulting in headache, dizziness and some joint pain in right shoulder resolved.

The diver received two further treatments over the next two days with full resolution of all symptoms.

November 2020**20/132**

Coastguard received a report of diver suffering from DCI. (Coastguard report).

December 2020**20/075**

A diver conducted two shore dives with his buddy at a water temperature of 8°C. The first dive was to a maximum depth of 21m for a total duration

Boating and surface incidents

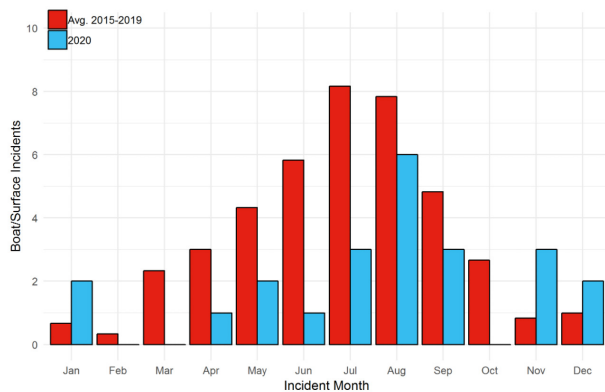


Figure 16. The month of occurrence of boating and surface incidents

January 2020

20/110

A charter boat with six divers aboard contacted the Coastguard to report they had suffered machinery failure after diving a wreck and were unable to return to harbour.

The Coastguard tasked an all-weather lifeboat and, on arrival on scene, the lifeboat took the vessel under tow. The vessel was returned to harbour and placed on its mooring, and the lifeboat returned to station. (RNLI report).

January 2020

20/028

Two divers carried out a cold-water shore dive in calm weather conditions. It was reported that lack of a buddy check and the inability to use a compass led to the two divers being further away from the shore than expected.

They were recovered by a local fishing boat and when they were returned to shore their cylinders were empty. It was not clear whether they ran out of air on the dive, to a reported maximum depth of 20m, or when they were back on the surface.

April 2020

20/019

Two divers were fined for breaching the Covid-19 lockdown rules after a large search and rescue operation was mounted when one of them went missing.

The divers had been using a boat and solo diving. The second diver surfaced safely but lost sight of the boat after his line became detached. The

diver spent two hours adrift by which time he had floated three miles from his last reported location.

The diver in the boat had phoned 999 and the Coastguard issued a 'Mayday' and co-ordinated the search and rescue involving two Coastguard helicopters, lifeboats, fishing boats and a Royal Navy security patrol vessel.

The Navy vessel spotted the lone diver and radioed one of the lifeboats that was in the best location to recover him. The diver was recovered safe and well aboard the lifeboat.

When the divers returned to shore they were met by the police. One had travelled over 400 miles from the north of the UK to the south coast to meet with his friend who had travelled 100 miles from the west. (Coastguard and RNLI reports).

May 2020

20/105

An RNLI lifeboat responded to a call for assistance for a diver. (RNLI report)

May 2020

20/106

An RNLI lifeboat responded to a call for assistance for a diver. (RNLI report)

June 2020

20/107

A RNLI lifeboat station received reports of a diver in difficulties approximately 100m off the station. As the lifeboat was launching the diver was assisted by a local fishing boat, which was nearby.

The lifeboat continued and checked that the diver was okay. With no medical or any other assistance required the lifeboat returned to station. (RNLI report).

July 2020

20/030

A diver and her buddy planned a shore dive but their first site conditions were unsuitable due to swell over the top of rocks, so they selected a backup site known to the diver in a bay with rocks either side and rocks and gullies at the mouth of an old open air swimming pool which had been bulldozed and opened up to the sea.

The divers were joined by two snorkellers who had planned a separate dive but turned up at the backup site and the group agreed to dive and snorkel in two waves to provide surface cover for each other.

Having assessed the surface conditions to be suitable, the divers kitted up and entered the water, agreed to swim out to the rocky mouth of the old swimming pool and then abort the dive if they did not feel comfortable.

As they swam out the swell and higher waves made them decide to abort the dive. They began to swim back to the shore, but it became apparent they were not getting anywhere. The buddy looked slightly stressed so the diver reassured her and said they needed to swim harder. They put in their regulators and swam using front crawl away from the rocks at the mouth of the old pool to get out of the current.

The diver reached a safe point out of the swell and expected to see her buddy behind her but saw she was much further back. The diver encouraged and tried to calm her buddy who had made some way but had begun to panic, was short of breath and kept taking her regulator out. The diver swam towards her to help get her out of the swell but the buddy was swept back further. The diver could not follow her as she feared she would be unable to swim back in so shouted to the shore to call the Coastguard.

One of the snorkellers prepared to assist by walking over rocks but did not enter the water. The diver focused on getting herself in a safe position and although the swell had picked up, she managed to swim and settle on some rocks forming a ledge which she knew you could walk to and from at low tide.

The buddy was around 8m away and the diver got her to hold onto a pipe sticking out of the rocks and a big wave made her lose her grip, but the swell pushed her towards the diver. The diver had her torch on a bungee cord and swung it towards the buddy which she grabbed, and the diver was able to pull her onto the rock ledge beside her.

They climbed further up the rocks in full kit, sat and calmed down. The divers de-kitted and

planned to come back and collect their kit at low tide. They climbed and scrambled back to the beach where a lifeboat had arrived and had been run up onto the beach.

The crew checked the diver and her buddy, who was still shaken, were alright. The diver explained what had happened and that they would collect their equipment at low tide at which point the lifeboat crew offered to retrieve their kit. They recovered it from the rocks and helped the diver to take it back to her car. A Coastguard rescue team arrived and checked that everyone was okay.

July 2020

20/027

The Coastguard was contacted by shore cover reporting two divers in difficulties. An inshore lifeboat was launched and arrived to assist the divers 7 min later.

The crew checked the divers were unhurt and did not require medical treatment. The lifeboat retrieved their equipment, and a Coastguard rescue team assisted the divers from the shore. (Media report).

July 2020

20/108

A dive boat reported to the Coastguard that they had a diver who had become separated from his buddy and was overdue. The Coastguard tasked a RNLI lifeboat and a rescue helicopter to the scene.

The lifeboat commenced an expanding box search and whilst on the first leg the rescue helicopter reported they were hovering over the diver. The lifeboat made for the position of the diver and once on scene the diver indicated he was OK.

The diver was recovered into the lifeboat and after confirming he was OK transferred him back to his dive boat. (Coastguard & RNLI report).

August 2020

20/034

The Coastguard was contacted when a diver was reported missing by a dive boat. A lifeboat, 10 min from the reported site, was to tasked help search for the diver. The diver was then reported safe and well and the lifeboat stood down. (Media report).

August 2020**20/112**

A lifeboat was tasked to respond to a dive vessel, with nine persons aboard, that had experienced gearbox issues. On arrival a tow line was passed, and the vessel taken under tow and returned to harbour and placed on a mooring. (RNLI report).

August 2020**20/037**

A group of divers planned a day's diving for a group of mixed diving experience using two boats. The first dive of the day was planned for the less experience divers to dive the south part of the island, which was conducted without incident. At the same time the second group of more experienced divers headed to the north of the island to dive a drop-off below a lighthouse.

On arrival at the site there was still some current running evident from the upwelling, which was clearly visible on the surface. The divers waited for 20 min for the upwellings to recede and the first pair of divers prepared to enter the water agreeing that if they found the current still running to abandon the dive.

On entering the water, the first pair descended but at a depth of 20m realised they had missed the shelf and were in deep water. They followed a compass bearing and reached the cliff face at about 30m, were caught by a strong down current and swept to 58m. They managed to recover control of their buoyancy and started to ascend.

Shortly into the ascent the pair heard a click and one of the divers BCD appeared to be continually inflating and the diver ascended rapidly surfacing after a total dive time of 12 mins omitting any safety stops. His buddy was also positively buoyant and made a rapid ascent too, arriving at the surface a short time after his buddy.

The second pair of divers had entered the water 9 min after the first pair. They were caught in a strong current at 23m running along the cliff and decided to abandon their dive after 13 mins surfacing without incident after a total dive time of 17 min and were quickly recovered into the boat.

The first pair, who had surfaced earlier, had

surfaced close to the boat but were unable to attract the attention of the cox'n. The surface current was estimated at 1-2 knts and the pair were quickly swept away from the boat and were estimated to have been about half a mile away by the time the second pair had been recovered.

When it became clear the first divers were overdue the crew initiated a search pattern downstream of the site. After 10 min searching the Coastguard was alerted and shortly after the crew spotted another dive boat in the area and they requested by VHF radio that they assist in the search.

The other dive boat located the divers 2 miles from the dive site, recovered them and placed both on oxygen before returning the divers to harbour where they were met by the crew of their own dive boat, including a doctor who checked the divers over and found them fit and well, but they were handed over to the ambulance service and taken to hospital as a precaution.

The Coastguard had tasked a lifeboat to launch but as it headed to the site the crew were informed that the divers had been found and recovered by the dive boat.

August 2020**20/041**

The Coastguard received a 'Mayday' call from a dive boat that two divers on a drift dive were overdue and missing. Two lifeboats were launched and started to search the area. With a strong ebb tide flowing one of the lifeboats made its way along the coastline where two local boats were also searching and a member of the public had reported seeing the divers.

Shortly afterwards one of the local boats found the divers safe and well. They were recovered from the water more than four miles from where they had started their dive. After confirming their identities and that no further assistance was required the lifeboats returned to their station. (Coastguard & RNLI report).

August 2020**20/068**

A group of divers launched two boats, a 5.5m RHIB

and a small inflatable with tiller steering, from a slipway at some distance from their planned dive as the hard slipway was better for launching the RHIB.

Both vessels were lightly loaded to allow a faster transit to a location closer to the planned dive site intending to load dive kit and divers at that location. Early during the trip, whilst still in sheltered water the RHIB was ahead of the inflatable.

As the inflatable drove over a wave the tiller was pulled sharply sending the boat into a sharp turn and ejecting the cox'n into the water. The engine kill-cord had been fitted over the cox'n arm and slipped off the arm and remained attached and did not turn off the engine. The throttle reduced to a steady speed and the boat continued under way circling the cox'n.

The cox'n of the RHIB noticed a short time later and returned to help. The cox'n of the inflatable had managed to grab hold of one of the grablines on the inflatable and was being towed in circles with the inflatable but was unable to climb aboard due to the speed of movement.

The cox'n of the RHIB was able to come alongside the inflatable and reach over to disconnect the engine kill-cord. The cox'n of the inflatable was then able to be assisted back aboard without injury.

August 2020

20/042

The Coastguard received a call regarding a dive boat in trouble and divers in the water. When a lifeboat arrived at the scene it was clear that all three people were safe and well aboard the boat and had managed to get the engine working. The boat returned to harbour and the lifeboat back to its station. (Coastguard report).

September 2020

20/057

A diver and his buddy had completed a wreck dive and were back aboard their boat with two others when an attempt was made to recover the shot which was well snagged on a wreck.

One of the other divers in the boat went in to

recover the shot using a lift bag. He successfully released and lifted the shot and ascended using an dSMB to mark his position. The diver who had just completed his dive was coxing the boat into position when the engine suddenly stopped, and the effects of wind and tide began to separate the boat from the diver.

He surfaced approximately 50m away from the boat, with a dive duration of 5 min to a maximum depth of 15m, signalled 'OK' to the boat but due to the surface conditions was unable to swim to it. Attempts were made to restart the engine manually by the buddy, but this was unsuccessful.

