

First Response and Other Emergency Drills

IMCA C 013, HSSE 047 Rev. 1 September 2021





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IMCA C 013, HSSE 047 Rev. 1 – Version History

Date	Reason	Revision
September 2021	Gender neutral language used throughout where practical; updates to diving scenarios to reflect updated practice	Rev. 1
January 2017	Reviewed as part of IMCA's five-year review process – no changes made	
April 2009	Initial publication	

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1 Introduction

This document has been produced by IMCA to assist with the ongoing competence of first response personnel on board vessels. This is not a guidance document; it sets out a range of first aid and other emergency drills which members can use on board their vessels as part of on-the-job training.

The drills cover a number of different scenarios encompassing a range of activities on a vessel.

Each drill has been written in the way that it evolves. Drill participants are provided with updated information on a real-time basis and the drills set out how they are expected to react.

The drills are designed to provide the reader with a number of pieces of information. Each of them is educational in its own right on the challenges of accidents and medical issues in an offshore environment. These may prompt the reader to look at developing or updating company procedures.

The medical solutions put forward are quite detailed. The drills can be modified to suit particular vessels or worksite needs and the depth of realism expected during the exercise.

It is intended that this document will be reviewed regularly and other drills will be added or the solutions will be updated if medical practice alters in any way. Likewise each IMCA member may alter the scenarios to suit their particular vessel or worksite needs. It is advisable to involve the member's occupational health advisers in this programme to ensure the maximum benefit is realised and to maintain compliance with medical guidelines.

It is envisaged that members may wish to add scenarios to this document in order to share best practice or to improve the practical aspects of the document. Any member who wishes to add scenarios to this document should forward them to the IMCA secretariat for inclusion in future versions of the document.

1.1 Changes to this document

This document was originally produced in 2009 by the IMCA Training, Certification & Personnel Competence (TCPC) Core Committee, now the Competence and Training Core Committee (C&T). It was designed to assist in ensuring the standard by which first aid or first response drills are undertaken as part of on-the-job training follows current medical and triage guidelines.

The document was re-issued in 2021 additionally as a HSSE document. Some of the scenarios were removed; others have been amended and updated to reflect good practice. The language of the document has been changed throughout to reflect appropriate gender neutrality.

¹ Triage – a process of prioritising the treatment of patients based on the severity of their condition

2 General Scenarios

2.1 Scenario 1

Someone is found collapsed on the bridge, not moving and apparently not breathing. It is lunchtime on the vessel and the medic is in the canteen, as is the master.

How do you proceed?

The person is then successfully resuscitated and is now in the sickbay. Evacuation is necessary. How is this co-ordinated? Can the person be successfully transferred to the helipad? Who communicates with the relatives?

The collapsed person is the radio operator. How do you proceed?

<u>Essentials:</u>

- *i)* ABC (airway, breathing, circulation). These are all part of basic life support. This person is not breathing, so needs their airway opened and possibly mouth-to-mouth respiration until the medic can be found and equipment located.
- *ii)* Watch for the neck this may have been damaged in any fall.
- iii) The medic should then check 'D' (disability) i.e. any neurological problems, and 'E' (exposure) which is to look for injuries.

You may also wish to consider:

The next challenge will be to contact emergency medical support and arrange evacuation, particularly if the person is the radio operator and the medic is involved in keeping the patient stable. Is there anyone else who can operate the radio to call for help?

Thereafter, the patient needs to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing harm?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a media response: who will speak to the media? What will they say? It is also important to tell the rest of the crew not to share anything on social media or communicate with the media so that a correct version of events, rather than hearsay, goes to the media.

2.2 Scenario 2

In heavy seas, a crew member trips and falls down the stairs inside the vessel and injures an arm, which appears to be deformed. How do you proceed?

The patient now tells you that they hurt their head as well and they seem a little confused. The patient declines any treatment.

How do you proceed?

That crew member is the Master. How do you proceed?

Essentials:

This is quite common, in that the more obvious injury is treated first and then the more subtle one may come to light later. The medic should ask about other injuries at the same time as the initial history-taking about the arm. The arm needs stabilised in some way, preferably by splinting. It is vital for circulation to be checked, as if it is compromised then it is an even greater emergency. The person needs to be evacuated.

Regarding the head injury, the patient may well have internal injuries. Airway and level of consciousness should be checked and monitored regularly. Are there charts to document this?

The patient needs evacuating urgently and transferred to hospital. How will this be expedited?

You may also wish to consider:

Given that they are the vessel Master, how will the vessel continue to operate?

Thereafter, the patient needs to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing harm?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.3 Scenario 3

The medic appears to be behaving strangely, in an animated and agitated way, and with a short temper. The medic does not respond to your questions.

Essentials:

This is a difficult matter, as the medic is of course the best person to assess this situation!

It would be important for the master to know of the situation, and if the vessel is working for a client it may be simplest to arrange for their medic to make an assessment of the vessel medic. The medic should be taken off their duties meantime and should hand over the keys to the sickbay. Are there sufficient trained first responders to cope with medical problems? The emergency medical support should be informed and arrangements made to evacuate the medic and find a replacement.

You may also wish to consider:

Who is accompanying the patient ashore?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

The medic will need to be formally assessed, at least by the emergency medical support doctor and perhaps by psychiatrists: how will this be arranged?

2.4 Scenario 4

The master appears very anxious and 'out of sorts'. There is no obvious reason for this.

Essentials:

This is a sensitive issue, and in the first instance the medic should be involved and discussions should centre on the possible causes of the problem and how to quickly rectify it.

Command of the vessel should be assumed by the chief mate and speaking to shore management is essential.

You may also wish to consider:

If the captain is very unwell then it may be necessary to arrange evacuation. Formal assessment by emergency medical support and perhaps by psychiatrists may be necessary: how will this be arranged?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.5 Scenario 5

The electrician is doing some work in the laundry behind one of the tumble dryers. They give a sudden cry and collapse to the floor behind the tumble dryer.

<u>Essentials:</u>

The clues are in the history. This is the electrician, in the laundry fixing something electrical. The electrician has more than likely been electrocuted. Given all the metalwork, it may be dangerous to approach the electrician right away, no matter how tempting it is.

First get help and shut off the power to that room and call the medic. Then check ABC (airway, breathing, circulation). This may be difficult owing to the location of the casualty behind the tumble dryer. Be careful of how the electrician is laying, so as to avoid injuries.

Once out, check Airway – Breathing – Circulation (ABC). Hopefully by then the medic will be in attendance and can take over.

You may also wish to consider:

If successfully resuscitated, the electrician will need monitoring in hospital for cardiac rhythm problems. Evacuation will be required. There may also be entry and exit burns from the electricity.

Another electrician will need to look at the tumble dryer, hopefully to mend it but certainly to make sure it is safe.

Thereafter, the electrician needs to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury to them?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

2.6 Scenario 6

A crew member is noted to be 'high' and louder than usual. A colleague thinks that there may be alcohol on this crew member's breath. The crew member denies this.

<u>Essentials:</u>

This crew member should be taken out of the workplace immediately and confronted with this information.

Depending on what is in the drugs and alcohol policy the crew member should be tested and if intoxicated then dealt with according to the policy.

You may also wish to consider:

Does the company have a drugs and alcohol policy?

Is testing performed in a proper manner that would stand up to legal scrutiny? Refer to IMCA HSSE 040 Guidance on Drug & Alcohol Policies and Testing

2.7 Scenario 7

The human resources (HR) department contacts the vessel: there is reason to believe that a crew member's medical certification has been falsified. The crew member denies this vehemently. How do you proceed?

Essentials:

The crew member should be stopped from working in the meantime whilst the issuer of the medical certificate is contacted to confirm the situation. The contact details should be on the medical certificate.

Although details about the medical certificate can be ascertained from the medical centre, it is inappropriate to request details of any medical conditions: this puts the medical centre in a difficult situation as regards medical confidentiality.

You may also wish to consider:

The HR department is likely to become involved in this at an early stage and will likely discuss it in depth with the company medical adviser.

2.8 Scenario 8

The human resources (HR) department informs you that the company medical adviser has discovered new information about a crew member which would invalidate their medical certification. How do you proceed?

