REF: GDSN-002-Otech Duty of care.

FAILURE OF FUNDAMENTAL DUTY OF CARE.

The GDSN would like to share the following information related to the consequences of a poorly managed diving project that lacked the basic but essential competences to effectively manage 'Risk to Life' and 'Post Incident Care'.

From: Odd Are Tveit <oat@otech.no>
Sent: Wednesday, February 6, 2019 6:39:07 pm
To: Lewis.beddows@outlook.com <Lewis.beddows@outlook.com>
Subject: Incident report - Las Palmas

Att: Lewis Beddows
Beddows Diving Technical Services Ltd

Dear Lewis,
I hope you are getting better.
I hereby attach a copy of our internal investigation report related to your incident with Otech Marine Services S.L for your information and consideration.

This is the internal report with names in it. The report will also be forwarded to IMCA and other clients. These reports will be edited to remove names etc. to preserve anonymity for the involved parties.

We have registered recent e-mail communication received from your father and believe that the best way forward is for you to contact directly with Otech Marine Services S.L lawyers for the further follow up related to insurance etc.

The contact info is the following:

Eileen Delgado Tovar

ISLAW Abogados
Avda. Mesa y López nº3 – 1ºU
35006 Las Palmas de G.C.
Tf. +34 928 26 64 32
Fax. +34 928 27 16 61
Mov. 647 71 48 25
www.islaw.es
Again, I hope for your recovery and remain

Yours Sincerely

Odd Are Tveit

Global Diving Support Network

The GDSN has received a copy of the following 'uncontrolled document' for the purpose of information sharing and Lessons Learned for the diving industry during the management of surface supplied air diving projects.

This Document is the Otech Marine Services Incident report that provides a valuable insight into how quickly events can escalate and become out of control when a diving plan is too aggressive, the project falls behind schedule, selected divers are over dived, there is no safety leadership, and the emergency management response plans fail.

This was created by a well-respected, well known diving industry professional and approved and signed off by Otech Marine Services owner and CEO.

INCIDENT REPORT
Ocean GreatWhite, Las Palmas
Diver Decompression Sickness
10.12.2018

Rev	Date	Description	Originator	Checker	Approver
A	05.02.2019	Issued for Use	MSL	JKO	OAT
1	01.02.2019	Issued for Internal Review	MSL	JKO	OAT
0	21.01.2019	Draft	MSL		

Signature Legend

	Name	Initials	Position	Signature
Originator	Mikal Sjur Lothe	MSL	Senior Diving Advisor	
Checker	Jens Koch	JKO	Diving Operations Manager - Norway	
Approver	Odd Are Tveit	OAT	Chairman	

OTECH P.O.Box 4096, 5608 Haugesund Norway Org. nr. 917 067 862

Contents

1 Short Introduction

In the early hours of the morning December 10, 2018 a diver working on a rig upgrade suffered a Type 2 Decompression sickness (Vestibular bends) at an Otech work site in Las Palmas, Spain. The incident happened after surfacing from a dive where the diver was welding anodes to the rig thrusters.

The lay-out of the report is following the recommendations from the Norwegian organisation "Samarbeid for Sikkerhet" SfS (Cooperation body for Safety) "Best Practices for investigation and review of HSE Incidents", SfS recommendation 029N/2014.

This report is based on interviews with some of the personnel, and the Personal Statements from others. As the evidence from the job was started to be collected 3 days after the incident, and the personnel present at site was then back in their respective countries across Europe, the report is based on the written statements, the Dive Logs and the video recording og the dive.

Otech appointed the following team to look into the incident

Mikal Sjur Lothe (Lead)
Jens Koch (member)
Morten Sørenes (member)