Throughout the incident the other diver in the boat had been tasked to keep watch on the drifting diver. A distress call was made on CH16, and another dive boat and a police launch responded. The dive boat recovered the drifting diver who had been on the surface for nearly 10 min and was now approximately 150m away from the stricken boat.

They transferred the diver back to his boat and further attempts were made to restart the engine but were unsuccessful and the police launch took the stricken boat under tow back to port.

September 2020

20/059

Shortly after departing the slipway a RHIB was travelling at approx. 25kts when the outboard motor stopped. An anchor was deployed, and Harbour Control informed, whilst checks were carried out for obvious faults.

Numerous attempts were made to restart, but the engine could not be restarted. Assistance was sought from the Harbour Control and tow was accepted from a passing yacht. Subsequent investigation found a short-circuit of the crank shaft position sensor.

September 2020

20/130

Coastguard received a report of diver overdue and missing. (Coastguard report).

November 2020**20/071**

Two divers became separated from their dive group and the alarm was raised with the emergency services in deteriorating weather conditions. A search was commenced involving three RNLI lifeboats (two AWLB and one inshore lifeboat), two helicopters, Coastguard rescue teams and the police.

The divers were spotted by one of the all-weather lifeboats after dark, in gale force 8 winds and a large swell. The pair had been in the water for almost three hours and were recovered aboard the lifeboat and given initial care.

One of the divers was entangled in the line from his SMB and the pair had drifted 1.5 miles from their original position. Whilst being returned to shore where they were met by Coastguards and ambulance crews.

One diver was treated for early signs and symptoms of hypothermia. Due to worsening weather conditions preventing the inshore lifeboat returning to its base it was escorted to another harbour by the other AWLB. (Coastguard & RNLI report)

November 2020**20/076**

A pair of divers commenced a shore dive in flat calm conditions on a flood tide with a slight current. The pair completed a dive to a maximum depth of 11m for a total duration of 70 min.

On surfacing they found that the sea state had changed and there was approximately a 1m swell which was breaking on the slip where they planned to exit the water. The pair swam onto the slip and got hold of a post about 60cm high to help them stand up. They were hit by a large wave and one of the divers had her regulator and mask dislodged, which made it difficult for her to see and she breathed in and swallowed some water.

She was then hit by a second wave, which pulled her back and she lost her grip on the post which was slippery. Her buddy held onto her to prevent her slipping further and helped her regain a grip on the post. The pair worked together to help her stand and make their way out of the waves.

The diver asked her buddy to refit her mask for her so she could see, and she breathed from her octopus and was eventually able to stand. The pair then shuffled backwards up the slip until they were clear of the water and the buddy signalled others in the group to come and assist with de-kitting.

Neither diver suffered any injuries, but the diver lost her dive bag with discarded fishing tackle she had collected.

November 2020**20/074**

A dive RHIB had deployed nine divers onto a wreck and the cox'n was standing off the site providing cover when the engine failed. The cox'n radioed the Coastguard who tasked a lifeboat to respond.

The lifeboat arrived on site within 2 min of launching to find the first divers to have surfaced were alongside another vessel but due to its size they were unable to get aboard. The lifeboat recovered the divers and then transferred them onto the larger vessel. A fishing vessel had picked up three further divers and transferred them onto the larger vessel, whilst the lifeboat stood by to recover the remaining divers once they surfaced.

Once all divers had been recovered the lifeboat made way to the RHIB, which had drifted to some salmon cages nearby and tied up to the pontoon. The RHIB was then towed back to shore and all divers landed safely.

December 2020**20/073**

A pair of divers entered the water for a shore dive and headed to a gully between some rocks. One diver had difficulty descending and she was provided additional weights by members of the shore party and she and her buddy descended to a maximum depth of 14m.

After 38 min, the diver was seen to surface at the seaward side of the rocks without her buddy. The diver began to swim in a westerly direction back to shore but the shore party signalled to her to head in an easterly direction as the water was calmer in that direction. The diver did not see the signals and she encountered a swell which pushed

her against the rocks and then a large wave lifted her onto the rocks and the diver became stuck and was unable to move.

Her buddy had noticed they had become separated after 39 min and he followed a separation procedure and surfaced to see his buddy on the rocks and tried to encourage her to swim towards him. Realising she was stuck on the rocks he swam to try and assist but was struggling due to the swell and he signalled for assistance.

Another buddy pair from the group had surfaced shortly after this and were making their way back to shore when they were directed by the shore cover to go and assist. One of the pair de-kitted and swam out using mask and snorkel followed by his buddy.

The diver's buddy was then thrown over by a wave, which caused a regulator free flow and consequent loss of gas. The buddy tried to inflate his BCD, but the inflation valve appeared to have been damaged when he fell against the rocks. The snorkeller managed to climb onto the rocks and assisted the buddy to de-kit so that he was able to stand.

The snorkeller then helped the diver to remove her fins and weightbelt and then helped her to her feet and back into the water where the snorkeller's buddy was able to help her swim back to shore.

The shore cover had called the Coastguard by this stage and a Coastguard rescue team had arrived by the time the diver was assisted back to shore where she was checked out but required no further assistance. The snorkeller had returned to shore and reported the buddy's damaged BCD and that he intended to take out a replacement BCD to allow the buddy to return back to shore.

The Coastguard rescue team advised that a lifeboat was en-route and that no-one should enter the water. The buddy abandoned his equipment on the island and headed back to shore across the rocks and swam a short distance back to shore. On arrival the lifeboat recovered the abandoned dive equipment, and it was recovered by the buddy from the lifeboat station later.

December 2020

20/115

A RNLI inshore lifeboat was tasked to assist a dive boat, with two persons aboard, which was experiencing engine problems. On arrival on scene the 10m vessel was taken under tow and headed back to harbour.

An all-weather lifeboat was then requested to take over the tow from the smaller inshore craft and on arrival on scene the tow was passed over and the smaller vessel stood down. A crew member from the AWLB was put onto the casualty vessel and managed to restart the engine. The vessel then made its own way back to harbour and onto its mooring, whilst being escorted by the lifeboat. (RNLI report).

Ascents

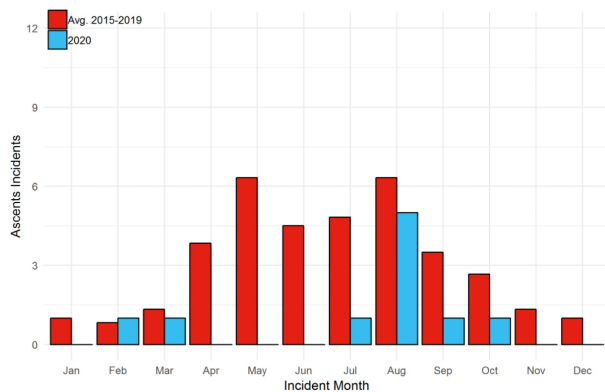


Figure 17. Ascent related incidents in each month of the year

February 2020

20/011

An instructor and his trainee, both using air, had carried out a cold-water shore training dive to a maximum depth of 21m with a dive duration of 42 min including a 5 min safety stop at 6m. After a 2-hour 9 min surface interval they carried out a pleasure dive to a wreck site.

The trainee struggled to descend due to forgetting his trim weights. These were fitted and the pair descended a wall to the wreck site at 21m. The trainee had used more air than expected so the instructor deployed his DSMB for a planned open water ascent. The pair ascended to 15m where the trainee then made an uncontrolled ascent and became tangled in the instructor's DSMB line.

The instructor mistook the pull on the line as being caused by lateral swimming but when he realised it was a vertical pull on the line, he was already at 4m and unable to halt his own ascent. The instructor surfaced with a dive duration of 17 min to a maximum depth of 21m and found the trainee lying motionless on his back.

When the instructor reached the trainee, he was initially slow to respond verbally or to signals so the instructor began to perform a rescue by inflating the trainee's wing BCD and was ready to shout for help. However, the trainee was now moving and attempted to free himself from the dSMB line but his drysuit was fully inflated and severely restricted his movement.

The instructor established the trainee was 'OK',

saw and heard that his breathing was normal but extremely rapid so began to untangle him from the line. With this completed the instructor handed his DSMB to the trainee to hold onto for the surface swim back to shore.

Due to exhaustion from the panicked ascent the trainee was unable to carry out the surface swim, so the instructor towed him ashore and removed his fins and weight pockets. The trainee went to sit on a nearby bench and the instructor sorted himself out and joined the trainee to help him de-kit.

As they headed towards the car park the trainee was complaining of a headache, so the instructor borrowed another dive group's kind offer of their oxygen kit as it was the closest to hand and, with the aid of another diver, administered oxygen to the trainee and himself.

After 5 min and with no symptoms, the instructor went to the dive site's shop to inform them of the incident and because the borrowed oxygen kit was small, he was unsure how long it would last. The shop advised the instructor to bring the trainee to their medical room if the oxygen ran out but they took details of the dives and passed them to a hyperbaric chamber for advice. The chamber recommended that as the trainee's headache was improving, he finished the oxygen from the borrowed kit and then to monitor the situation from home.

The instructor, who had cerebral palsy, had no symptoms other than a bad back which had been present from the day before and was unrelated to diving as well as being exhausted from having towed the trainee a considerable distance on the surface. Later, he developed more aches and pains which he attributed to normal diving activity and the extra stress on his joints during the rescue. He reported these were all different symptoms from his two previous DCI incidents.

The trainee reported that in the earlier confusion about his weighting at the start of the dive he thought he must have closed his drysuit dump valve. The diver was seen by a buddy pair, who were diving independently but followed the instructor and trainee to the wreck site, to inflate

his drysuit before ascending.

March 2020

20/116

A diver was on a training course for a deep diving speciality. On the second dive of the day the student experienced a free flow from her regulator. She attempted to breathe from her alternate on a pony cylinder and then made an uncontrolled ascent for 23m.

Her instructor was unable to catch up with her to make contact to slow her ascent, but she ascended directly to the surface omitting any safety stops. On the surface, the instructor found the student positively buoyant, communicative, a little shaken but pain free. The instructor closed the student's cylinder valve to prevent further gas loss and the pair waited on the surface for a few minutes to regain their composure.

The pair then swam to a nearby pontoon and exited the water. A second instructor in the group witnessed the incident and remained with the two other students and escorted them on a normal ascent including conducting safety stops. The group remained on the pontoon to discuss the incident and to ensure everyone was fit and well and no treatment necessary.

The group then conducted a detailed debrief in the on-site café and the student was given advice to contact a recompression chamber should any symptoms develop after leaving the site.

July 2020

20/087

A diver entered the water from the shore for her first dive of the day with a buddy, who had completed a dive to a maximum depth of 36m for a total of 36 min including a 4 min safety stop at 5m, 66 min earlier in the day. The pair descended to a reef at around 20m and followed the depth contour to a sunken speedboat reaching a maximum depth of 23m.

After around 18 min the diver indicated to her buddy that her weightbelt had slipped. Her buddy attempted to replace it but it slipped further until it was around her knees. Her buddy indicated for her to hold onto the speedboat, and he removed

her weightbelt and draped it around her shoulders and then dumped his own buoyancy.

The pair then began to crawl up the sloping seabed. As the pair reached a depth of around 20m and 24 min into the dive, the diver became positively buoyant and the pair ascended with a steady ascent rate until reaching 11m, at which point the ascent became uncontrolled and they ascended direct to the surface in 1 min omitting any safety stops.

The pair made their way back to shore and exited the water and were monitored but no adverse effects were identified. It was reported that the diver had been trained to use both her BCD and drysuit for buoyancy control and she was advised to only use her drysuit for buoyancy and should consider using a weight harness.