Essentials:

This individual should be removed from work. This is a difficult situation but if their medical certification is invalidated then they are unfit to be offshore. They should be returned ashore forthwith.

2.9 Scenario 9

There has been a major incident on the vessel: three crew members appear to be dead, with fatal head and facial injuries. They are all foreign nationals. A number of other members of crew are clearly upset and traumatised by events. The client representative and master of the vessel are shouting at each other on the bridge and appear to be almost coming to blows as part of a violent disagreement.

The radio operator has called for help and a helicopter is on its way.

Essentials:

Major multiple trauma needs dealing with in a different manner from other trauma. The medic and first aiders must assume a different style of management. The casualties must be assessed rapidly according to a number of different measures.

- *i)* Open the airway. If they are not breathing, they are dead. Move on to the next casualty.
- *ii)* Find those who are viable *i.e.* breathing. Go to those who are not moving or complaining and assess those first.
- *iii)* Then move on to the more vocal.

Trauma triage can be performed rapidly in this manner and people are triaged according to their vital signs. A good method is the Cruciform card system.

The medic will then co-ordinate events in conjunction with the first aiders.

Given possible time delays with getting another helicopter out with doctors on board, it may be most efficient to get any sick casualties on the helicopter with first aid support and fly straight to hospital, rather than waiting for a second helicopter.

You may also wish to consider:

Does the vessel have a multiple trauma plan? Is there a multiple trauma system in place?

Is there a triage area within the vessel? Such areas should be sufficiently large and contain first aid equipment for first aiders, as well as diagnostic equipment. There should also be a board for detailing the injured. The triage area should be as close to the sickbay as possible: very unwell people would be treated in the sickbay, less unwell in the triage area before being moved out to other rooms nearby. A nearby room should also be designated a mortuary.

Are there sufficient qualified first aiders present? Is there someone who can keep a log of events and details of the injured/dead? Is the human resources (HR) protocol satisfactory? They are all foreign nationals, how are the relatives to be contacted?

Have drills been carried out on the vessel but also in conjunction with the other support services – e.g. emergency medical support, coastguard/helicopter companies/HR/contractors/etc.?

Do stretcher-bearers know the vessel? Can they lift loaded stretchers from the sickbay or triage area to the helideck? Can the first aiders cope if the medic is themselves injured, or completely occupied in the treatment of very sick people? What would happen if the helideck was out of commission?

What post-incident support do workers have? There is good evidence that a forced debriefing is not beneficial and can even be harmful. However, the offer of psychological support is often very helpful in itself.

Thereafter, they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patients and without causing further injury? Who is accompanying the crew members ashore? They need transferring to hospital – how will this be expedited?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.10 Scenario 10

A life support supervisor (LSS) falls down the stairs into sat control. The LSS is unconscious and is lying at an unusual angle.

Essentials:

ABC (airway, breathing, circulation).

Don't forget neck/spinal injuries!

The casualty should be recovered (carefully) to the sickbay on a spine board and then assessed by the medic for any neurological problems. A good neurological method for recording the conscious state of the patient – the Glasgow Coma Scale (GCS) or similar – should be used. Thereafter the patient should be examined for any other injuries.

The emergency medical support should be contacted urgently. This individual needs to be evacuated to hospital for definitive treatment.

You may also wish to consider:

This person's work will need to be taken over by another member of the crew. Do you have sufficient crew to enable this?

Thereafter, they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury to them?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.11 Scenario 11

The sickbay has been broken into, and some drugs may have been taken. How do you proceed?

<u>Essentials:</u>

The area should be sealed off and drugs accounted for: it would be important to start with the controlled drugs and other drugs which are commonly abused. It is possible that if these have

been consumed, that individual may now be under the influence of drugs and constitute a safety risk. Another possibility is attempted suicide and this should be considered as well.

The medic should be aware of the potential risk to health in an individual who has taken drugs.

This is also quite clearly a criminal matter and the police should be informed immediately: they will be able to give advice on how to proceed.

You may also wish to consider:

How accurate is the vessel's stock record? Is it likely to pick up missing medication?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.12 Scenario 12

There has been an outbreak of gastroenteritis on the vessel. One person was affected three days ago and now six others have come to the medic complaining of vomiting and diarrhoea. Several members of crew are becoming alarmed. There is a routine crew change tomorrow by helicopter.

How do you proceed?

<u>Essentials:</u>

The affected individuals should be isolated. One of the most common causes of infectious diarrhoea are the noroviruses, which can be passed on by faecal-oral spread, by contamination (such as cutlery) or by aerosol from vomiting.

The isolated individuals should not share a cabin with an unaffected individual, as they will surely become infected.

Most of the symptoms caused by these infections will subside after 24-48 hours. Thereafter the individual may well continue to be infectious for 48 hours after the symptoms have stopped. Thereafter they can go back to work.

The galley needs to be deep cleaned, as do their cabins after they are well.

Of VITAL importance is to ascertain that there are no caterers involved: before they return to work stool sampling should be undertaken to make sure that they have fully recovered.

You may also wish to consider:

The difficult issue is what to do in the next few days: exposing new crew members coming in on the next helicopter runs the risk of them becoming infected also. It may be worth sitting tight and letting the cleaning and isolation do their job before introducing new crew into the equation.

An equally difficult issue is management of the rest of the crew and their relatives. There may also be a press response, which will need management. Who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.13 Scenario 13

A person who has been on the vessel for one month goes home on shore leave. That person has had a persistent cough for six weeks. Following a visit to their own doctor, the person reports that they have informed that they have tuberculosis (TB). How do you proceed?

Prior to working on the vessel the person was on a training course with 30 other people for a day at a hotel. How do you proceed?

<u>Essentials:</u>

Tuberculosis is becoming an increasing problem. For the purposes of this discussion, TB management falls into two basic types, dependent on the type of TB – open or closed. Closed TB is when the individual is infected with TB and is unwell with it but not infectious. This individual needs to be treated by a specialist for the condition and will be unfit for a relatively short period whilst this is going on.

Open TB is altogether a different problem. Open TB is diagnosed when the individual is coughing up spit (or 'sputum') in which are TB bacteria. It can take a few weeks for the TB bacteria to grow in a lab culture of this spit and so the individual should stay off work until this is confirmed or refuted. Sputum containing TB bacteria is infectious and the individual will need treatment, during which time they will be off work. Treatment can take several months. If they are still infectious after that then they can be off even longer. Contacts will also need to be screened. (For example, the current view on land in the UK is that individuals who are infectious should have their household contacts screened first. This means that Public Health will contact them and arrange X-rays for them in about 6-8 weeks. If any of these are infected, then the net is cast wider and less intimate contacts are then contacted and screened.)

In the offshore vessel context, the people with whom the individual works and lives with for half their life are considered close contacts and so it is they who are contacted and screened in the same manner. If any of them are infected, then they would be treated. Offshore, this can become a significant logistic issue.

In the first instance it is better to issue a statement for the crew, in conjunction with the medical adviser, to the people with whom they shared a vessel and let them know of the situation and the possible need for testing at a later date. This should preserve the individual's confidentiality. Thereafter there is no further action until more information is obtained over the next few weeks from the patient's doctors, and the company's energies are best directed at making up a list of those likely to have been in close contact (i.e. working with them on the vessel).

As regards the training course, this is a red herring. It would be extremely unlikely for an individual to be able to pass on TB in that length of time. However, should they prove to be infectious and other crew members are infected too, then it may be that further screening is warranted: in this case it would be prudent to keep details of who was on the course.

You may also wish to consider:

This is almost certainly going to hit the press and it would be prudent to have public statements ready. Crew should be advised to direct any queries from the press to the press officer for the company.

2.14 Scenario 14

A member of the crew has been found dead in bed in their cabin. There are no obvious signs of what has happened.

<u>Essentials:</u>

ABC (airway, breathing, circulation) initially and call the medic immediately.

If it is clear that the person has been dead for some time then resuscitation need not be attempted: however, otherwise it should be.

If the medic is able to confirm death, then they should and inform the emergency medical support. The police may also need to be informed and will take on the matter themselves. The area must be kept secure for their investigations. See also HSSE 016 Guidance on the investigation and reporting of incidents.