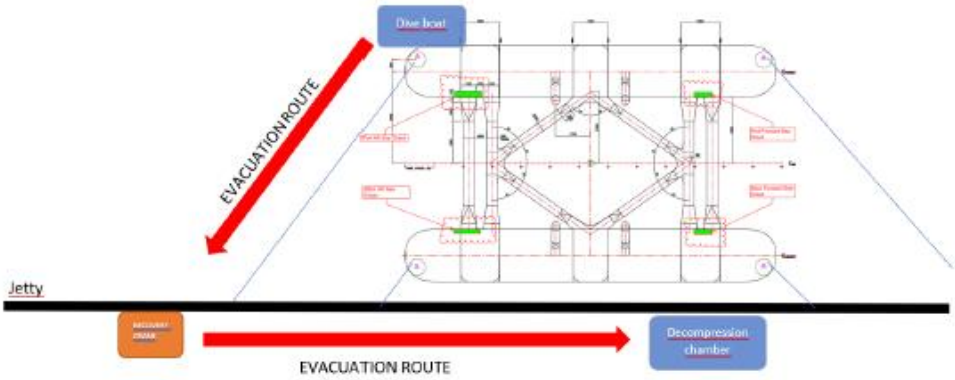
The Author of this report (Mikal Sjur Lothe) is satisfied that these pieces of evidence gives enough background to define:

a. What happened
b. The reason for the incident
c. The failings in the response and
d. The root cause for the problems.

2 Background

The work scope was main line work at Otech, and the work was performed around -18 msw using a no-decompression schedule under US Navy (USN) manual, rev 7. The schedule used was 60 ft and 63 minutes.

The below figures are the lay-out of the site the Hyperbaric Centre locations, and the evacuation route from the Dive site to the Otech DDC.



The work had been ongoing for 5 days when the incident happened, and the worksite was organised according to Otech standard routines in accordance with IMCA recommendations.

The work had been bid and was led from the Otech offices in Las Palmas. Otech Project Manager for the job was David Bustillo Losa, with Alejandro Lluch Guerrero as Night Project Responsible.

The Diving Supervisor during the incident was Olivier Thewissen.

The work was executed with a fully operational Decompression Chamber at the work site. As the work was executed from two stations, one at the Quay-side and one from a chartered vessel "Maresa Dos" (containerized dive system DC-01), supported by a Fast Rescue Craft (FRC)-

3 The incident

There were no indications of something going wrong during the dive.

The dive commenced at 22:55 hrs in the evening December 9, 2018. He left bottom 23:53 hrs. Bottom time 58 minutes. When reviewing the video of the dive, the bottom time, according to the clock of the video was slightly above 56 minutes.

Less than 10 minutes after surfacing, the diver complained of pain in the middle ear and problems with balance. These indications of a Type 2 bends were recognized, and the actions according to good practice were made, including getting him on a stretcher, administered oxygen, and brought him onto the FRC. He was then brought to the quay-side where the DDC was situated.

He was at the quayside by the DDC in approx. 4 minutes, indicating him being at the DDC within 15 minutes from the outset of symptoms.

At the same time, the Spanish Emergency Services were notified through a call to the emergency number 112.

At the Quay side, the Diving Supervisor decided against using the DDC present at site due to a faulty O2 analyzer, claiming that without it he could not control the O2 % in the chamber. This is written in his personal statement. As a consequence, the diver was on surface breathing oxygen till the arrival of the ambulance.

It was confusion at site, where some personnel with DMT background was questioning the decision of the supervisor not to recompress immediately. The statement of Mr. Jared Barber highlights this situation.

As the team had notified the Las Palmas Ambulance service, their arrival at site resulted in them taking over the incident.

The diver was first sent to the contracted hyperbaric treatment chamber in Las Palmas (Hiperbaricas Canarias SL). Though it was a contract in place stating that this would be available 24 hrs. per day, every day, it proved not to be manned on the day of the incident.

The IP was then taken to the hospital, where a doctor referred him to the Hyperbaric facility of the neighbouring island of Tenerife. They also ordered a helicopter transport for this.

4 Timeline

The below timeline is lifted from the personal statement of Mr. David Bustillo, Otech Project Manager. This is the best timeline that can be extracted, based on the personal statements from the team. The timeline is compared with other statements and seems correct.

Time	Action	Comment
Around 00:12	- Dive Boat personnel contact quay side team, Quay side team receive the message one diver from the dive boat still being evacuate.	