August 2020

20/035

A diver and her buddy had carried out a boat dive to a maximum depth of 18m with a dive duration of 37 min including a stop at 6m for 3 min. After a 1 hour 50 min surface interval they carried out their second dive, both using air, on a wreck. The diver was using the dive as an opportunity for the buddy to lead the dive.

The first part of the dive was in a shallow gully at around 4m for 15 min and the buddy was dumping air during this to stay down. The diver thought this was due to being in shallow water as the buddy appeared more comfortable as they descended to around 10m on the wreck. There was a slight current running across the wreck, so the diver signalled the buddy to descend a little lower to the bottom at 12m to make it easier for their planned swim against the current.

The buddy struggled to dump air from her drysuit to drop down so the diver offered a hand and then noticed how much air she had in her suit. The diver guided the buddy down to hold onto a piece of wreckage at 10m and disconnected her drysuit feed. The buddy was positively buoyant, and her legs floated up. She had hold of the wreckage and the diver signalled that she would try to bring her feet down to dump air. The buddy lost her hold once but when she did a second time, she made an

uncontrolled inverted buoyant ascent. The diver ascended after her to give her support on the surface.

Their dive duration was 27 min to a maximum depth of 12m. The buddy was floating on the surface with a full suit, empty BCD and her head just at the surface. She was breathing from her alternate source regulator so had switched to this during the ascent which she later explained was due to breathing a mix of water and air during her inversion. The diver loosened the buddy's BCD to ease her fast and shallow breathing and was assisted by another member in their dive group to help the buddy out of the water and onto the dive boat's lift.

Back aboard the buddy, although shocked, recovered well although coughing a little and belching but her breathing was back to normal, and she had no respiratory or DCI symptoms. She was kept well hydrated and rested for the remainder of the day.

August 2020

20/036

A diver and his buddy, both using nitrox 32, carried out a wreck dive from a RHIB. At the end of their dive the diver inflated his dSMB using the regulator from his 7 lt side mount decompression cylinder.

The dSMB became tangled in the diver's equipment and snagged. The diver was unable to cut the line and made an uncontrolled ascent which he attempted to slow by using a 'starfish spread' position. The diver surfaced with a dive duration of 28 min to a maximum depth of 31m.

He was breathless on the surface, signalled he was unwell and was rapidly recovered aboard the RHIB where he was immediately laid flat and given oxygen.

The remaining divers from the RHIB were re-called using a thunder flash and the diver's buddy had made a normal ascent and completed a 3 min safety stop.

The RHIB had issued a 'Mayday' and the diver was attended to by a trained diver medic aboard the RHIB and interrogation of his computer showed

no decompression stops were required or missed. A neurological examination revealed no further issues, the diver's breathing had returned to normal although he complained of an ache in his right shoulder after 10 min.

The diver remained on oxygen and drank water for 42 min until a lifeboat arrived at the same time as a Coastguard rescue helicopter. The RHIB had deployed an orange smoke flare to assist with recognition and indicate the wind direction. A paramedic was winched down onto the lifeboat and assessed the diver in the RHIB.

The diver was then transferred from the RHIB to the lifeboat, lifted off by the helicopter and flown to a hyperbaric chamber. At the chamber the diver had further neurological tests and after being monitored was discharged as no DCI symptoms developed. No further treatment was required, and the diver made a full recovery.

August 2020

20/045

A diver had carried out a shore dive to a maximum depth of 16m and had carried out a 3 min safety stop at 5m. After a 1 hour 20 min surface interval the diver carried out a second dive with four other divers, all using air.

About 10 min into the dive an integrated weight pouch slipped out of the diver's BCD and despite dumping air he made a buoyant ascent and surfaced with a dive duration of 12 min to a maximum depth of 17m.

One of the other divers made a controlled ascent to the surface and met up with the diver who did not report any symptoms. Back ashore the diver was monitored for the next 2 hours and had no symptoms which he also confirmed again later that evening.

August 2020

20/039

Three divers carried out a shore dive. On a 12m platform one of the divers, who was short sighted, was struggling to read his contents gauge so had been giving false readings during the dive. His buddies checked his gauge which read 50 bar so they gave the signal to ascend using the

platform's shotline.

The diver was not on the shotline as he inflated his BCD, and he made a buoyant ascent omitting his 3 min safety stop at 6m. He surfaced with a dive duration of 35 min to a maximum depth of 14m, headed towards the shore and got out.

The two buddies ascended, carried out safety stops but could not see the diver when they surfaced. One of the buddies re-descended to the platform but could not see the diver and returned to the surface after doing another safety stop.

The dive site's rescue boat and two other divers started a search for the diver as the buddies returned to shore where they were told the diver was back in the car park.

August 2020

20/055

A diver and his buddy, both using air, carried out a shallow, non-penetration wreck dive. The buddy had tied off his DSMB to the wreck as a marker for a second wave of divers.

During the dive the diver felt a slight snag on the wreck and assumed it was his self-inflating dSMB which was attached to a D-ring on his BCD. He checked the dSMB, and it was free so thought no more of it until he became positively buoyant.

When the diver looked down, he saw one of his 4 kg integrated weights at around 13m on the seabed so descended to retrieve it. His buddy was about to signal that they should make their way back to the tied off dSMB to start their ascent when he saw the diver holding a weight pouch in his hand. The buddy offered but was stopped by the diver from trying to re-fit it the pouch as it would be too difficult.

They were about to head back to the tied off dSMB when the diver still felt buoyant, finned back down, and saw his other 4 kg weight pouch which he grabbed hold of. He was now unable to operate his BCD controls for the ascent as he now had a weight in each hand but thought this would not be a major problem as he used his drysuit for buoyancy and had a cuff dump. The buddy grabbed one of the diver's BCD D-rings and dumped all the air from his drysuit.

Having confirmed they were both okay the pair exchanged 'up' signals and the buddy indicated he would attempt to deploy the diver's DSMB. As it was self-inflating the buddy was able to do so with some difficulty as he was only using one hand, the other holding onto the diver.

The pair ascended to 6m and carried out a safety stop of 3 min towards the end of which they sank to 8m. The buddy put a little air back into his suit and because of this the pair began to accelerate towards the surface and the buddy was forced to let go of the diver at around 3m so he could dump excess air.

They surfaced with a dive duration of 44 min to a maximum depth of 14m and neither of their computers showed any alarms. The weight pouch manufacturer has since updated the pouches with shorter slide handles.

September 2020

20/043

A diver and his buddy carried out a boat dive. They reached a maximum depth of 26m on a wreck and on the ascent at 15m the diver's BCD inflator valve stuck open.

The diver made a buoyant ascent omitting his safety stop. He signalled 'OK' to the dive boat and was recovered aboard with the assistance of the skipper and his buddy and was put on oxygen. The diver had no symptoms and when the boat returned to shore the buddy agreed to stay with him.

October 2020

20/084

A diver suffered a panic attack at a depth of 7m and surfaced with her buddy after a total of 5 min. The diver was recovered from the water by the site safety boat and monitored whilst her breathing rate was brought back down and was told to relax.

Technique-related incidents

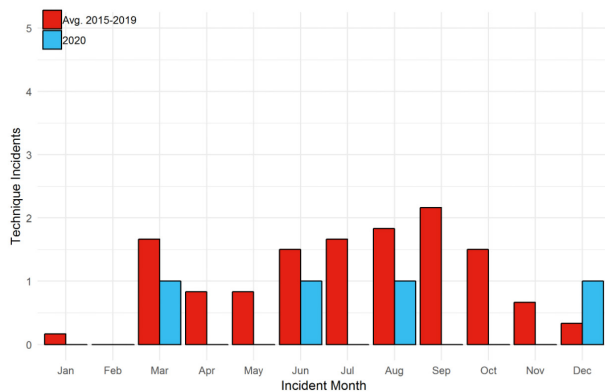


Figure 18. Technique-related incidents in each month of the year.

March 2020

20/079

A pair of divers were on a dive to a maximum depth of 32 min. As they reached a depth of 8m the pair became separated, and one diver surfaced after a dive time of 38 min and reported his buddy missing.

The on-site rescue team organised a search team and they commenced an underwater search 22 min after the diver was reported missing. The missing diver surfaced alone at an exit point 33 min after the separation and a total dive time of 71 min. The on-site rescue team provided advice on separation and buddy protocols.

June 2020

20/023

Following the period of Covid lockdown, a diver and her buddy had planned two cold water shore dives to a maximum depth of 35m. The diver was using a rebreather with a trimix 20/20 bailout, and the buddy was using nitrox 32 with a nitrox 50 stage cylinder.

The diver had carried out around fifteen hours on her rebreather having recently changed from another unit on which she had completed about fifty hours.

The plan for the dives was to continue to practise and refresh skills following a shore dive a few days earlier to a maximum depth of 8m. They intended to run simple drills and return to the surface with each deploying a DSMB for the decompression stops.

Prior to the first dive the diver realised she had forgotten her heated vest's wireless switch so changed to a thicker and lighter unheated undersuit. She had also checked the oxygen pressure remaining in her unit's oxygen cylinder and based on her recent experience had concluded that although quite low it would be sufficient for a one-hour maximum dive.

The pair descended and the rebreather diver carried out mask clearing, diluent flush to clear the loop as well as establishing neutral buoyancy and feeling comfortable. The buddy watched to provide any support should it be needed and then he carried out various valve shutdown drills and mask clearing while neutrally buoyant.

Following the skills, the pair decided to swim around the site at 35m then ascend a slope to around 20m to use a shotline before deploying their DSMBs.

At the beginning of the ascent the diver struggled to vent sufficient gas due to the slight increase in buoyancy caused by her change of her undersuit. The ascent was slowed down with the diver holding onto rocks whilst venting as much gas as possible every few metres. The venting continued when the pair began their ascent on the shotline with the diver holding it to achieve a slow and steady ascent to their first decompression stop at 12m.

Unknown to the buddy was that during the ascent phase the diver had realised her oxygen pressure had dropped so the rebreather was unable to maintain 1.3 PO₂. The drop appeared to be much faster than on previous dives probably due to the greater venting of the loop and the depth at which the drills had been undertaken. The diver decided that the PO₂ being achieved was safe for the ascent phase until switching to her trimix 20/20 bailout at 12m when the PO₂ had fallen to 0.3.

The buddy assumed that the diver's decision to bailout was part of the intended drills, he switched to his nitrox 50 decompression gas and deployed his DSMB.

As a rebreather and open circuit diver buddied together, he expected that

the diver would have a lower decompression obligation than him but when he cleared his decompression the diver indicated that she still had 12 min of stops to make during the final ascent. The pair carried out a 1 min stop at 12m and just before the 3 min stop at 9m the diver, still using the shotline to control her ascent, had become caught under a thin line connecting buoys and was released by her buddy.

They ascended to 7m for the diver's remaining 8 min of decompression but without warning, possibly caused by the strain put on the shotline during the ascent, part of the permanent line broke loose underwater. The mid-water float that had been attached to the line to steady it caused the 20m shotline to become buoyant and shoot to the surface between the buddy pair. It became entangled in the DSMB, which the buddy let go, and caught the diver nearly sending her into a rapid ascent. The buddy was able to grab hold of the diver before she ascended too far and venting gas from his wing BCD returned them both to around 8m.

While the buddy was able to control the remainder of the decompression stop and final part of the ascent, he did so with the diver partially inverted and unable to regain neutral buoyancy. The pair surfaced with a dive duration of 58 min to a maximum depth of 35m.

August 2020

20/069

A diver completed a first dive to a maximum depth of 15m and a total dive duration of 39 min. After a surface interval of 2 hr 24 min the diver conducted another dive on a wreck with a maximum depth of 20m and a total duration of 29 min. On both dives the diver missed his planned safety stops at 6m.