You may also wish to consider:

The rest of the crew will of course be affected, and pastoral support should be offered. This can be through the company or their medical advisory support.

Informing the relatives must be done sensitively: this may well be a task for the police or for a joint effort with police and human resources (HR) department.

A press statement should be carefully worded and released. The crew should be advised to redirect any queries back to the public relations (PR) representatives of the company and not try to answer questions themselves.

2.15 Scenario 15

A welder is experiencing pain in the eyes and has to stop work. The welder manages to switch off the equipment but is still on deck.

Essentials:

The medic should be informed. The welder should try eyewash solution initially.

It is likely that the welder has suffered from either a foreign body in the eye (mostly when fettling/grinding and likely to be metal fragment) or arc eye.

It is possible for foreign bodies to enter the eye even if safety glasses are worn, so this must be considered. If this is a possibility then specialist treatment ashore may be required.

If arc eye is suspected, then the welder will experience severe pain and may need guiding to the medic. The medic should have been trained in eye examination and can apply fluorescein to look for foreign bodies under a blue light – they show up green. If arc eye is suspected then the individual is likely to need their eye patched, for approximately 24-36 hours. They also receive antibiotic ointment, which also serves to act as a lubricant for the eye. Arc eye is ultraviolet damage to the eye and if uncomplicated can recover rapidly.

You may also wish to consider:

Are working areas well stocked with eyewash solution? Are they in date and the seals intact? Is there a system to check this? On occasion, particularly in hot countries, eyewash bottles have been tampered with in an attempt to drink the contents.

If the welder has suffered arc eye, how did this happen? It is difficult for this to happen if they were wearing their welding goggles, so to prevent recurrence (in other people: it tends to be a formative experience for the sufferer!) it should be investigated.

2.16 Scenario 16

A caterer slips on the bottom step of the galley store. They are in some pain and having some difficulty in weight-bearing.

<u>Essentials:</u>

This may be a broken ankle. The medic should be summoned and will want to examine the caterer back at the sickbay, thereafter bandaging the affected part as necessary.

There are certain criteria which merit an X-ray of the area, including inability to weight-bear immediately and tenderness in some areas around the ankle: these may indicate a greater likelihood of a broken bone. If this is the case, then the individual should be evacuated for X-ray. Thereafter what happens to them depends on how they are: if mobile and no swelling or pain, then they can go back to work – if pain or swelling they will need support bandaging and may perhaps not be able to go back to work.

You may also wish to consider:

Are there any measures that increased the risk of the slip? Check the layout of the steps and the surface quality. Is there spillage of anything that might make the step slippery? Is the caterer's footwear up to the job?

2.17 Scenario 17

A crew member has been on board for three weeks and develops a high temperature, shivering and shaking and feeling generally unwell. They have had to travel through West Africa to reach the vessel.

Essentials:

This may well be malaria and should be taken very seriously. Urgent assistance should be sought from the emergency medical support by the medic. Thereafter they will risk-assess the likelihood of this being the cause. There are a number of other causes of this, general infections of other origins being one. The malaria test cards can help in the diagnosis. If they are suffering from malaria, then instituting treatment as recommended by emergency medical support is necessary, and evacuation should be arranged: the emergency medical support will help with this and the patient should be directed to an infectious diseases specialist. Malaria should be suspected in an individual up to one year after travel to an infectious area.

You may also wish to consider:

Some employers provide a letter to each employee to carry with them: it will help their own doctors (or any doctors they might meet) to include malaria as a possibility should they become unwell.

Employees should always take antimalarials as recommended by their travel medicine specialists. Does your company ensure that individuals are taking them and using other measures to reduce the risk of malaria?

Does your company carry drugs for treatment of malaria and the instant test cards?

It is possible that there may be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

2.18 Scenario 18

A painter is spray-painting on deck. It is their first day on the job. The crew member is concerned that the spray paint compressor is not working, so sprays it on to the tip of their glove. It is immediately painful. Taking the glove off, they can only see a pinprick wound on the fingertip, and so carry on working. However, later on, the finger looks a bit swollen and their hand is also throbbing.

Essentials:

This is a really easy accident to have, particularly in a junior member of staff, and is a classic preventable incident. A high-pressure injection injury may well have occurred: the spray guns work to high pressure and the entry wound can be really small. However the volume of substance injected can be surprisingly large. The injected liquid then tracks down between the tissue planes or layers, down the finger and into the hand. It could even go up the arm. It may need surgery, to open up and 'explore' the finger and possibly the hand, with a view to washing it out. The assessment of the need for surgery needs to be done urgently by a specialist, so the crew member will need evacuation. The paint (or other substance depending on the job – another common one is mineral oil) can be very corrosive and end up with internal scarring and loss of function of the hand.

You may also wish to consider:

This is clearly an education issue if a deliberate act. How well are the staff trained in preventing such an accident?

Occasionally it can also occur with equipment failure: This has occurred on land with a highpressure water jet used for cleaning of naturally occurring radioactive material (NORM): the individual needed an operation (done in a special operating theatre) and Geiger counters were used to make sure that there was no radioactive material left in the individual's arm afterwards. That was due to faulty equipment. How often is the equipment checked? Do staff know how to connect it safely?

3 Saturation Diving Scenarios

3.1 Scenario 1

A diver is working on clearing an area of debris on the seabed at 130m. The debris partly consists of fishing nets, including buoys. The diver decides to puncture a buoy with a hammer and chisel. The buoy is still at 1 atmosphere and implodes, pulling the diver's hand into the implosion. The diver's arm is now very sore and their watch was wrenched off in the implosion. The other diver was not close enough to become injured in the implosion.

However, their hats begin to fill up with water.

Both divers are stunned by the implosion and only wake up when water begins to cover their mouths. They are at some distance from the bell.

The implosion was heard by the diver in the bell, who now starts to get ready for a recovery effort.

<u>Essentials:</u>

The important first step is recovery to the bell. If the divers are sufficiently alert they will be able to turn on their free-flow valves and head for the bell themselves: otherwise it might be the bellman who has that task to do. Recovery to the bell of one diver is exhausting: two will be more than doubly so. If the divers are not able to return to the bell, can the bellman recover an unconscious diver back into the bell? Is there equipment within the bell to help with this? How will the first diver be secured safely in the bell while the other diver is being recovered? Is there resuscitation equipment within the bell to resuscitate one or two divers? Is there sufficient room to resuscitate a diver? Are diver rescue drills regularly practiced? In addition, the bellman may have a difficult decision to make between the two divers as to which one to resuscitate. As a rule of thumb, the more viable diver is the one who should be resuscitated with the limited resources available. First step – open the airway. If there is no breathing, then move on to the next casualty. If neither is breathing, then check a pulse: if one has a pulse but is not breathing then the bellman should concentrate on that one.

Once back on the boat, how easy is it to transfer an unconscious diver from bell to chamber? Thereafter there will be more help available from the other divers and also some input from the medic, who can at the least peer through the view and give advice, or perhaps even go into the chamber itself to assist.

What facilities exist for psychological support for the divers or other crew members? There is good evidence that forced debriefing is detrimental, but the offer of support has been found to be useful and can prevent or reduce the risk of long-term absence.

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

3.2 Scenario 2

A diver at 100msw in saturation has stomach pain and is feeling unwell. The diver starts to vomit and is unable to keep anything down.

At this stage this could be a number of different things. It is obviously impossible to isolate them: this is what would ideally be done were they on the surface. As it is possible that the diver has gastroenteritis, strict hygiene should be exercised.

There is a high likelihood of dehydration due to fluid loss.

The medic should be contacted and should give advice to the diver medics within, who will be able to examine the sick diver and feed back this information to the medic, who should discuss with the diving medical support doctor. Decompression may need to be started, and the diver may need an intravenous drip.

You may wish to consider:

Does the dive spread have monitoring equipment?

Are the divers proficient in administering treatment of this type, including putting in drips, administering intramuscular pain relief, etc.?

Is it possible for the medic to enter the chamber to assess the diver?

3.3 Scenario 3

On the seabed at 100msw, a diver's hand is caught in machinery and crushed. The diver is clearly in a lot of pain and is still on the seabed.