Time	Action	Comment
-00:16	Quay side team ready to recover the diver from the quay side	
-00: 18	Main chamber pressurized to 60 ft	
-00:19	Emergency 112 ACTIVATED according Emergency Response Plan. (Alejandro Lluch did the call)	
-00: 20	Injured person arrives at the quay lying on the stretcher and breathing O2 at 25 l / min. The diver felt dizzy and manifested discomfort in one ear. Breathe normally but the pulse is 102 beats / min. It is appreciated that he is nervous, but his level of consciousness is high. They tell us that the first symptoms appear 10 minutes after reaching the surface.	Here the question rises why he was not immediately pressurized to 60 ft. According to USN treatment table 6.
-00: 31	The pulse remains high (102 pulse / min). Normal breathing, He reports dizziness and remains nervous. It seems that the temperature of the diver is high, you start to control this sign. Neurological examination is performed constantly, and no deterioration is seen.	
-00:32	First contacted with the hyperbaric facility contracted in the port area.	
-00: 34	Manifest that his ear is blocked. Continues with neurological examination and with O2.	
-00: 40	The O2 ends and the injured person moves to the entrance of the chamber to continue supplying O2 normobaric on demand, through the BIB of the entry lock. The supply works well and breathes normally. Neither deterioration at the neurological level nor appearance of any other symptom is seen.	
-00: 45	Neurological ok. Pulse 86 pulse / min. The temperature is correct	
-00: 46	Begins to notice nausea and vomits after removing the O2.	
-00: 50	Increase the pulse, 100 pulse / min and again show nervousness. Physical and neurological evaluation continues for three DMTs. There are no changes. From this moment, I intervened in the attention to the injured person, so I did not register several important data. The doctor comes from the platform	
-00:53	The ambulance arrives 112 activated the protocol for accidents. - On the way to the Hyperbaric Centre, Alex tells me by phone, that the contracted doctor requires that the injured person be treated at the hospital before handle.	
-01: 13	Arrival at the hired hyperbaric centre. Closed.	Hiperbaricas Canarias SL
-01: 15	Confirm that we should go to the hospital.	

Time	Action	Comment
-01: 20	The ambulance arrives at the Insular hospital. The injured person is admitted to the emergency room.	
-01: 38	They tell us that the injured person should be transferred to Tenerife.	
-01: 43	The doctor from the Insular hospital speaks with the contracted hyperbaric doctor.	
-02: 01	Approved for transfer to Tenerife.	
-02: 54	The ambulance arrives for the transfer to the helicopter. They tell us that the helicopter will fly at 3:30	
-03: 00	They inform us that they have already transferred the injured person. We go back to the dock.	

5 Discussion of details related to the incident

This incident and the treatment of it raises questions and show shortcomings related to the planning and execution of the job prior to this incident. These findings require Corrective Actions from Otech.

5.1 Definition of Tables

This operation was executed using the US Navy tables. The actual table used was USN, rev. 7, Surface Oriented Air Diving. The Otech instructions to be used in Spain is the IDMS, and IDMS-3 have the following instructions:

> **IDMS-3**
>
> **4.4.11 Planning with Decompression**
>
> When performing decompression diving, bottom time and decompression stops must always be strictly in accordance with the current revision of Norwegian diving and treatment tables (Norske dykke- og behandlingstabeller, 4th edition).

Due to the Spanish legislation, there is a requirement to use USN tables, so the Project was planned according to the USN Diving Tables, rev. 7. The schedule used was 60 feet.

There is no evidence that this schedule was compared with the Norwegian tables to ensure that the most conservative approach was used and that a more conservative USN schedule was defined. No deviation request is raised regarding the use of the tables.

Though there is no warning in the US Navy Diving Manuals against using the tables to their full extent, the internal Otech warnings should be adhered to.

Corrective Action:

When using other tables than the Norwegian tables, a formal Deviation shall be raised and accepted by the Diving Manager. This request shall contain the reason for the deviation and formalize the deviation.

The deviation shall never be more aggressive than the Norwegian table.

5.2 Definition of schedule

During the planning stage of the Project, the USN tables, rev. 7 was used. The deepest work was at almost 18 msw (17.8). When planning for a dive, the schedule to be used shall be defined. If the table is different from the Norwegian tables are used, a formal comparison shall be made between the tables, and in case the Norwegian table is the most conservative, the schedule defined from the table need to amended to suit the conservative approach, ref. section 3.2.1 above

The IDMS-3 is addressing this as follows:

> **IDMS-3**
>
> **4.4.2 Bottom time limitations:**
>
> The dives have to be planned with a safety margin in case planned bottom time is exceeded. A typical Safety margin would be either 5 minutes to max. time, or the use of the next deeper table.
> The bottom time limitations set by the UK Health & Safety Executive shall be adhered to.