The diver was struggling with his drysuit buoyancy because he was heavily overweighted in the belief that would assist with holding his stop at 6m. The diver did not declare his missed stops to his buddies and simply indicated they had become separated. No adverse symptoms were experienced.

December 2020

20/121

A student was on a diver training course in an underwater group of six divers including instructor and safety divers.

The student was instructed to remove and release her demand valve for a regulator retrieval exercise. The student appeared to panic and recovered her demand valve replacing it back in her mouth. The instructor witnessed her press the purge button and at this time she became more agitated and tried to bolt to the surface, but she was prevented from doing so by the instructor holding onto her BCD. Sensing the student's panic the instructor initiated an ascent to the surface, the student appeared to be breathing normally at this point.

At approximately 5m depth the student rejected her regulator and the instructor tried on several occasions to provide the student with his alternate air-source, whilst continuing the ascent. The attempts to replace the regulator are believed to have resulted in some slight bruising of the diver's lower lip. Due to the lack of gas provision for the diver the instructor elected to switch from a controlled ascent to a buoyant type for the remaining few metres omitting any safety stops and on reaching the surface the instructor made the student buoyant.

The student was distressed but fully conscious and able to talk and the instructor towed the student to the entry/exit point and removed her kit. The student was able to exit the water and was helped by the surface support. The student quickly recovered from the panic attack and explained that she thought her regulator was beginning to free flow and that it felt wet to breathe. The regulator had been used earlier that day by the student and was working as normal. The regulator set was quarantined and is awaiting examination by a service technician.

Equipment-related incidents

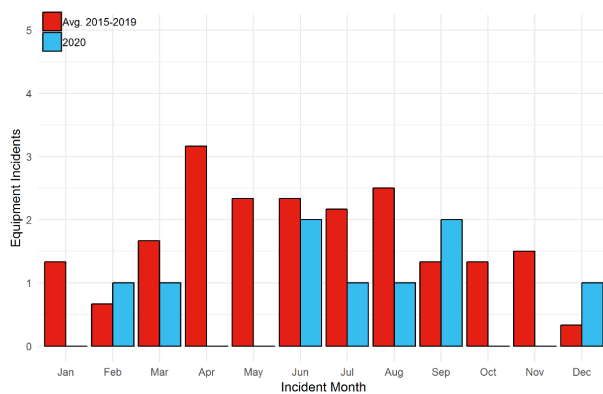


Figure 19. Equipment related incidents in each month of the year.

February 2020

20/010

An instructor and his student, both using air, carried out a shore training dive with a water temperature of 7°C. The aim of the dive was to run through skills at 6m before descending to 15m to repeat them and then to carry out mid-water DSMB deployment during the safety stop at the end of the dive.

At 30 min into the dive having ascended to the 6m safety stop the instructor demonstrated mid-water DSMB deployment using the exhaust from his primary regulator. The student tried to mimic but was unable to get any air into his DSMB so tried to use his alternate source regulator and whilst doing so he descended to approximately 9m where his alternate source regulator went into free flow. The instructor descended to the student and tried unsuccessfully to resolve the free flow so signalled that they should surface.

They carried out a controlled ascent omitting some of their safety stop and surfaced with a dive duration of 34 min to a maximum depth of 14m. On the surface the instructor ensured the student had inflated his BCD, turned off his air to stop the free flow and turned it on again so the student could maintain buoyancy. Back ashore it was noticed that the alternate source regulator had been set at its maximum operating level.

March 2020

20/018

A diver and his buddy carried out two shore dives with a water temperature of 6°C. The diver was

using air in manifolded twin 12lt cylinders with identical first and second stages, one set which was about a year old and the other bought second hand and serviced two years before.

The buddy was using a rebreather and carried a 7 lt air bailout cylinder. Their first dive had been to a maximum depth of 20m diving in a three with a less experienced diver. The second dive was as a buddy pair with the aim to visit an underwater habitat unknown to the buddy at 35m where although visibility was generally good it was dark, and the bottom of the site was deep soft silt.

The diver's primary regulator began to breathe oddly with small extra blasts of air at the end of each breath and the diver felt it was about to go into free flow. He signalled to his buddy he might have a problem but within seconds the regulator went into free flow. The diver breathed from it open mouthed for a short while but then switched to his second regulator which was breathing normally. He had pointed the free-flowing regulator downwards and pinched the hose back on itself to slow the free flow but did not want to attempt a shut down where they were as he might disturb the bottom and lose sight of his buddy.

He signalled the buddy to make their way to a slope where he knew the bottom was gravel and was not panicked but still losing a quantity of air. On the slope the diver went for a pillar valve shutdown but as he reached for it his buddy did it for him.

The diver checked his gauges every few seconds, a mechanical one on one first stage and a rather unreliable wireless integrated air gauge on the other. The mechanical gauge showed zero, but the integrated air gauge was working.

The pair made their way up the slope and the diver paused, turned the pillar valve on slowly and the free flow fault had cleared. The diver switched back to what had been the faulty primary regulator as he figured he would rather have the second working one as a backup rather than the suspect primary one. The divers finished their dive including all decompression obligations.

When discussing the incident later the buddy pointed out that both diver's

regulator hoses were black so there was no way to tell which pillar valve to shut down. The diver has since updated his equipment to a new pair of cold-water regulators and changed one hose to be a different colour.

June 2020

20/103

An unregistered PLB was activated in Dorset. Coastguard tasked Coastguard Rescue Helicopter to follow the homing frequency given off by the beacon, but no trace was found.

Further Coastguard investigations discovered that the beacon belonged to a diver and that it had been damaged when his housing flooded, causing the beacon to transmit sporadically once he was at home. He was confirmed to be safe and well. (Coastguard report).

June 2020

20/024

A diver and his buddy, both using air, carried out a shore dive. The plan was to practise mask clearing in shallow water before a pleasure dive.

The divers descended to 2m and after the buddy had successfully practised mask clearing the diver signalled to follow him. He turned away from his buddy but after a couple of fin strokes heard a very loud bang right by his head. The diver was confused about what had happened then realised he could no longer breathe. Assuming it was a problem with his regulator's first stage he turned back to his buddy who was unaware of what had happened and was now a couple of metres away in very silty visibility.

The diver signalled something was wrong and to ascend as being so shallow the surface was as equally close as the buddy's alternate source regulator. The diver's BCD inflator hose was still working so the diver reached the surface quickly, spat out his regulator so he could breathe and fully inflated his BCD. The duration of the dive was 3 min to a maximum depth of 2m.

The diver then realised that his problem had been caused by the hose detaching from the regulator and rapid air loss. Having assumed the problem was behind his head and with lack of peripheral

vision through his mask the diver did not see the regulator in his mouth was no longer attached to anything. He swam to shore with the hose flailing around whilst losing air and another diver who had seen the problem turned the diver's air off and helped him to de-kit.

July 2020

20/032

A diver and her buddy, both using air, carried out a drift dive from a boat. They descended and around 5 min into the dive and at 25m the diver had insufficient air flow through her regulator which then ceased. The diver switched to her alternate source regulator on a 3 lt pony cylinder and signalled her buddy to ascend.

They surfaced with a dive duration of 12 min including a safety stop at 3m and a maximum depth of 27m. The O-ring in the cylinder had disintegrated which made it feel as though the valve had been fully opened when it hadn't and caused a blockage which eventually stopped the air flow at depth.

The equipment was taken to a dive shop where the diver's regulator was also serviced to ensure that pieces of the O-ring had not got into the first stage or further.

August 2020

20/049

A diver was kitting up preparing for a shore dive. As he attached the hose to his drysuit's inflation valve the press button blew out. On examination the plastic ring under the button had sheared off.

September 2020

20/120

On a training dive with a group of five divers including an instructor the group were descending a shotline. The instructor noticed that one of the students was continuously clearing his mask, which was leaking.

The group arrived at the bottom of the shotline at 19m and after checking for the usual causes of any leaks the instructor noticed that the frame of his brand-new mask was cracked on the side.

The instructor maintained physical contact with the student and signalled the

group to terminate the dive. The student was starting to panic, and the instructor held onto him during the ascent using the student's BCD to lift him.

During the ascent the student started inflating his BCD and continued to inflate causing him to shoot up and the instructor lost his grip. Both the student and the instructor ascended directly to the surface taking 6 sec from 19m and both reported feeling dizzy at the surface. The instructor and his assistant assisted the student back to the exit point.

The student reported feeling better by the time he reached the exit point, had no difficulty walking although his legs had felt like jelly. His face was still flushed and he said he was feeling dizzy and nauseous. Oxygen was administered to the student on a demand valve. After 10 min, the student said he now felt fine and asked to remove the oxygen mask. He looked considerably better but was told not to remove the mask and to stay sitting down. After another 15 min, the student insisted that he was feeling completely fine and there were no signs or symptoms of DCI, so the oxygen was removed and was advised to go and sit down comfortably which he did.

The instructor was assisted out of his kit in the water, but after a brief rest, exited the water without help was given oxygen on a non-rebreather mask with the continuous flow at 15 lt per minute and took some rehydration fluids. The student was advised to remain in contact with the instructional team, to have a quiet evening, was told what to look out for and told to contact emergency services, specifying an earlier dive-related incident if necessary.

The centre had recently bought new masks for the dive school and upon inspection, several of them appeared to have bubbles and flaws in the same area as where the diver's leak was seen. New, unused masks, still in the packaging were cracked: the centre reported this to the manufacturer.

September 2020

20/058

A diver was on a three-day boat diving trip and on the third day prepared to enter the water. He

was diving twin independent 12lt cylinders with nitrox 32 and completed buddy checks including breathing from both cylinders without any issues.

He and his buddy entered the water and descended but at 6m the diver noticed an unusual taste in the breathing gas and returned to the surface with a dive duration of 5 min.

Back aboard the dive boat he was put on oxygen as a precaution. When examined the cylinder gas smelt of a chlorine-based cleaner. The cylinder had been filled two days before along with seventeen others all of which had no taste or smell. A significant number of cylinders had been filled from the same compressor on the day before as well as those filled with a new oxygen bottle during blending and again, as far as could be ascertained, their contents had no taste or smell.

As no other cylinders were contaminated, an assumption was made that a cleaning product had entered the pillar valve and had either been blown into the cylinder when it was filled or contaminated the gas being released. As the smell of the chlorine-based cleaner was fairly significant and constant when the cylinder was drained, the assumption was made that the contamination had been when the cylinder was filled. There were no chlorine-based cleaning products in the compressor room, in the van used to transport cylinders or on the dive boat. Cylinders had been stored on the deck of the dive boat for both days prior to the incident and been taken off the boat at night.

The diver was examined by a consultant cardiothoracic anaesthetist who was also aboard the boat, and he confirmed that the diver should not dive for the remainder of the trip as a precaution and seek medical assistance if any symptoms presented. The diver did not dive again and had no symptoms. The source of the contamination was not found.

December 2020

20/089

A student and instructor planned a dive to 25m and a shot recovery exercise. During the descent the student lost a weight pouch, which the instructor noticed, followed it down to the

bottom at 19m and recovered it.

The student descended, assisted by pulling on the shotweight in his hand. On reaching the bottom, the instructor returned the weight pouch to the student who, realising he had lost it, "freaked out a bit" and in doing so stirred up the silt on the bottom, reducing the visibility. The instructor assisted the student until he calmed down and then helped him fit the weight pouch into its pocket.