The first action is to extricate the diver with the minimum of further damage to the hand. Once the diver is recovered to the bell, an examination should be undertaken to ascertain the damage to the hand. An essential part of that is to check the blood flow to the fingers to make sure it is not compromised – do this by pressing gently on the fingertip until it goes white: the colour should return in less than two seconds. As the nerves run up the sides of the fingers, these can become damaged too – so check by rubbing the tips and comparing sensation with any undamaged fingers.

Once back in the chamber, the diver medic should look at the injuries to assess them and relay ashore to diving medical support, who will give advice. The injury should be dressed and splinted as best as possible and, if the skin is broken, antibiotics should be started. The hand will need checked periodically: particularly to make sure that the dressings are not too tight: therefore sensation and circulation should be checked.

The diver will need pain relief: ideally orally but intramuscular if necessary. The diver will need decompression and probably surgical review as soon as possible.

The tetanus status should be ascertained.

3.4 Scenario 4

A diver nips their fingertip closing the chamber door. The skin is broken but there don't appear to be any broken bones.

This will need to be assessed on a case-by-case basis. There is little ventilation, chamber temperature is relatively high, levels of humidity can be high and there is a relatively high oxygen concentration, which means that bacteria which are widespread in the environment but normally harmless can cause problems. It is normally a good idea to have a low threshold for starting antibiotics.

Under these circumstances it is best discussed with the diver medic and emergency medical support for advice. In addition a decision needs to be made about future fitness to dive on this period of saturation.

Is there sufficient expertise to clean and dress a wound that has occurred in saturation?

The tetanus status should be ascertained.

3.5 Scenario 5

A diver becomes confused shortly after a bell run. Though now in the saturation chamber, the diver is keen to get out, despite it being at 50m. The other divers are now becoming concerned.

This is a difficult one to manage. Clearly the diver cannot come out of the chamber!

It is unclear what the problem is: given the circumstances there is a good chance that this diver has suffered a cerebral bend and the usual neurological decompression illness (DCI) protocol should be followed, even if it is in doubt. The diving medical support needs to be contacted and the treatment discussed. There are a number of other causes that could be responsible for their behaviour. Acute confusion is probably the best medical description for this situation and so a diagnostic 'sieve' needs to be run through: this of course would include decompression illness but also would need to include stroke, infection, toxicity, etc.

If the diver becomes more confused and violent, is there sufficient skill in the chamber to be able to deal with this?

Is the supervisor skilled in treating decompression illness?

Are the divers skilled in treating other causes of confusion?

3.6 Scenario 6

After a bell run, a saturation diver complains of back pain. The diver is unable to stand up straight and is still in the bell.

Much more common on the vessel than in saturation, but still possible. It would seem that the diver has suffered acute back spasm, or perhaps even a lumbar disc prolapse (i.e. a 'slipped disc'): this can sometimes occur after a period of hard working and all the muscles will be in spasm, preventing movement.

The diver is therefore in a tricky position, in the bell and having to go through a narrow opening which would normally demand reasonable flexibility.

The diver will need assistance from the other divers. Before moving the diver from the bell, antiinflammatories and muscle relaxants should be administered: this should be in conjunction with the medic and diving medical support doctor. Thereafter if it is possible, the diver should be put on a spine board or other rigid stretcher and carried from the bell into the chamber where a fuller examination can take place. 'Red flags' are symptoms which indicate that it is at the more severe end of the spectrum and is actually compressing the nerves. These include loss of sensation in the buttocks/leg and loss of control of the bowels/bladder. Also worrisome can be pins and needles down the legs. These symptoms can mean that the nerves in the spine are being compressed and this needs urgent surgical advice.

Most cases, however, are 'simple' mechanical back pain (as opposed to 'complicated' back pain, i.e. complicated by nerve root irritation as described above): anti-inflammatories and muscle relaxants, along with keeping the back mobile and exercised, are recommended. Lying on the bunk for days on end is not helpful in this case: exercise is more useful.

Given the patient's history of not being able to straighten up, decompression should be started: even if there is a full recovery there is further risk of this recurring and if this happens in the water then recovery will be much more difficult.

3.7 Scenario 7

A diver returns from diving and has very inflamed and painful wrists and hands, with blistered skin.

It is not immediately clear what has happened here, but it is possible that the diver has suffered burns from substances in the water. The severity of this chemical burn is unusual. The diver's suit should be very carefully washed and assessed for damage.

As for the diver, attempts should be made to ascertain what the chemical was. The treatment will be copious irrigation of the area. The blisters should be carefully dressed and, if the skin is broken, antibiotics considered. Analgesia should be discussed with the medic.

This has multiple side-issues: why were the chemicals present in the first place? Is there a leak? Is it clear what chemicals are present in the water: are there chemical datasheets and supporting documents on which to base a management plan? In addition, is the discarded diving suit likely to cause a problem? In the bell, it may be releasing vapour into the atmosphere.

Will the environment agencies need to become involved in the management of this problem?

3.8 Scenario 8

A diver returns from a dive at a heavily contaminated worksite with copious hydrocarbon residue. On returning to the bell, the others in the bell suddenly become confused and drowsy. The diver removes their hat and immediately become confused and drowsy as well.

It is likely that they have succumbed to hydrocarbon toxicity, which is rapid. Hopefully the remaining diver has the presence of mind to don the BIBS mask or reattach the hat and flush it with clean gas. The other divers in the bell can then be assisted. The bell itself should be flushed with clean gas and the offending equipment washed to get rid of the hydrocarbon residues.

What procedures are in place to prevent this sort of thing occurring again?

3.9 Scenario 9

A diver returns from a dive with injuries to the back of the hand. During the cleaning of debris away from a dive site, the diver's hand was brushed against some rough metal. The wound is bleeding but is very dirty, contaminated with oil.

The first step is to ascertain the severity of the injury. This is best done in conjunction with the diver medic in the chamber, who can look at the wound. The wound will need irrigation as much as feasible and dressing. If extensive then it will need a surgeon to look at it. It is important to ascertain whether there is any blood vessel damage (by checking the tips of the fingers) and loss of sensation.

After dressing the wound, the diver may be prescribed a course of antibiotics and the tetanus status ascertained.

Is there a sufficient supply of medication carried on board?

Is there a system in place to regularly check medical supplies?

3.10 Scenario 10

A diver develops diarrhoea and vomiting shortly after going into sat. The diver does not feel too well and so lies down. There's no recollection of having eaten anything 'dodgy', but four days before, the diver was with family members who had suffered from diarrhoea and vomiting.

The other divers are wondering what to do.

There is a good chance that this is a norovirus. Viral gastroenteritis is very common and can be passed on easily. It does not bode well for the other members of the chamber!

Ideally, this diver should be isolated, but clearly this is impractical. The infection can be passed on by faecal-oral spread (a hygiene issue), by contamination (such as cutlery) or by aerosol from vomiting. The vomiting from norovirus is legendary, in that it can produce projectile vomiting for several feet. The other hallmark feature is that there is only very rarely a feeling of nausea before the vomiting starts.

Most of these infections will subside after 24-48 hours, but the incubation can be two to three days. There are therefore two possible choices: keep the divers in saturation and let them all catch it, suffer from it for 24-48 hours, and recover: they will be able to go back to work two days after symptoms have resolved. The alternative is to decompress the infected diver with one attendant and hope that the others in the chamber have not yet become infected: the chamber will need deep cleaning, and it is possible that the divers will become infected if nothing has happened for two days then their chances of having become infected are low. Difficult choices indeed!

The next problem, if the first choice is followed, is what to do with the diver once they have been decompressed. If they are not too deep, then it is still possible that they might be infectious: in that case the diver should be isolated for another 24 hours, to a maximum of 48 hours after the symptoms stopped. It is unlikely that the diver will be an infectious risk thereafter.

Has advice been sought from the company medical adviser regarding medication which could help with the symptoms? Is the diver being sufficiently rehydrated?

Are precautions in place to prevent transmission of the virus via medical and equipment locks to the life support crew outside the chamber?