The schedule used was 63 minutes at 60 ft. This allows a free ascent. However, as the below table show, the dives performed by the IP were close to the limit repetitively over the 5 days prior to the incident. This is not in breach of the table, but International Best Practice should have made the supervisor taking a more conservative approach, particularly since the work was during the night, and repetitive hard-working dives.

The Norwegian max. bottom time at 18 msw without decompression is 60 minutes. Table 1 shows the exposures of the IP during the last 5 days before the incident.

Another finding from the investigation is that the filling in of the dive sheets are not clear. Though it is no reason to believe that there are deliberate mistakes in the dive sheets, the handwriting and the way some of the figures were filled in, required some review in order to be confirmed.

In the below table (table 1), the dive sheet for the last dive (December 9) there could be a question whether the "Left Bottom" time was 23:51 or 23:54. The review of the "Black Box" recording of the dive confirms that the LB time was indeed 23:51.

Table 1: Injured Person's dives during the project:

Date	Left Surface	Arrived Bottom	Left Bottom	On surface	Bottom Time	Dive Time	Max Depth	N2-letter	Surf. interval	Table Used	US Navy
05.12.18	05:19	05:21	05:57	05:59	38 mins	40 mins	16,6 msw	K	N/A	18.3/63	60/63
06.12.18	20:17	20:18	21:40	21:42	84 mins	85 mins	13,5 msw	M	38 hrs 18 mins	15.2/92	50/92
08.12.18	00:39	00:41	01:38	01:40	59 mins	61 mins	17,4 msw	K	26 hrs 57 mins	18.3/63	60/63

09.12.18	02:25	02:27	03:20	03:21	55 mins	56 mins	17,6 msw	K	24 hrs 45 mins	18.3/63	60/63
09.12.18	*22:55*	*22:57*	*23:51*	*23:53*	*56 mins*	*58 mins*	*17,6 msw*	*K*	*19 hrs 34 mins*	*18.3/63*	*60/63*

Based on the above table, the work schedule seems too aggressive, and also that the work should be considered as hard. In such circumstances, the safety margins need to be extended, ref. IDMS-3, section 4.4.2.

Good practice with the depth indicated would have been to use the 90 ft schedule under US Navy, rev. 7, or 21 msw schedule based on the Norwegian tables.

Corrective Action

When planning for a Project, part of the risk assessment shall be to ensure that there is enough Safety Margin in the decompression schedule planned to allow for robust Safety Margins to the tables used.

If other than the Norwegian Diving Tables are used, a formal comparison shall be made between the table used and the Norwegian tables. The table used shall be chosen to be minimum at par with the Norwegian tables.

5.3 Evaluation of Diving fatigue

The Project was construction work on the thrusters of a rig. This encompassed work with grinders, rigging of heavy anodes and welding work. Such work in open water is hard, and the IDMS-3 is addressing such work:

IDMS-3

4.4.3 Single dives vs Repetitive diving

It is preferable to plan the work using one single, longer dive per day per diver, rather than repetitive dives. This will reduce the decompression stress on the diver. It is however, recognised that, for operational reasons, such as short diving periods between tides, repetitive diving may be the most practical solution. Planning shall then ensure that the free period between dives are increased, and that non-diving days are introduced.

IDMS-3

4.4.4 Diving rotation

When intensive diving continues over some weeks, "decompression fatigue" accumulates and may cause divers to become more susceptible to decompression sickness. The Dive Supervisor must define a diving rotation to ensure that each diver has one dive free day each 4 day.

As can be seen from the table 1 above, the IP had been diving on a daily basis since start of the work, and the incident happened on the 5th day. Though the diving was performed within the written limits of the USN, rev. 7, the intensity of the work should have triggered a review of the potential for Diving Fatigue, and the introduction of every 4 days being a non-diving day.

When using a no-decompression schedule, the potential for fatigue is still building up, and the necessity for non-diving days will be present.