The pair, assuming the weight was secure, decided to continue the planned dive. The instructor demonstrated putting gas into the lifting bag on the shotweight. Whilst finning, the same weight fell out of the student's pocket again and was lost amongst the weeds and could not be relocated.

The pair decided to abort the dive and ascended to complete a safety stop. During the safety stop it became apparent that the student's other weight pouch had been lost without being noticed by either diver.

The student had managed to remain negatively buoyant throughout the dive by holding onto the shotweight and lifting bag and so was able to complete the safety stop of 3 min at 6m and a slow ascent to the surface. The dive was to a maximum depth of 19m and a total duration of 24 min including the 3 min safety stop at 6m.

Illness or injury-related incidents

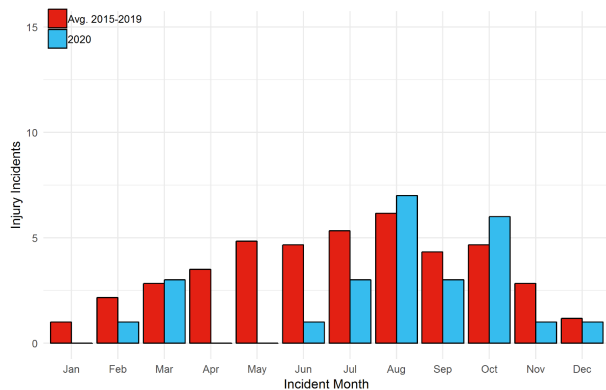


Figure 20. Illness or injury related incidents in each month of the year

February 2020

20/008

During a club's pool training night, a trainee passed out while attempting to swim from the deep to the shallow end. He was spotted by two other club members who were having a pool practise session using full equipment. They were some distance away in the deep end when they saw the trainee in about 2m of water. They brought him to the surface, called for help and a pool lifeguard helped to recover the trainee onto the side of the pool where it was found he had a pulse but was not breathing.

One of the rescuers reported the trainee's tongue was obstructing his airway. The trainee was given CPR, breathing returned and he was put in the recovery position. Bloody fluids were apparent around his mouth and nose. An ambulance had been called but in the meantime first aid care was given by an A&E nurse who was attending the pool session that night for a Try Dive. Oxygen, in a pony cylinder with a regulator, was available to the nurse but not used.

An ambulance arrived and first aid was taken over by the paramedics who administered oxygen. The trainee was screaming and in obvious discomfort. A second ambulance arrived, and the trainee moved to a trolley at which point he was just about able to speak but incoherently. The trainee was transferred to an ambulance and taken to hospital. A club member went to the hospital and met the trainee in A&E and found he had recovered well and reported what he thought had

happened.

He said that he had exhaled in the deep end to become negatively buoyant and had recovered consciousness just before he had been put in the recovery position on the pool side but was unable to speak.

Two policemen asked the trainee some questions while he waited for a chest x-ray. The following morning the trainee contacted the dive club to report he was well.

March 2020

20/102

A 'Mayday' call was received by the Coastguard from a dive boat reporting a diver aboard undergoing CPR. The Coastguard tasked a Lifeboat, Coastguard rescue team and a Coastguard Rescue Helicopter. The diver resumed breathing and on return to shore was transferred to a waiting ambulance for transfer to hospital. (Coastguard & RNLI reports).

March 2020

20/017

A dive club was conducting several swim assessments in a pool which were for trainees who had not completed the full 200m assessment earlier in training. One trainee expressed his nervousness about being able to complete the distance, but an instructor said to give it a try and he could abort the swim at any time.

The trainee started the swim quickly which slightly worried the instructor. After swimming two pool widths of 25m each, the trainee paused but looked fine and was happy to continue. During the third width he went to the side of the pool and was not happy. The trainee was holding his head with his hands, so the instructor assisted him out of the water.

The trainee looked a bit out of breath, was discoloured and showed signs of anxiety and perhaps mild panic. The trainee reported that this had happened once or twice before in situations that he had been anxious about. This had been noted by a GP but not been put on his medical form nor had he mentioned it to a medical referee that he had spoken to about another issue.

The instructor made sure the trainee was alright but asked why he had started the swim so quickly to which the trainee replied that if he didn't go fast, he worried about sinking.

The instructor felt it unwise to continue the pool session, so the trainee sat it out. Afterwards he looked a lot better but was still a bit worried about his performance.

March 2020 **20/080**

A diver slipped on a slipway injuring his right knee. After reporting to the on-site team he was treated with an ice pack and advised to rest. The diver experienced a little swelling of his knee and was advised to call 111 if his condition worsened.

June 2020 **20/104**

Coastguard was contacted for assistance by the ambulance service, who were responding to a tachycardic diver on a beach. They tasked a Volunteer Life Brigade who assisted the ambulance to extract the casualty for onward transfer to hospital. (Coastguard report).

July 2020 **20/026**

A Coastguard rescue team was tasked to assist the ambulance service at a marina with a diver who had suffered a head and back injury after being knocked across a boat's deck by a rough wave. The diver was assessed by paramedics and taken to hospital by ambulance for a full check-up. (Media report).

July 2020 **20/029**

An instructor and two students, all using air, carried out a shore training dive to practice controlled buoyant lifts and rescue skills. They reached a maximum depth of 6m but 11 min into the dive one of the students panicked, dumped his weights, and inflated his BCD. He was unable to calm himself and was hyperventilating so the instructor and other student towed him 150m back to the shore.

The shore cover assisted in recovering the student and put him on oxygen. The student calmed down and was fine but said that he was

unfit, had become breathless, panicked, and then hyperventilated.

July 2020 **20/117**

A diver on a training course cut his finger underwater whilst finning during an exercise. The diver was escorted from the water by an assistant instructor and provided first aid. The diver subsequently went to A&E and had the wound cleaned and received two stitches to close the wound.

August 2020 **20/051**

A snorkeller was on holiday and arrived at a beach in a bay. He was with a friend and two children who had planned to do some swimming and body boarding and for him to do some solo snorkelling.

The weather was cool at around 16°C, the water temperature around 14°C, a slight drizzle was falling and the bay calm but with a swell up to 1.5m. The group had planned to stay for up to five hours so had plenty of food and hot drinks.

The snorkeller had a 5mm full wetsuit with him that he used for colder days, but he kitted up using a 3mm shorty wetsuit and 4 kg quick release weightbelt which was equipment he had used over many years and several times earlier in the week for swims of between 30 to 60 min.

The drizzle had stopped as the snorkeller entered the water for his first dive and finned up the right side of the bay and around a headland. He moved fairly slowly as there was a lot of underwater life to see but as he finned around the headland the water was significantly colder than in the bay, so he returned to the beach with a dive duration of 40 min and a maximum depth of 3m.

He wrapped himself in a towel over his wetsuit, had a hot drink with some biscuits and re-entered the water after 15 min for his second dive. He finned up the left-hand side of the bay but there was little in the way of sea life, the maximum depth he had dived to was 3m and the underwater visibility poorer. He stopped and floated for a while trying to decide whether to abort the dive or swim across the bay to its right-hand side.

As he had been in for around 12 min he decided to swim across the bay as he felt physically fine and although a little cold, he thought the swim might warm him up. He reached halfway across the bay having looked up occasionally to stay on course as there was nothing under the water to use as a guide.

At this point he had the sensation of having forgotten how to fin so raised his head, tried to fin forward and began to struggle for breath. He floated face down breathing through his snorkel but began to struggle to stay afloat so rolled onto his back. He found he couldn't lie on his back and float but became upright and was finning to keep his head above water. He pulled his mask down to try and lie back and float but was unsuccessful, floundered and sank below the surface. He surfaced still floundering and went under again and this happened about three times. The final time he surfaced he thrashed out with his arms and realised he was going to die unless he did something so shouted to himself but found he couldn't make any sound other than a croaking noise and with his loss of vocal cords he knew he was drowning. In anger and fear he somehow started doing a side stroke towards the rocks 25m away on the bay's right-hand side.

He reached the rocks and splashing and croaking he saw a flat ledge, grabbed the rock and laid his face on the ledge and stayed there for a while. At this point a call had been made to the Coastguard reporting the snorkeller hanging onto the rock. He was being bounced up and down by the swell and finally dragged himself onto the ledge and sat down. His dive duration was 20 min, but he still could not speak or shout, was breathing heavily and shaking from cold. At this point he realised he was still wearing his weightbelt which he knew he should have ditched earlier.

As he tried to recover his breath, two canoeists in a Canadian-style canoe arrived to recover him but the snorkeller waved them away as the rocks were sharp and the swell still around 1.5m. The canoeists shouted to the snorkeller to remove his fins and dive across the canoe when they came alongside. The snorkeller removed his fins and weightbelt and fell across the canoe then laid

face down in the bottom as he was returned to the beach. A Coastguard rescue team had arrived and a helicopter, unable to land on the beach, had landed on the bay's clifftop shortly after the snorkeller was recovered to the beach.

The helicopter paramedic came down to the beach and carried out an assessment. The snorkeller's sats were 97%, heart rate 131, blood sugar 1.5, blood pressure 132/130 and his temperature under 35°C, which was not recordable on the paramedic's thermometer below 35°C. The snorkeller was winched off the beach and taken to a hospital's A&E department. A chest x-ray showed the snorkeller was clear of water build up in his lungs and after four hours a second x-ray showed no oedema, and he was discharged.

August 2020

20/081

A student and her instructor had completed a previous training dive to a maximum depth of 6m for a total duration of 42 min. After a surface interval of 123 min the pair conducted a further training dive to a maximum depth of 12m with a total dive time of 26 min.

The student did not equalise her mask and following the dive she displayed redness in the whites of her eyes, red side of her face but her vision, pupil responses and eye tracking were normal. The student was advised to rest.

August 2020

20/048

A group of divers were carrying out shore training dives. A diver and two trainees, all using air, prepared to carry out their dive. The first trainee had an issue before entering the water with a faulty pressure gauge which was replaced before the group kitted up and buddy checked.

They entered waist deep water where the trainee had an issue with her glove zips and then her mask. The gloves were sorted out, but her mask kept leaking when she put her head in the water and the silicone skirt came away from the mask frame. It was impossible to resolve but another diver in the main group was just exiting the water and loaned the trainee his mask. This was checked and the trainee happy but when

the three waded further out, but it became apparent she needed more weight, and two 1 kg weight pouches were added.

The three divers then descended by buoyed lines marking a 6m training platform. The dive manager on shore was checking dive details with two other divers who had just finished their dive when she looked up and saw the first trainee on the surface, throwing her arms around as if she was trying to grab hold of a large buoy. The dive manager immediately shouted for the trainee to put air in her BCD and sent one of the pair, who had just finished diving but were still in the water, to help the trainee.

There was no sign of the diver and second trainee as the safety diver made her way out but as did two divers surfaced nearby, the trainee went quiet and disappeared below the surface. The safety diver returned to shore as another two divers surfaced with the unresponsive and unconscious trainee. The two had been diving independently when one of them had seen a loose fin and saw a diver just below him, head down and unconscious at 8m with one fin and no regulator in their mouth. Another diver who had also seen the diver approached and took her to the surface and then ashore.

An emergency alert was raised, the trainee was de-kitted and given rescue breaths using pocket mask by the diver who had recovered the trainee. A member of the dive site's staff arrived, and oxygen was administered. The trainee was unresponsive for approximately 6 min but had a slight facial twitch, was cyanosed with oxygen levels of 50% and bleeding from her nose and mouth. She eventually coughed, produced a large amount of fluid, and became more responsive with her oxygen levels slowly rising to 85%.

Paramedics, an ambulance, and air ambulance attended but it was agreed that the trainee was well enough to go to hospital and did not need to go to a hyperbaric chamber. The trainee was discharged from hospital two days later, was on antibiotics and had a slight cough due to a little lung damage but was able to return to work the following day.