3.11 Scenario 11

A diver's hot water supply is too hot and a diver has got badly scalded. The diver returns to the bell in a lot of pain and with skin already starting to blister. It is painful and red.

As with all burns, the severity of it should be checked, in conjunction with the diver medic. Because it has started to blister, this might suggest that it is fairly severe. It will be very painful.

In the first instance the burns should be doused in copious amounts of cold water. The burns need to be dressed and, if the blisters are burst, antibiotics may be warranted. The patient will need adequate analgesia and then will most likely need decompressed. If these are only minor burns then a return to diving without being decompressed may be possible.

What safeguards are there to avoid excessively hot water from being supplied to the diver?

3.12 Scenario 12

A diver spills a pot of tea over themselves when removing the tea tray from the medical lock. Blisters form immediately and the diver is in a lot of pain and resists examination by the other divers in the chamber.

The diver needs to have the area deluged with cold water immediately to prevent further damage. The diver then needs to be examined to ascertain the damage: that it is blistered suggests that at least moderately severe and could be worse. The diver medic should be contacted to give further advice and assist with medications, etc.

The burns will need dressed and, if blisters are burst, will probably need antibiotics. They will need pain relief and decompression.

3.13 Scenario 13

A diver is loosening a bolt on pipework when it comes off at great speed, hitting the diver in the chest. It transpires that the pipework was under pressure.

The diver is winded but recovers quickly. About two minutes later, pain starts at the place where the bolt hit, and there may be breathlessness.

This diver needs to be recovered to the bell. A careful examination of the chest and breathing is necessary, including listening to make sure that there is air entry to all areas of the chest and looking for any wounds. Some types of spirometry machines work in a compression chamber and can be useful in assessing lung function. If the diver continues to be breathless then more qualified assessment will be required, and for this it might be prudent for the offshore medic (if feasible) to enter the chamber to assess the diver and report back to the diving medical support. Thereafter careful monitoring for 24 hours will be necessary: and after speaking to the diving doctor responsible, the diver may perhaps return to diving. However if there is continued concern then decompression may be required – with continued close monitoring of the patient throughout.

How did the pipework come to be under pressure and the diver not know about it? Where did communications fail?

3.14 Scenario 14

A diver is assisting with pressure testing. A dye has been instilled into pipework to test it and high pressure applied. It is clearly leaking from a flange. The diver starts to screw the bolt in with a spanner when it loosens suddenly and the flange comes off, striking the diver on the arm. The diver is stunned but able to summon help. The pipe is still leaking copious amounts of thick dye.

The rescue diver will need to recover the diver to the bell. The pressure will need to be switched off.

The diver will need to be assessed in the bell for injuries. As the diver has been struck on the arm, this may well be broken. If so, the arm will need splinting; pain relief will be required, and eventual decompression may be required. However, always start with ABC (airway, breathing, circulation), and then look for injuries thereafter.

Why was the diver allowed to tighten the bolt while the pipe was under pressure?

3.15 Scenario 15

There has been an explosion on board, resulting in a major incident necessitating abandonment of the vessel. There are divers in saturation but none in the water; one of these has been injured in the explosion. It is unclear if there are injuries, but the diver is conscious and able to talk to the other divers, who are clearly anxious about the situation.

In this respect the divers are practically on their own: they must marshal themselves to escape to a hyperbaric lifeboat and follow the instructions from the supervisor.

Are the divers able to transfer an injured diver up to the lifeboat? Can this be done with a diver who has spinal injuries? What facilities exist in the hyperbaric lifeboat for treatment of a sick diver (or in a normal lifeboat, for other crew, for that matter)?

3.16 Scenario 16

A diver appears to lose consciousness in the water. The other diver tries to awaken them but it is clear that they are unrousable.

Before approaching the unconscious diver, the other diver should first ascertain that it is safe to do so. After that is ascertained, there is no other option but to recover the diver to the bell and see what the matter is.

On doing this, ABC (airway, breathing, circulation) checks are the first things to do, and will dictate what happens next. The diver ought to go back to the chamber for further investigation of the cause. Possibilities include syncope (i.e. a faint), also a seizure, hypoglycaemia (low blood sugar), heart problems or problems with inhaled gas, amongst others. It would be unwise to allow them back to diving without finding out what has happened and this may well include decompression.

The diving medical support should be contacted for advice as to how to proceed.

3.17 Scenario 17

During decompression, a diver becomes increasingly breathless, finding it more difficult to speak, and suffers pain on one side of the chest.

If the chamber is being decompressed at the time, stop the decompression. Recompression to depth may relieve the symptoms. Check ABC (airway, breathing, circulation). The next thing to do would be do would be to listen for breath sounds on either side of the chest. If they are reduced on one side and there is uneven movement of the chest, then there is a possibility that this is a pneumothorax. Feel for the trachea (windpipe) – you should be able to fit a finger down each side between trachea and clavicle (collar bone). Check whether it is deviated to the side, look for distended neck veins. If this is the case then urgent treatment is needed – there is a good chance of this being tension pneumothorax. First unless it is impossible, contact the medic urgently and the diving medical support. Advice will follow. Put the diver on a high partial pressure of oxygen.

For the sake of example, if the trachea is deviated to the left, and there are reduced breath sounds on the right, then there is a tension pneumothorax on the right – i.e. the trachea will be pushed out of the way of the expanding lung on the right side. The chest might also be 'hyper-resonant' – i.e. when you tap (i.e. 'percuss') the chest, it will sound like you are tapping a drum – as opposed to the hollow noise you would normally get when tapping the chest.

A pneumothorax in a decompression chamber is complicated to manage. This diver will require a great deal of care and expert medical help should be sought.

4 Air Diving Scenarios

4.1 Scenario 1

A diver is assisting with pressure testing and is diving with a surface supplied umbilical.

A dye has been instilled into pipework and high pressure applied. It is clearly leaking from a flange. The diver starts to screw the bolt in with a spanner when it loosens suddenly and the flange comes off. The diver is stunned but able to summon help. The pipe is still leaking copious amounts of thick dye.

The diver needs to be recovered to the surface as soon as possible and checked over. Depending on the decompression requirements, the diver may require surface decompression in a chamber.

Particular care needs to be taken with any chest wall injuries, which might cause problems during decompression. The diver should be accompanied by another diver, who has diver medic training, and who can relay information to dive control and to the diving doctor back on shore.

The situation still needs rectifying in the water, and an investigation as to how that incident happened should take place.

Why was the diver allowed to tighten the bolt while the pipe was under pressure?

4.2 Scenario 2

A diver on surface supplied gas at 30msw, gets trapped under some equipment on the seabed and suffers a crush injury to the hand. The diver is clearly in a lot of pain.

The diver needs urgent recovery by whatever means, particularly if trapped. Investigation and treatment will be necessary, perhaps in the decompression chamber. Care will need to be exercised in the decompression: it is at least theoretically possible to experience problems during decompression in a limb with an impaired blood supply.

The damage to the hand will determine the treatment after that: a full examination will be required (by whatever means) and the situation discussed with the diving doctor, perhaps with surgical input as well.

The diver should not receive nitrous oxide (laughing gas) from the medic as pain relief

4.3 Scenario 3

A diver is noticed to be unusually irritable and slightly confused after returning to the surface after a prolonged and difficult dive. The diver is not co-operative and insists that they are feeling fine.

It is possible that the diver has suffered from neurological decompression illness. The diver should be escorted to the chamber and recompressed. There should be a full neurological examination by the accompanying diver medic and it will need to be discussed with the diving doctor, who will give further advice on compression, decompression and treatment.

The diver should see a diving doctor after decompression has taken place and prior to any return to diving.

4.4 Scenario 4

A diver loses consciousness whilst on a surface supplied air dive and cannot be roused.

This diver needs urgent recovery. The recovering crew should check ABC (airway, breathing, circulation) and take any necessary immediate steps at that point. Then the diver should be assessed in conjunction with the diving doctor. The tender will need to check ABC and then vital signs, before going on to do a neurological examination. The diving doctor will be able to advise on treatment thereafter, which will depend on how the patient is faring.

Is the tender able to ventilate the patient should they stop breathing? Can they intubate and cannulate the patient? Is the tender able to do cardiopulmonary resuscitation (CPR) if necessary?