The diver who had been leading the trainees' dive reported later that as the first trainee was nervous, he had made her his priority on the dive as the underwater visibility was poor. On the training platform he saw the other trainee was too near its 6m edge and had buoyancy problems. He had told the first trainee to wait as they were near a shotline so he could attend to the other trainee.

On returning to the shotline he noticed the first trainee had gone and could not find her so surfaced with the second trainee, got him to hold onto a surface guide rope and re-descended for another look. When he re-surfaced, he and the second trainee were called ashore.

The first trainee later reported that she had panicked due to the poor visibility on the training platform, had lost her buoyancy and gone to the surface where she panicked again as she thought her first stage had become caught on a surface line and in thrashing her arms around she had knocked her regulator out, lost a fin, had taken in a large amount of water and found herself sinking believing she was going to die.

August 2020

20/044

A diver led two others on a shore dive the purpose of which was depth progression for one of them to 20m. They descended and spent some time on wreckage at 12m before descending to 20m.

They made a gradual ascent to 12m and spent more time on the wreckage and started to make their way to another underwater feature when one of the divers stopped the dive leader, signalled he was unhappy and wanted to surface. The dive leader tried to ask what the problem was, but the diver just signalled 'up' so the three started a controlled ascent. They surfaced with a dive duration of 36 min, including a 3 min safety stop, to a maximum depth of 22m and the diver informed the dive leader that he was having difficulty breathing.

They all exited the water and after 2 min the diver said his lungs felt 'bubbly'. The dive leader suspected IPO and contacted the dive site's staff

who put the diver on oxygen. An ambulance attended and was concerned with the diver's ECG reading so called an air ambulance in case he needed recompression. A doctor on the helicopter decided it was IPO and that recompression would not help so the diver was taken to hospital.

Two hyperbaric chambers were consulted but they were happy that the incident had not been caused by diving. The diver's lungs cleared but he was kept in hospital for nine days as his heartbeat was irregular. He was diagnosed with Takotsubo syndrome and was referred to a hospital closer to his home for further investigation of this heart condition of which there had been no previous evidence.

Doctors from both hyperbaric chambers had talked through the dive with the diver, read the computer details step by step and stated that it appeared to be 'a textbook' dive. The conclusion was that the diver's heart condition was existing or 'waiting to happen'. This syndrome can be triggered by stress or psychosomatic pressures.

August 2020

20/083

A diver and his buddy conducted a dive to a maximum depth of 32m. As the pair were following a line back towards shallower water at a depth of 22m the diver began to feel lightheaded.

He was helped to ascend to the surface and was hyperventilating when they surfaced. The diver had suffered from asthma as a child but had not experienced any problems since. Advice was sought from medical staff at a hyperbaric chamber.

August 2020

20/040

A diver and another student were on a training course with an instructor and a safety diver. The dive had proceeded to a maximum depth of 30m and when one of the students signalled reaching 100 bar the dive was turned.

During the return, the diver was seen acting oddly and then described as panicked and became separated from the group, it being presumed he had made a rapid ascent. The rest of the group

made a slow steady ascent and on surfacing found the diver already ashore and receiving CPR.

The diver had been seen on the surface holding onto a marker buoy and looking underwater, presumed to be looking for his buddy. He was then seen to roll over and turn face down in the water without his regulator in. A member of the site staff raised the alarm shouting for assistance for an unconscious diver and a member of the groups support team ashore entered the water and recovered the unconscious unresponsive diver back to shore, whilst site staff called 999.

Once back at shore a number of people assisted with de-kitting the diver, recovering him from the water and commencing CPR. Four people took turns at CPR efforts including rescue breaths, chest compressions and oxygen enriched rescue breaths. CPR efforts continued until arrival of emergency services, which included two ambulances, a fast response ambulance car and an air ambulance, who were successful in reviving the diver. Several police cars and a fire engine were also in attendance.

The diver was taken to hospital by air ambulance, and it was reported he was making a good recovery from what was suspected to have been a mild heart attack. It was later reported that the diver had failed to disclose an underlying health problem.

August 2020

20/083

A diver had just completed his initial qualification and was on a guided dive. During the ascent at a depth of 6m he panicked, removed his regulator, and refused an AS offered by the guide.

The guide brought the diver to the surface at which point the diver became unconscious and stopped breathing. The guide raised the alarm and commenced in water rescue breaths until the site's emergency boat arrived and recovered the diver into the boat and began CPR with oxygen.

The diver was taken to hospital by ambulance and released later the same day.

September 2020**20/047**

The Coastguard received a report of three divers in difficulty and an inshore and all-weather lifeboat were launched. When they arrived at the scene, they found three divers clinging to a lobster pot marker after getting into difficulty and unable to make their way back to shore.

The inshore lifeboat recovered two of the divers and transferred them to the all-weather lifeboat where one of them received first aid. The third diver was recovered by the inshore lifeboat and all three divers taken back to shore where one of the divers was transferred into the care of the ambulance service. (RNLI report).

September 2020**20/077**

A pair of divers conducted a drift dive from a club RHIB both using rebreathers. The dive went to plan but the leading diver was unaware that his buddy was struggling with the SMB as the wind was blowing from the west against the current of about 0.5-0.75 of a knot making the buddy work considerably harder than the leading diver even though they were drifting with the current. The buddy was becoming increasingly out of breath, but the leading diver was unaware because every time he gave his buddy the 'OK' signal, he returned it.

Towards the end of the dive the pair followed the plan to come up into the shallows to carry out a safety stop, ensuring they didn't stray into a shipping channel. Because of the current and the effect of the wind on the SMB, this meant the buddy had to work even harder and he became even more out of breath. The pair were at about 15m making slow progress up into the shallows in an interesting bit of reef, when the buddy was hanging onto a rock and had let go of the SMB and had bailed out from his CCR onto his bailout cylinder with nitrox 27.

It took a minute or so for the leading diver to realise this as he thought he was enjoying the reef. On recognising the problem, the leading diver moved in close to establish he had an issue. He seemed very confused and suspected a CO₂ hit.

In order to mark their position for the boat, the

leading diver deployed his DSMB and then used a controlled buoyant lift to bring his buddy to the surface. The buddy regained some awareness on the way up and was able to operate his buoyancy device towards the end of the ascent.

Once on the surface the buddy was able to climb back into the boat and was put onto oxygen as a precaution. He had a headache but did not want any medical treatment.

September 2020**20/119**

An instructor met with a student to plan and prepare for drysuit training on a planned dive on a wreck in 30m on a dive charter boat. The pair used the transit time to the site revising knowledge, checking equipment, dive planning and preparing.

Once the boat reached the dive site the pair descended without issue to 24m, the visibility was good at 8m with good light and no surge. The student refused to move away from the shot line despite attempts to encourage him by the instructor. As a result, no skills were conducted on the dive. After 7 min of the dive the student signalled he had 50 bar remaining. The instructor checked the student's SPG and found it read 120 bar and he noticed that the student appeared stressed. The student then signalled that he was out of gas.

The instructor then tried to bring the student off the shotline in order to deploy a DSMB and looked away. When he looked back the student had gone, and he noticed that the student was swimming up the shotline. The instructor caught the student at approximately 20m and attempted to stop the ascent, but the student struggled and swam harder for the surface. The instructor opened the student's drysuit valves, then started dumping air, before flaring to slow down and gain some control on the ascent.

At the surface, the student exited the water via the boat lift. The student was monitored on the trip back to shore and once back onshore, the instructor saw no signs of any adverse symptoms. Approximately 20 min after departing the boat, the student returned to the boat and informed the skipper that he felt unwell, stating he had a

rapid ascent. The skipper advised the casualty to rest on the boat, administered oxygen and called the Coastguard. Approximately 20 min later an ambulance arrived and left with the diver to be taken to a recompression chamber.

October 2020

20/066

A trainee and another student diver completed two training dives, the first to 7m for a total dive time of 20 min and after a surface interval of 80 min a second dive to a maximum depth of 12m for a total duration of 33 min.

As the diver left the water after the second dive, she slipped on the rocky ground and banged her foot as she fell. She said she was fine at the time but after 30 min complained that her foot hurt a bit. She was able to walk and so her instructor told her to let him know how it progressed.

The next day the diver's foot was still not right and so she went to hospital to get it checked. She was advised it was badly sprained but that there were no breaks.

October 2020

20/060

A pair of experienced divers were undertaking training for Accelerated Decompression Procedures with an instructor. They completed the first dive of the day to a maximum depth of 9m to practise skills including buoyancy. During the dive one of the divers gave a signal to indicate gas contents and this was understood by the instructor to signal a level of 50 bar.

On terminating the dive and returning to shore, the diver was found to have 100 bar contents remaining. After a short surface interval, during which the diver changed her cylinder for another containing air at 150 bar, the group entered the water with the intention of conducting further training at a depth of 18m, where an underwater feature allowed the group to remain clear of the bottom, avoiding disturbing the visibility.

The group entered the water and conducted a bubble check at a depth of 6m, with no bubbles noted during the checks. The group descended to the planned 18m depth and conducted an AS

exercise during which the group drifted to a depth of 26m. The instructor then demonstrated DSMB deployment and the student who had started the dive with 150 bar deployed their DSMB without problem. The second student had difficulty recovering his reel from his drysuit pocket as his side-mounted deco-stage was lying on top of it. The instructor removed it from his pocket with some difficulty and passed it to the student. The student fumbled and dropped the reel to the bottom. The first student shone their torch in the poor visibility and the second student looked for his lost reel for 5 to 10 sec before descending further to 27m. The instructor then signalled to abort the dive and received an 'OK' signal from both divers and the instructor began to reel in her DSMB line.

The first student at this point signalled out of gas to the second and on receiving an AS had difficulties with the orientation and may have initially fitted it upside down getting water into their mouth. After altering the orientation of the AS the diver managed to get a breath and took some time to settle their breathing during which time the group had sunk to a depth of 32m.

The instructor signalled to ascend but the out of gas diver continued to experience inhaling water during the ascent although at a depth of 18m their breathing had noticeably slowed to a more normal rate. The second student indicated the DSMB lines behind her to the instructor which were becoming entangled. The instructor paused to untangle them but, in the process, lost sight of the two students who continued their ascent.

The pair of divers surfaced safely but the out of gas diver reported an "impending sense of doom" and the second diver called for help and started towing the diver to shore. During the tow, the diver became unresponsive and on arrival at the shore another diver, who was not part of the group, came to assist and noticed the unresponsive diver was not breathing and gave two rescue breaths in the water before pulling the now unconscious diver from the water.

The onsite staff administered CPR with oxygen enriched rescue breaths and after two cycles the diver regained consciousness.

The emergency services had been called and an ambulance and air ambulance both arrived.

After treatment in the ambulance for 45 min the diver was taken to hospital, treated for near drowning and aspiration pneumonia, and kept in for observation before being released two days later.

October 2020

20/062

A diver had conducted two dives the previous day both to a maximum depth of 22m and a duration of 30 min.

The next day, in a group with four other divers, he completed a dive to a maximum depth of 24m for a total duration of 32 min during which the group rose to a depth of 14m and then descended again. During the subsequent ascent the group spent around 10 min at a depth of 9m and then 6 min at a depth of between 5 and 6m.

On exiting the water, the diver was desperate to visit the toilet and ascended a set of stairs quickly whilst in full kit. The diver de-kitted and went to the toilet at which point he started to feel wobbly. The diver sat in a car and was provided a sugary carbonated drink after drinking which he felt nauseous and a little disoriented.

The dive manager escorted the diver to the on-site shop and requested oxygen, which was provided. First aid tests were conducted with no abnormalities identified but because the diver was now shivering a hyperbaric doctor was conducted who advised the diver should attend a recompression facility for assessment. The diver was driven to the chamber where all neurological, balance and lung function tests were normal and that the likely explanation was dehydration and running up the stairs had resulted in exhaustion. The diver was discharged with no treatment necessary.

October 2020

20/064

A group of three divers conducted two dives 20m for 46 min with the last 8 min spent around 5m or shallower and 20m for 52 min with the last 8 min spent around 5m or shallower. One of the divers

had been using a semi-dry wetsuit and he had removed his suit shortly after returning to his car following the second dive.

The other two divers then planned to conduct a third dive and they approached the other diver to see if he wanted to join them. The diver declined as he had already removed his suit and said it was hard work to get his suit back on. The pair then proceeded to take cylinders for refilling and then went for some food and drink and did not see the diver again although they had looked for him in the carpark during their surface interval.

On surfacing from their third dive, the pair were approached by a member of the site staff who asked if they had lost a diver. The pair explained they had been with another diver on their previous dives and, on checking, the member of the site staff confirmed that the diver had been taken to hospital by ambulance after being sick. The diver had been sick shortly after the pair had last seen him and had been taken to a recompression chamber by ambulance, however on investigation he was not recompressed and was advised by the chamber doctor that being cold and dehydration were possible factors in his illness.

October 2020

20/063

Following the end of diving for the day on an inland lake, the site safety boat with tiller controls was being used to provide in-house training in basic boathandling to two members.

The cox'n had provided a briefing on the boat and controls and then demonstrated various manoeuvres. One of the students then practised the same manoeuvres. The second student then took the controls and during a turn is believed to have accelerated, which resulted in the cox'n being thrown from the boat and was then struck by the boat on his hand and leg. The boat engine was cut and stopped 2-3 boat lengths away from the cox'n.

One of the crew entered the water and assisted the cox'n back to the boat where he was recovered with the assistance of the two crew members. The crewman in the water was then

recovered with some difficulty as he had entered the water with his drysuit open. The boat was then returned to shore and ambulance was called.

October 2020**20/085**

Two divers completed three dives in a day all with no required decompression stops and with safety stops completed. Following the dives one of the divers reported feeling aches in both elbows and shoulders.

The diver was placed on oxygen for 20 min and advised to relax and drink plenty of water with symptoms reducing over the 20 min on oxygen.

November 2020**20/070**

During a training session in a swimming pool, whilst at a depth of 2m, the trainee indicated he was experiencing numbness in his fingertips and lips whilst underwater. The instructor raised him to the surface using a controlled buoyant lift and the trainee was assisted from the water, assessed, and placed on oxygen as a precaution.

The trainee was then transferred to an onsite medical facility and a diving doctor was consulted but the conclusion was that the symptoms were not diving related.

December 2020**20/086**

After completing a first training dive in a heated swimming pool a student fainted and sustained a slight cut and bruising to his forehead. The student was advised to drink plenty of water and apply an ice pack to his head if necessary and to rest.

Overseas incidents

Fatality

July 2020

20/025

The police attended an inland dive site where two divers died. It was reported that one was using a rebreather, the other on open circuit and they wanted to test a DPV they had recently acquired.

It was understood that they had been in the water for about 30 min when the rebreather diver got into difficulties at around 25m. The open circuit diver went to his assistance but got into difficulty too. He surfaced and raised the alarm but became unconscious and died a short time later.

Members of two search and rescue teams were in the water conducting training exercises when the alarm was raised. They recovered the body of the rebreather diver after the police and emergency services had arrived. Both bodies were removed to a hospital where post-mortems were due to take place. (Eire).

DCI

September 2020

20/098

Following a wreck dive, which included required decompression stops, a diver experienced pain in his upper arm. The diver was put on 100% oxygen and the Coastguard was contacted and the diver was advised to go to hospital A&E.

Following assessment, the diver was subsequently referred to a recompression chamber where he received treatment for 2 nights. His condition never developed into anything worse than pain in the arm and the pain was reduced after the first session in the chamber. (Eire).

October 2020

20/061

A diver completed four dives over two days all within computer limits. The first dive on day two was to a maximum depth of 37m for a total duration of 42 min. After a surface interval of 1 hr

50 min, she completed a dive using nitrox 28 to a maximum depth of 31m for a total duration of 36 min.

Two hours after the final dive of the series the diver began to experience pain and tenderness to her central upper abdomen. These symptoms were quickly followed by itchiness and tightness to both upper arms. Between 30 min and an hour later the diver experienced a visual disturbance in the form of a line of distorted vision out of the corner of her right eye, which lasted 5 to 10 min. In a further 10 min the diver experienced tightness to her upper chest and reported her symptoms to another diver who observed a rash on her upper abdomen and upper arms.

Oxygen was requested from the dive centre and the diver was given hydration salts, antihistamine and rested on a bed. Oxygen was provided approximately 30 min later and administered. The rash reduced slightly but did not disappear and so a recompression chamber was called but there was no response and so a local hospital was called but they were unable to advise on DCI.

A call was then made to the UK Diver helpline for advice. The advice was to go to a local chamber and an internet search located the emergency number and on attending the recompression chamber DCI was confirmed and the diver received two periods of recompression all symptoms resolved.

Boat/surface

July 2020

20/122

Coastguard received a report of diver overdue and missing. (Coastguard report).

August 2020

20/111

A RNLI lifeboat was requested to launch to assist a 6m dive RHIB with five persons on board. The RHIB had suffered engine failure. When the lifeboat arrived a tow line was passed, and the vessel taken under tow and returned to the slipway where the RHIB was recovered onto its trailer. The lifeboat returned to its

berth and made ready for service. (RNLI report).

September 2020

20/097

A group of divers in a RHIB suffered engine failure approximately 500m after departing from a marina. The crew immediately took out the paddles to ensure that it remained as close to the side of the busy harbour and just as they rang the marina to send a rescue boat, a local fishing boat was passing and threw a line and towed the RHIB back to the marina.

Once back at the marina the group did a limited amount of troubleshooting and concluded that there was water in the petrol as the water separator was very cloudy. The planned dive was abandoned. (Eire).

September 2020

20/113

Two RNLI lifeboats were launched in response to a 'Mayday' call from a dive RHIB that had caught fire. The three persons aboard had been diving approximately 3 miles offshore when the fire started. They had inflated their life raft, evacuated the RHIB and were taken under tow by a local fishing vessel.

One lifeboat arrived on scene and took control of the situation, and the second lifeboat was stood down. A Coastguard helicopter was also on scene whilst the lifeboat escorted the casualties ashore. (RNLI report). (Eire).

October 2020

20/101

A boat was being prepared to be launched for a Cox'n assessment. During pre-launch checks a problem was found with the tailgate, which was unable to be repaired there and then. The test was cancelled as a result. (Eire).

December 2020

20/114

A lifeboat was requested to launch by the Coastguard at 2306 hrs to respond to reports of two missing divers near a harbour. The lifeboat launched and was on scene by 2315 hrs and started a search outside the harbour. The two divers, who had been conducting a night diving

training exercise, were quickly located exhausted and trying to make their way back to shore having been caught by fast flowing currents.

The pair were recovered aboard the lifeboat and assessed and found to be very cold but otherwise in good health. On return to harbour, they were placed in the care of the ambulance service. The alarm on the overdue divers had been raised by other members of their shore party. (RNLI report). (Eire).

Ascents

January 2020

20/007

A diver using air and his buddy entered the water from a boat and descended onto a wreck where the visibility was around 20m.

At 28m, the diver began to suffer a mild anxiety attack which resulted in uncontrollable breathing, and he wanted ascend. He signalled he wanted to abort the dive and his buddy carried out a controlled buoyant lift omitting a safety stop.

The pair surfaced with a dive duration of 7 min to a maximum depth of 28m. The diver was recovered aboard the boat with no difficulties.

February 2020

20/016

An instructor and two students, all using air, carried out a boat dive to include controlled buoyant lifts from 20m to 6m.

Following the second lift to 6m the instructor signalled to re-descend but one of the students made a fast descent to 17m whilst the instructor and second student were still at 8m. The second student signalled to the instructor that he was on 85 bar, lost buoyancy and surfaced. He did not give the 'OK' signal at the surface, re-descended to 6m and joined the instructor.

In the meantime, the instructor had signalled to the first student at 17m to return to him at 6m. The first student had looked up to locate the instructor and second student but due to his exhaust bubbles had not seen the instructor's signal. However, he ascended and

met the instructor as the second student had just re-descended from the surface.

All three conducted a 3 min safety stop at 6m, surfaced with a dive duration of 29 min to a maximum depth of 20m and were reported fit and well.

February 2020

20/012

A diver and his buddy, both using air, carried out a boat dive in a sheltered cove during which they practised controlled buoyant lifts.

The diver carried out the first lift from 20m to 6m and the pair descended back to 20m for the buddy to carry out his lift. The buddy initially put quite a lot of air into the diver's wing BCD which he dumped on the ascent and controlled the ascent close to the 10m/min rate.

At 14m and 10m, the ascent slowed, and it was necessary to put extra air into the diver's BCD to continue but at around 8m the buddy could not dump air quickly enough from the diver's BCD and the pair ascended. omitted a safety stop and surfaced with a dive duration of 30 min to a maximum depth of 25m. Both divers were recovered aboard their dive boat. Analysis of both divers' computers showed the ascent rate was approximately 11m/min but showed no warnings or restrictions.

It was subsequently found that inflator on the wing BCD was injecting air into the wing which possibly happened during the ascent, but the buddy also reported that it was possible he inadvertently operated both the inflate and dump simultaneously during the last phase of the ascent.

August 2020

20/093

A trainee and an instructor commenced a training dive and were descending when the student lost buoyancy control and sank too quickly, panicked, and then ascended quickly. The instructor followed but was unable to control either the descent or ascent.

On surfacing, both divers were placed on oxygen and transported to a recompression chamber

where it is understood both were referred to hospital, but they were understood to be okay. (Eire).

August 2020

20/099

A diver, diving in a group of three, became separated from his buddies. After a brief look around for the other divers, the diver then proceeded to ascend but then lost control of buoyancy at a depth of around 10m and made an uncontrolled ascent direct to the surface.

The diver was put on oxygen and was observed and refrained from diving for 24 hours. They were okay the next day to dive. (Eire).

December 2020

20/078

A diver, using air, and his two buddies, using nitrox 32, had completed a dive to a maximum depth of 25m for a total dive time of 48 min including stops at 6m for 9 min. After a surface interval of 90 min and using the same gas mixes they were diving a wreck at a maximum depth of 22m.

Visibility on the wreck was poor at less than 2m and the diver became separated from the other pair towards the end of their planned bottom time. The pair managed to relocate the shotline and ascended normally. The diver had tried to locate the shotline but was unable to and so ascended directly to the surface in a faster than normal ascent.

On surfacing and regaining the boat, his computer was indicating that he had missed approximately 9 min of decompression stops. The diver was placed on oxygen and the rest of the day's diving was aborted.

The diver remained on oxygen for about 120 min and showed no signs of any symptoms. The diver was monitored once off oxygen for a further hour and then allowed to drive home. Subsequent checks with the diver revealed that he did not develop any symptoms of DCI.

Equipment

January 2020

20/005

A diver and his buddy, both using nitrox 32, were on holiday and carried out a wreck dive.