Does the tender have facilities to further resuscitate the patient? Can they administer medicines? Is there a defibrillator that will work at pressure? Is the tender able to use it?

How will communications be effected with the diving doctor? Is there a robust system in place so that the dive support can get in touch with a diving doctor urgently?

If this diver is incapacitated, how will they be evacuated from the chamber after decompression? Do sufficient facilities exist? How will the diver be transported to hospital?

4.5 Scenario 5

An inspection diver intending to do surface decompression, trips over whilst getting back on deck, suffering a 'locked' back. Doubled over, straightening up is very painful. Time is ticking away...

First things first: Recompression is required urgently to avoid decompression illness (DCI). However getting into the chamber may need more agility than the diver currently has. Are there means of getting an incapacitated diver into the chamber? The diver will be bent over, so may need a team effort to get them into the chamber. Pain relief and gentle mobilisation will be required, starting inside the chamber and then outside. This should be on the advice of a diving doctor as pain relief can mask the symptoms of decompression illness.

Is the tender able to give pain relief? What is the arrangement for dispensing of medicines to this diver – who will do it?

From the health and safety perspective, how and why did the diver trip? Is the workplace sufficiently free of trip hazards during an operation like this?

4.6 Scenario 6

A diver returns to surface to undergo surface decompression after an uneventful dive – after 20 minutes of oxygen, the diver has a full-blown seizure which lasts a few minutes and then seems to resolve with a slow regaining of consciousness.

The diver's ABC (airway, breathing, circulation) should be checked. Thereafter the diver should be stabilised. It is possible that this is an oxygen-related seizure. Does the company diving procedures manual give instruction on how to continue decompression following oxygen toxicity during surface decompression?

However, a number of other causes are possible – including epilepsy, low blood sugar and decompression illness. Urgent discussion with the diving doctor will be needed to assess the likelihood of these other causes. A full neurological examination, along with a blood glucose

test (i.e. blood sugar – if the equipment is present) will be necessary. Is there sufficient equipment on board to ensure that vital signs and a blood sugar can be performed? Are there sufficient monitoring equipment and charts for this?

It is likely that the doctor will be keen to see the diver to make an assessment before the diver's return to work to ensure that there are no underlying causes that might preclude diving work in the future. They will also be able to give advice on decompression protocols to follow after an incident like this.

4.7 Scenario 7

A diver becomes increasingly breathless is finding it more difficult to speak and suffers chest pain during decompression. The pain is on one side of the chest.

Check ABC (airway, breathing, circulation). The next thing to do would be do would be to listen for breath sounds on either side of the chest. If they are reduced on one side then there is a possibility that this is a pneumothorax. Feel for the trachea (windpipe) – you should be able to fit a finger down each side between trachea and clavicle (collar bone). Check whether it is deviated to the side, look for distended neck veins. If this is the case then urgent treatment is needed – there is a good chance of this being tension pneumothorax. First unless it is impossible, contact the medic urgently and the diving medical support. Advice will follow. Put the diver on oxygen.

For the sake of example, if the trachea is deviated to the left, and there are reduced breath sounds on the right, then there is a tension pneumothorax on the right – i.e. the trachea will be pushed out of the way of the expanding lung on the right side. The chest might also be 'hyper-resonant' – i.e. when you tap (i.e. 'percuss') the chest, it will sound like you are tapping a drum – as opposed to the hollow noise you would normally get when tapping the chest.

If it is a tension pneumothorax, this can be relieved by putting a needle into the chest to relieve the pressure, **on the side where the pneumothorax is.** This procedure may only be performed by trained personnel.

A pneumothorax in a decompression chamber is complicated to manage. This diver will require a great deal of care and expert medical help should be sought.

5 Engine Room Scenarios

5.1 Scenario 1

A crew member falls down the ladder into the engine room. They are unconscious but appear to be breathing. The lighting is poor but it looks as if they are surrounded by a pool of some liquid.

How do you proceed?

The liquid appears to be blood, which is coming from the mouth and nose. There may also be some fluid leaking from the ears. The crew member is still unresponsive except to pain.

How do you proceed?

A stretcher has been located, can a recovery to the sickbay be effected?

Another member of crew expresses concern, saying that this person is human immunodeficiency virus (HIV) positive.

While being taken to the sickbay, halfway up the ladder, the casualty appears to stop breathing. How do you proceed?

<u>Essentials:</u>

This person appears to have suffered a serious head injury and is very unwell. The medic should be summoned and ABC (airway, breathing, circulation) should be checked. The casualty should be transferred on a spine board and head huggers to the sickbay where there can be an assessment. The casualty will need to be evacuated ashore and no time should be wasted in calling for a helicopter. As regards the HIV possibility, the crew member may have some information that is relevant and universal precautions (in this case, gloves) should be worn. The individual appears to have stopped breathing on the way up the stairs – they should be brought up to the next level and then ABC should be rechecked. If not breathing, then cardiopulmonary resuscitation (CPR) should commence and as rapid a transfer to the sickbay as possible should take place. The pop-up pocket masks are useful in reducing the risk of communicable diseases and are useful to have at strategic points around the vessel.

5.2 Scenario 2

The chief mechanic is working in the engine room. The mechanic suffered from back pain for a few days. On standing up, the mechanic's back 'locks' in a bent-over position. There is no one else in attendance.

How do you proceed?

Essentials:

Two difficulties for the mechanic: Firstly, summoning help will be difficult; secondly, extrication may be difficult due to the mechanic's back being in a locked position, bent over. Use of a stretcher may be necessary.

You may also wish to consider:

This person may well have a lot of difficulty in summoning help. Is there a system in place that would ensure that lone workers are checked on regularly?

5.3 Scenario 2

The engine room is filled with smoke. It is unclear what the damage is or how many, if any, crew members are in the engine room.

The fire suppression system fails to operate.

Essentials:

Follow the fire procedures on the vessel: do not attempt to locate people on your own.

The fire team needs to become involved in locating the crew and procedures need to be followed in locating members of crew.

All members of crew are accounted for except one, an engineer. After some time, the remaining crew member is found and, remarkably, is conscious. The crew member has soot staining on the face and is experiencing pain in the leg. How do you proceed?

It is possible that smoke has been inhaled – the crew member needs to see the medic urgently. The leg may be broken, so care must be taken, but the more serious issue may be the chest one, as it can cause difficulty breathing. Provide oxygen and probable evacuation.

You may also wish to consider:

The casualty is likely to need lifting to the sickbay: are there sufficient crew not involved in the emergency who can lift them up there? The medic may well be involved in triage and treatment of minor injuries: are there sufficient first aiders who can help with applying oxygen and initial management until the person is seen by the medic?

The message also needs to go ashore to the emergency support doctor that there is an emergency on board: who will take on this responsibility? It is likely that a helicopter will be needed in the very near future: will they also make the call to request this?

6 Machinery Spaces Scenarios

6.1 Scenario 1

A person involved in maintenance falls down into a crawl space and becomes unconscious.

<u>Essentials:</u>

First make sure it is safe to approach. The crawl space may well be difficult to assess the individual in, and so long as there are no obvious injuries, attempts should be made to remove the casualty. First check ABC (airway, breathing, circulation) and assess for injuries. In this circumstance assume that there are neck injuries. The individual needs careful removal on a spine board, ideally with head-huggers in place, and then needs to be moved to the sickbay prior to evacuation.

Do company procedures highlight where individuals are? Is there a way of checking up to make sure that an individual safely returns from the confined space?

Are drills carried out involving extrication from machinery spaces? Are there means of removing people from the confined space – e.g. pulleys set up, additional lighting?

After assessment in the sickbay, they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury to them?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

6.2 Scenario 2

An engineer's hand has been caught in moving machinery. It is badly damaged and trapped. Help has been summoned, and the machinery is still running.

The first thing to do is shut off the machinery, check it is safe to approach and assess the damage. The medic should be alerted and asked to attend, as well as other engineers who may be able to assist with the extrication. The damage will determine what happens next: if the machinery can be taken apart to free the casualty's hand, then that will be obviously better than the alternative, which may involve surgical methods (e.g. amputation) to free the hand.