Around 12 min into the dive, they were finning across the wreck's debris field at approximately 15m but when the diver turned around, he saw that his buddy had ascended about 4m above him. As the diver ascended towards him, the buddy continued his ascent and surfaced next to their dive boat as the diver reached 6m. The buddy did not indicate anything was wrong but seeing that he was safe by the boat, the diver made a safety stop and surfaced with a dive duration of 15 min to a maximum depth of 20m.

With both back aboard the boat the buddy reported that at 18m his octopus regulator had gone into free flow and he had surfaced with an empty cylinder. He had tried to resolve the free flow but when his pressure gauge indicated zero he had signalled to the diver below who could not see him so the buddy made an emergency ascent but was able to complete a safety stop before his air ran out.

July 2020

20/090

A pair of divers were conducting a second dive of the day. One of the divers suffered a regulator free flow and the dive was aborted.

Both divers surfaced safely and the diver whose regulator had free flowed was placed on oxygen and monitored but no symptoms of DCI were observed. The regulator was reported as being over 20 years old. (Eire).

August 2020

20/094

A diver conducted a dive during which his breathing gas, nitrox 30, had an unusual taste and so he terminated the dive and surfaced. On shore, the diver was offered 100% oxygen to breathe but he declined.

The diver had mixed and filled his own cylinders from a recently serviced compressor. All cylinders filled from the same compressor were emptied.

(Eire).

September 2020

20/100

During a dive to a maximum depth of 38m for a training dive a diver experienced a regulator free flow. The cylinder was turned off and the diver began to breathe from an AS provided by their buddy.

The pair continued an ascent at the correct ascent rate and completed a safety stop. The divers' regulator was sent for servicing. (Eire).

Injury

January 2020

20/003

A group of divers of approximately 10 divers carried out a night dive entering the water from a bay. The sea condition was choppy, underwater visibility was between 8m and 10m and the water temperature was 23°C.

During the dive, an instructor, who had been running courses during that day, signalled a diver and his buddy to turn around when their air had reached roughly sixty percent and leave the rest of the group, which was contrary to the intentions of the dive leader. The diver felt the instructor was unsure of where he was underwater.

The instructor decided to use a buoy line to ascend from 11m and they all carried out a 3 min safety stop at approximately 6m during which the instructor's torch stopped working. The instructor and divers re-descended to 10m, re-joined and followed the rest of the group. The instructor then signalled the diver and his buddy to ascend, and they surfaced, with a dive duration of 30 min to a maximum depth of 11m but were around 40m from the shore.

Due to the choppy conditions, the surface current pulled the instructor and two divers onto a coral shelf the top of which was just below the surface. All were forced to crawl across the coral whilst being hit by waves to reach their exit point in the bay. They sustained cuts and bruises, damaged equipment, and a lost wedding ring.

January 2020**20/006**

A diver and his buddy had carried out a boat dive to a maximum of 40m with a dive duration of 23 min including a 5 min decompression stop at 6m. The following day the divers, both using air, planned a square profile dive to 45m with a maximum time of 30 min to surface and no more than 8 min of decompression.

Just before the divers began their ascent from their maximum depth of 45m, the diver reported the onset of a headache. Their ascent was at a normal rate with the diver's computer requiring a 6 min stop at 6m and the buddy's computer requiring an 8 min stop. They used the more conservative profile, carried out the 8 min stop and surfaced with a dive duration of 22 min.

The diver's headache continued so as soon as other divers had surfaced and been recovered aboard the boat he was taken back to shore and examined at a medical centre. The staff at the centre put the diver on oxygen and a drip and agreed he would have to attend a recompression facility for further assessment. It was later reported that a visit to the chamber would be unlikely, and the medical centre were just awaiting the results of a blood test.

February 2020**20/013**

A diver had spent about five hours operating a RHIB and although the sea state was slight to moderate around the site the boat was susceptible to quite a lot of movement.

When the diver left the RHIB, his ankle was hurting and although he could not attribute this to any particular event, he could only assume it was hurt during the five hours spent aboard. The diver's ankle became swollen, and it appeared to be a sprain.

February 2020**20/014**

A group of three divers, all using air, carried out a shore dive. The plan was to dive a reef at 25m but at the beginning of the descent one of the divers noticed a slight pain above his nose which he assumed to be his sinuses. The pain became worse

as he descended and at 5m the diver signalled to his two buddies that he wanted to abort the dive.

The group surfaced with a dive duration of 5 min to a maximum depth of 5m. The diver made his way back to the shore and his two buddies continued with the dive. The diver did not dive again that day.

February 2020**20/015**

A diver had completed a dive to a maximum depth of 30m for a total duration of 30 min, without incident. The following day he completed a dive to a maximum depth of 30m for a total duration of 39 min, again without incident.

On the morning of the next day the diver was unwell and on consulting a doctor was advised his symptoms were not likely to be diving related and he was advised to rest and refrain from diving for 24 hours after he felt better in case further symptoms appeared.

July 2020**20/091**

On route to a dive site, a dive boat hit a large wave, which caused one of the cylinders to be dislodged and it trapped one of the divers' legs and foot. The diver appeared okay and so the group continued to the dive site. The divers condition worsened, and he found it hard to keep any weight on his leg.

The dive was aborted, and the boat returned to harbour where it was met by an ambulance. The diver was treated by the ambulance crew and transferred to hospital for further assessment of an injured knee. (Eire)

July 2020**20/092**

A diver and his two buddies prepared to dive a wreck from a boat. The three were all on the same side of the boat and as the boat approached the shot buoy the divers entered the water on a signal from the cox'n.

As the diver entered the water, he signalled 'OK' to the boat and began to orientate on the shot buoy, which was 4-5m away.

The boat then crossed between the diver and the shotline and the diver found himself at the rear of the boat facing the engine. The diver tried to move away by pushing on the engine casing 2-3 times, but his right leg was sucked into the propeller. The propeller hit his right leg on the lower part of his shin and almost immediately his leg was sucked up into the propeller which stopped locked with his thigh trapped in it.

A diver on a second boat could see the situation but the diver managed to pull himself free and get to the starboard side of the boat. The boat crew checked the diver and helped him to remove his weightbelt, BCD and cylinder. The ladder was lowered, and the diver made his way on to the boat.

Once back aboard the diver was taken to shore where members of his party checked on his injuries and covered his open wound. The diver attended A&E and was treated for bruising and mild cut to his right thigh, stitches to his right shin and a fracture of his right shin which required a cast. The second boat had remained on site and recovered divers when they surfaced. (Eire).

September 2020

20/095

During a dive for a dive leading assessment an examiner felt his ear pop at a depth of 3-4m and returned immediately to the surface.

The diver had experienced the same problem before and on consulting his GP was given antibiotics to control any infection. (Eire).

September 2020

20/096

A group of divers had launched a RHIB and decided to load the boat at another slipway as the launch slip had lots of seaweed and was very slappy. After driving to the alternative slip the group began loading the boat from some steps.

One of the divers was descending the steps when he slipped and fell down several steps. The diver was attended to by the other divers and after about 15 min felt okay. A safety briefing was held with the dive group to use the handrail and to be very careful.

The following morning the first diver to slip didn't feel great and went for a X-ray in hospital in Cork to find that they had cracked ribs. Despite the briefing, a second diver slipped and landed on their back but the diving cylinder took the worst of the fall and the diver suffered minor pain and bruising.

The divers were later informed by locals that the county council no longer chemically treat the growth on the steps. That evening all steps were cleaned by the divers with a shovel and gritted with sand. (Eire).

History of previous UK diving fatalities

Year	Membership	BSAC	Non-BSAC
1965	6,813	3	-
1966	7,979	1	4
1967	8,350	1	6
1968	9,241	2	1
1969	11,299	2	8
1970	13,721	4	4
1971	14,898	0	4
1972	17,041	10	31
1973	19,332	9	20
1974	22,150	3	11
1975	23,204	2	-
1976	25,310	4	-
1977	25,342	3	-
1978	27,510	8	4
1979	30,579	5	8
1980	24,900	6	7
1981	27,834	5	7
1982	29,590	6	3
1983	32,177	7	2
1984	32,950	8	5
1985	34,861	8	6
1986	34,210	6	9
1987	34,500	6	2
1988	32,960	10	6
1989	34,422	4	8
1990	36,434	3	6
1991	43,475	8	9
1992	45,626	9	8

Year	Membership	BSAC	Non-BSAC
1993	50,722	3	6
1994	50,505	6	6
1995	52,364	9	9
1996	48,920	7	9
1997	48,412	4	12
1998	46,712	5	14
1999	46,682	9	8*
2000	41,692	7	10
2001	41,272	10	14
2002	39,960	3	7
2003	38,340	6	9
2004	37,153	4	18
2005	37,185	5	11
2006	35,422	4	11
2007	34,857	8	5
2008	34,325	6	5
2009	32,790	8	9
2010	32,229	7	7
2011	30,909	5	7
2012	29,632	9	7
2013	28,728	5	9
2014	28,375	5	11
2015	27,803	3	5
2016	27,346	5	7
2017	26,774	2	13
2018	26,717	8	9
2019	27,000	10	3
2020	21,594	2	4

**1999 figure corrected from 9 to 8 due to a double count discovered in 2010
1998 figures onwards are calendar year figures; 1965 to 1998 are October 1st to September 31st figures.*

List of abbreviations used in this and previous incident reports

AISAutomatic identification system (location beacon)	ILBInshore lifeboat
ASAlternative source (gas or air)	INMInstitute of Naval Medicine
A&EAccident and emergency department	IPOImmersion pulmonary oedema
AEDAutomated external defibrillator	IVIntravenous
ARCC(K)Aeronautical rescue coordination centre (Kinloss)	kgKilogramme
ARIAberdeen Royal Infirmary (Scotland, UK)	LBLifeboat
AWLBAll weather lifeboat	MCAMaritime & Coastguard Agency
BCDBuoyancy compensation device	mMetre
BOVBailout valve	minMinute(s)
CAGECerebral arterial gas embolism	MODMaximum operating depth
CGCoastguard	MOPMember of the public
CCRClosed circuit rebreather	MRCCMaritime rescue coordination centre
CNSCentral nervous system	MRSCMaritime rescue sub centre
CPRCardiopulmonary resuscitation	MVMotor vessel
CRTCoastguard rescue team	NCINational Coastwatch Institute
DCIDecompression illness	PFOPatent foramen ovale
DDMODuty diving medical officer	PLBPersonal locator beacon
DDRCDiving Diseases Research Centre (Plymouth, UK)	POBPersons on board
DSCDigital selective calling (emergency radio signal)	QAHQueen Alexandra Hospital (Portsmouth, UK)
DSMBDelayed surface marker buoy	QABQueen Anne Battery (Plymouth, UK)
DPVDiver propulsion vehicle	RAFRoyal Air Force
ECGElectrocardiogram	RHIBRigid hull inflatable boat
ENTEar, nose and throat	RMBRoyal Marines base
EPIRBEmergency position indicating radio beacon	RNRoyal Navy
FAWGIFalse alarm with good intent	RNLIRoyal National Lifeboat Institution
FRSFire and rescue service	ROVRemotely operated vehicle
GPGeneral Practitioner (doctor)	SARSearch and rescue
GPSGlobal positioning system	SARIS/SARSYS Search and rescue information system
heloHelicopter	SMBSurface marker buoy
HEMSHelicopter emergency medical service	SRRSearch and rescue region
HLSHelicopter landing site	SRUSearch and rescue unit
HSEHealth and Safety Executive	UKDMCUK Diving Medical Committee
HUDHead up display	UTCCoordinated universal time
	VLBVolunteer life brigade
	111UK non-emergency medical assistance number
	999UK emergency phone number



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