The engineer will need to go to the sickbay to be assessed: of paramount importance is to check the blood flow to all parts of the hand before and after splinting it, as well as nerve function: this will determine the speed of any necessary response.

The patient will need to be evacuated: they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury to them?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

Are there guards in place on the machinery to prevent this type of accident? Were they in operation and properly maintained? Are the engineers sufficiently educated to be aware of the hazards?

7 Galley Scenarios

7.1 Scenario 1

A recently employed cook has injured a finger with a meat cleaver. The finger is bleeding profusely. The cook, noticeably agitated, refuses medical attention, suddenly brandishes the cleaver at colleagues and leaves the galley for the helideck.

<u>Essentials:</u>

There may be a mental health issue with this one, as well as the injury. The individual needs urgent sedation. The medic should discuss urgently with the emergency medical support, who may need to become involved. Attempts should be made to 'talk the person down', take away the cleaver and persuade them to take an oral dose of tranquillisers whilst awaiting the helicopter. If this is impossible then sedation by different means (normally an injection) may be necessary. In this case, based on a real incident, the crew member and doctor (armed with cleaver and syringe, respectively), had a standoff for some time before the matter was resolved.

Similar cases have raised concerns about the individual's human rights: however in this case where the individual's ability to make decisions is impaired, the medic and master are in loco parentis – i.e. they are responsible under common law and can forcibly restrain the individual for their own safety and that of others and the vessel. Obviously, this is a last resort as it does not engender good employee-employer relationships!

7.2 Scenario 2

The night shift cook is scalded with boiling water in the galley. It is 3 am. The cook has suffered extensively burns to the hand and arm.

<u>Essentials:</u>

Wake up the medic! This accident should be brought to the medic's attention immediately. The immediate first aid should be to immerse the hand and arm in cold water for at least 20 minutes and then treatment by the medic should continue.

Given the nature of the injury, there is a high likelihood that evacuation will be necessary.

You may wish to consider:

It is the middle of the night: does the night cook have a means of attracting help whilst attending to an injury?

7.3 Scenario 3

A caterer gets stuck inside a walk-in freezer - for almost an hour. The handle on the inside failed to operate. The caterer seems OK after being rescued.

<u>Essentials:</u>

There is a good chance that this individual is suffering from hypothermia. The medic should be called. If the individual is hypothermic then they will need appropriate rewarming. The nature of this should be on the advice of the medic.

The freezer equipment will also need to be checked as it failed to operate. In addition alarms, if not working, should be fixed and tested on a regular basis. The alarm should sound in a public place, and staff should know what it relates to.

7.4 Scenario 4

A caterer suffers a cut to the thumb with a carving knife. It is bleeding profusely. The caterer decides to apply a plaster and get on with work. However, the plaster keeps coming off.

It is likely that this is a more serious wound than first surmised. The individual ought to be report to the medic for a fuller assessment – stitches may be required.

Other aspects of this include: Was personal protective equipment (PPE) being correctly worn? Also did the worker inform their manager (if PPE was not being worn then there may have been reluctance to do so)? Are there procedures in place to capture all injuries of this type? What about food hygiene?

8 Helideck Scenarios

8.1 Scenario 1

In getting out of the helicopter a person trips on the netting and falls, causing a painful hand injury. The rotors are still turning.

This person needs seen by the medic: unfortunately the medic is likely to be organising heliadmin and so this might be a problem. The person may have a broken hand/wrist and, as there is a helicopter on the helideck, should probably go back ashore to be X-rayed if this is suspected.

Therefore, it would be wise to delay the take-off of the helicopter, make sure that the person sees the medic (who would need temporarily released from heli-admin duties) and then make the decision.

Can these duties be taken over by another member of crew?

Is there someone available who could manage an incident like this to make sure that the helicopter doesn't leave before a good assessment of the person has taken place?

8.2 Scenario 2

There is a helicopter engine fire on the helideck, during a routine crew change. Crew are still in the helicopter.

There is a standard method for dealing with the fire, and crew are trained for this. The crew on the helicopter need rescuing and assessing for injuries.

Management of them must follow a multiple triage plan, with a triage area being set up and the dead/ill/walking wounded must be appropriately segregated and managed. This will then dictate what is done thereafter. This should all be in conjunction with the emergency medical support who will assist in advice to be given.

Medical problems are likely to include burns, smoke inhalation and 'shock' – i.e. psychological trauma. These should all be triaged appropriately.

Are there sufficient first aiders on the vessel to cope with this type of emergency? Are they well trained to be able to organise themselves to help (the medic will most likely be occupied in triage and looking after the less well people on board)

Are there sufficient stretcher bearers able to carry individuals to helideck/other mode of transport?

What facilities are there onshore to receive potentially unwell people? Is there adequate psychological support for the aftermath of such an incident?

What company and human resources (HR) response is there? Is this sufficient? Who will speak to client/ contractors/relatives?

8.3 Scenario 3

One of the helicopter landing officers (HLO) is lifting baggage from the hold when their back 'goes'. They are in a lot of pain and can't straighten up. The helicopter is still on the deck, rotors turning.

There are safety concerns for this person, who is incapacitated on the helideck. The person needs to come down to the sickbay to be assessed by the medic: this must be done safely, if necessary, stopping the helicopter engines.

Ideally the person would be put on a stretcher and transported to the sickbay. If they can walk then, supervised, they could go down to the sickbay, but getting off the helideck is difficult and dangerous, so they must be able to use the handrails.

Are there sufficient stretcher-bearers to get this person off the helideck?

Has this person undergone manual handling training?

Was the load that they were carrying too heavy?

The medic may well need to assess the person and decide on what to do: it may be that if it is severe enough, they may need to be evacuated: so it might be prudent to decide this before the helicopter leaves.

9 ROV Spread Scenarios

9.1 Scenario 1

A technician doing some maintenance gets a hand trapped in the machinery. It is bleeding but the technician manages to extricate it. The technician is feeling faint and then passes out.

Firstly, check it is safe to approach (it might be possible that they may have fainted for a reason other than the bleeding - e.g. gas/electrocution), then check ABC (airway, breathing, circulation). If this is all in order, then resuscitation is not needed but the patient should be put in the recovery position. The medic should be summoned for assistance and assessment. If possible, pressure should be applied to the wound to lessen bleeding, ideally with a dressing and the area should be kept as clean as possible.

Once the medic arrives, then the injuries will dictate the treatment thereafter. It may be that this person fainted at the sight of blood and is otherwise OK (in which case the wound severity will be the thing that determines what happens next): alternatively the wound could be relatively minor and other less easily treatable causes – e.g. blood loss and shock, electric shock, etc. – could necessitate evacuation.

10 Pipelay Scenarios

10.1 Scenario 1

A person is found collapsed on the deck, not moving, and apparently not breathing. There are no obvious severe injuries.

How do you proceed?

The person is not breathing and there is no pulse. How do you proceed?

The medic/first aider arrives on the deck with the defibrillator. The rhythm is ventricular fibrillation (VF) - a 'shockable' rhythm. How do you proceed?

Essentials:

Start with ABC (airway, breathing, circulation). Check the area is safe and that the cause of the collapse is unlikely to affect the rescuers. Summon help. Thereafter open the airway and check for breathing, ensure that help is on the way and start cardiopulmonary resuscitation (CPR) until the medic arrives. If the heart has stopped then it will need restarted as soon as possible. However there may be a problem with using a defibrillator on the deck if there is a high hydrocarbon content: there will be risk of explosion and this will need to be considered as it would endanger the rest of the crew and the vessel: by definition a defibrillator is not intrinsically safe! In a case like this it may be prudent to evacuate the patient to a place of safety – such as the accommodation or another sealed area before using the defib.

The individual will need to be evacuated and the radio operator should speak to emergency medical support on behalf of the medic as they will be tied up with resuscitation. Urgent helicopter is needed in this case.

10.2 Scenario 2

A crew member working on deck is hit by moving machinery and has suffered injuries to the chest and head.

Essentials:

Check safety to approach: stop the moving machinery and take stock. If safe to proceed, then the casualty can be approached, and first ABC (airway, breathing, circulation) should be checked and cardiopulmonary resuscitation (CPR) started if there is no breathing. The medic should be summoned to attend.

If the injury is less severe than that, the casualty should be escorted to the sickbay for assessment by the medic. The medic will then contact emergency medical support for assistance and treatment will depend on the severity thereafter. A good indication of injury may be guessed at by the damage to personal protective equipment (PPE) sustained.

You may also wish to consider:

This person may well need evacuation to ascertain the likelihood of chest wall injuries and internal head injuries; in the meantime they will need monitoring. Does the medic have paperwork and charts to record chest function, blood pressure, pulse and neurological status?

Thereafter, they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury to them?

Who is accompanying the patient ashore? They need to be transferred to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

10.3 Scenario 3

A crew member is hit on the chest by a high-pressure air hose. The crew member is in a lot of pain and having trouble breathing.

Essentials:

This person needs immediate evacuation to the sickbay for assessment by the medic. The area should be made safe, and the medic alerted. It is not clear whether there is a high-pressure injury or merely impact injuries from the hose itself. The medic should then check with the emergency medical support as to the likelihood of internal injuries: if this is unlikely then they may well be able to return to work if pain subsides. However, the further management depends on whether the difficulty breathing is due to pain (which will hopefully subside quickly) or chest wall injury due to the hose.

10.4 Scenario 4

An air hose fractures and passes across a crew member's arm. There is little obvious damage but there is a small hole in the arm, and it is red around the area.

<u>Essentials:</u>

There is a good chance that this individual has suffered a high-pressure injury and there may be little obvious skin damage. Indeed there may be little in the way of pain initially and the skin can look healthy, but the arm ought to be looked at by an accident and emergency specialist and probably X-rayed at the least: it may be that they need a surgical 'exploration' of the wound.

This individual will probably need to be evacuated to ascertain the risk of injury.

You may also wish to consider:

There will clearly need to be an investigation into the cause of the incident. How often is equipment checked? Are staff trained in checking it and connecting hoses?

10.5 Scenario 5

A hose is not connected properly and showers an individual in a mixture of substances, including methanol and water. The worker is drenched and has ingested some fluid.

<u>Essentials:</u>

The first step would be to check whether it is safe to approach. Next would be to escort the casualty to an emergency shower for deluge. Methanol can be corrosive and painful to the eyes. Methanol causes obvious health concerns, and the medic should fully assess the individual in conjunction with the emergency medical support who will assess the risk of this.

You may wish to consider:

This can be nerve-racking for the individual concerned and those around who might not know what to do. Are there data sheets close by that are readable and will tell untrained people what to do if the person is covered in the substance? Is it clear what each substance is?

Are staff trained in the correct connection of hoses?

Are the hoses in good condition?

10.6 Scenario 6

A crew member climbs onto a pile of pipework on the deck to assist the crane operator. The vessel is in heavy seas. The pipework shifts, causing a trapped ankle between two heavy pipes. How do you proceed?

<u>Essentials:</u>

This may go against natural instincts, particularly if it is clear that there is pain, but is it safe to approach the crew member? If so, then the pipework needs to be carefully removed. The medic should be summoned to attend and will be able to help with assessment. The extrication should be gentle and then the individual transferred to the sickbay to be assessed. If fracture is suspected it will need bandaging and pain relief: then after discussion with emergency medical support evacuation may be necessary in order to assess the damage.

You may wish to consider:

This would appear to be a preventable injury but happens with surprising regularity offshore. It is difficult to legislate against everything, but workers should use their judgement before embarking on such actions. Are company educative procedures post-incident sufficient? Do all crew pay attention to incident reports and corrective actions?

10.7 Scenario 7

The crane operator appears to suffer a seizure in the cab of the crane, three days into the trip. The crane operator has been noted to be anxious and shaky in the preceding days. The crane operator, though initially unconscious, 'comes to' but is still confused. How do you proceed?

Essential:

It is difficult to extricate a confused individual from a crane cab. The crane needs to be shut down in the first instance and the medic summoned, along with first aiders/stretcher party. Once the crane operator is removed they need to go to the sickbay for assessment prior to being evacuated.

Other aspects of this history may point to a medical cause for the symptoms. The medic will need to discuss with emergency medical support and stabilise the person before evacuation: this individual needs to go to hospital to be fully assessed as to the cause. Another possibility is that this is not a seizure at all but a panic attack: therefore witness statements as soon after the event are of real benefit to the medic and emergency medical support in assessing the likely cause.

11 Working at Height Scenarios

11.1 Scenario 1

A new member of crew slips off scaffolding, from about three metres, landing awkwardly but without falling over. The crew member is not able to weight-bear and has a lot of pain.

The first things to do are to check it is safe to approach, then to check the casualty over. The medic should be summoned to attend and then management of the incident will be as dictated by the injuries. The medic will wish the crew member taken to the sickbay. Are there sufficient crew available for this? Are they of sufficient fitness and do they know the layout of the vessel?

Thereafter the medic will examine the crew member and decide on the route to follow. Loss of sensation or compromised blood flow to the area denotes a more serious and pressing emergency. The fact that they cannot immediately weight-bear, along with a number of other criteria (such as pain over certain areas of the foot and ankle), means that they have 'earned' an X-ray of the ankle to make sure it is not broken: this will need to take place as soon as is practicable. In the meantime it will need to be splinted which will also help with the pain.

The medic will also search for other injuries: a common one is a broken fibula up at the top of the shin.

Thereafter, the injured person needs to be evacuated from the sickbay to the helideck: can this be done whilst monitoring them and without causing injury?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

11.2 Scenario 2

A moving crane hook hits a person working on an elevated area of the deck, on the back and chest. Whilst the crane was moving slowly, the person appears quite badly hurt.

Momentum depends on the weight as well as the velocity and, given the weight of the equipment, it is quite possible that a severe injury has occurred. The medic should be informed and asked to attend. With the site of the injury, there may be risk of spinal damage and possibly internal organ damage: transportation to the sickbay had best take place on a spinal board and stretcher. Are there sufficient crew available for this? Are they of sufficient fitness and do they know the layout of the vessel?

Thereafter the injuries will need assessed in conjunction with the emergency medical support: it is good to have a low threshold of suspicion, even several hours after the injury, and it would be best to have this individual seen at a hospital: it's possible they will need a scan of their abdomen and an X-ray of their back.

Thereafter, they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury to them?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

11.3 Scenario 3

A person is assisting with load-handling when a 1.5-ton weight is lowered onto their foot by accident. Luckily the crane operator spots this and lifts the weight after about five seconds, but the worker is in pain and has a split open boot – the toecap is exposed and broken.

Given the damage to the boot, there is likely to be an injury, most likely a broken toe (or several). The medic should check the circulation and sensation to the toe: if these are impaired then it will be a bigger emergency than otherwise. If the skin is broken then antibiotics will be necessary, as it will then be classed as a compound fracture (assuming it is broken).

Further review, including an X-ray of the foot to check for fractures will follow from that.

Does this suggest that a competency review is needed for the crane operator? Regardless of this, the crane operator is likely to be upset and may not be able to work for the rest of the shift (or longer) – what provisions can be made if they are unable to continue working?

Thereafter, they need to be evacuated from the sickbay to the helideck: can this be done whilst monitoring the patient and without causing injury?

Who is accompanying the patient ashore? The patient needs transferring to hospital – how will this be expedited?

The patient is likely to have relatives who will need to be told. Who will tell them, how will they do it and what will they say?

There is likely to be a press response: who will speak to the press? What will they say? It is also important to tell the rest of the crew not to communicate with the press so that a correct version of events, rather than hearsay, goes to the press.

12 References and Further Reading

12.1 References

- HSSE 016 Guidance on the investigation and reporting of incidents
- HSSE 040 Guidance on Drug & Alcohol Policies and Testing

12.2 Further reading

- HSSE 003 Guidance for the initial and refresher familiarisation of vessel crews
- HSSE 007 Basic safety training and vessel induction for non-marine personnel working offshore
- HSSE 033 *Guidance on occupational health*
- C 018 Basic Safety Training Requirements for Vessel Personnel Employed in the Offshore Renewable Energy Sector