The table show that the dives are planned without repetitive diving, but the warning of Diving Fatigue, IDMS-3, section 4.4.3, was not taken into consideration.

Corrective Action

The Project Checklist shall contain a warning related to planned diving exposure where no dives are planned with less than 5 minutes to the end of table indicated exposure, and less than 5 ft. away from the depth limit.
In the incident situation, the dives should have been planned using a 70 ft. table.

5.4 Discussion of details related to the Emergency Response

After the Dive Team was notified that the IP was having health problems, the initial response was adequate with exception of no notification of the Otech Diving Doctor. The doctor's contact details were stated in the Emergency Response Plan, but he was never contacted till after the IP was at Tenerife.

After the preliminary onboard diagnosis of a diving incident, the IP was given Oxygen, laid on a stretcher and kept warm. At the time of the incident, the temperature on surface was above 20 degrees, and the water temperature around 20 degree Centigrade.

The diver was then taken onto the FRC, and the FRC immediately went to the Quay-side where the DDC was situated. Upon arrival at the DDC site, the IP was not recompressed, but left on surface awaiting the arrival of the local ambulance.

As the DDC was blown down to 60 ft, the lack of recompression is the open question during the incident.

This evacuation scenario had been trained at the start of the job, and the response went without any problems till the IP was alongside the DDC. As can be seen from the timeline, the diver was by the DDC at 00:20 hrs.

One personal statement says that an unnamed DMT had decided this was not a Decompression Incident. It took until 00:53, or nearly one hour after the incident onset before a doctor was involved.

The Diving Supervisor states in his written account that he decided against a blow-down according to treatment tables because an Oxygen analyser measuring the O2 content in the DDC atmosphere was faulty.

As a result, the IP was left on surface breathing O2 till the ambulance picked him up. He was then taken to the Las Palmas Hyperbaric Centre (Hiperbaricas Canarias SL) which was the designated 24/7 reception centre in case of Diving Emergencies. This centre proved to be closed, and the Health Services decided to carry the IP by helicopter to Tenerife to be treated there. It took several hours before the diver was recompressed.

5.5 Preparation for Emergency Response

The Project was organised according to the requirements of Otech's written procedures, laid out in the IDMS-1.

However, the Otech Diving Doctor had not been notified that a Project was ongoing even if his name was on the Emergency Response chart.

When the incident happened, there was no attempt made to consult with the Otech diving doctor, with the result that he was not being notified of the incident till the following day after the onset of the situation.

The decisions related to the treatment of the diver was consequently made without any input from accepted hyperbaric medical specialist till the decision to send the IP to Tenerife was made.

According to the statement of Alejandro Guerrero, a DMT decided that it was not a DCS and that was accepted by the management at site.

This breakdown in communication resulted in unnecessary confusion during the initial response to the incident. It also resulted in the Diving Team at site was not supported by Diving Expertise, which again resulted in lack of adequate response to the incident in accordance with the requirements of IDMS-1.

Corrective Action

The Project documents shall have a checklist ensuring that all necessary Emergency Response personnel are notified of work being planned, and give the Otech Diving Doctor necessary time to ensure all necessary preparation for a Project is in place.

It must be emphasized in the Project Plan that necessary emergency response drills are carried out, and that the adequate response in case of decompression incidents is to recompress the diver according to Table 6

5.6 Incident response

The requirement is to recompress the diver immediately. Please see the below excerpt from IDMS-1

IDMS-1

3.3.1 Indications of DCS

If there is suspicion of decompression sickness the patient must be put in the decompression chamber and recompressed according to Table 6 in the Norwegian Diving and Treatment tables. The Diving doctor must be contacted immediately for further diagnosis and advise in such cases.

IDMS-1

3.3.2 Diver Decompression Sickness

In case of suspicion of DCS treatment shall be started according to the Norwegian Diving and Treatment Tables, section treatment, table 6.

First Action

When someone has decompression sickness the treatment by pressure is the only effective First Aid. If this cannot be achieved, give oxygen or treatment mix by mask.

Please Note:
There are instances where the symptoms of DCS is not very strong. It is the duty of the diver and the supervisor to report such incidents even when in doubt, and then treat the symptoms. Training and drills are recommended.

Actions in case of Indications of DCS

Title	Action
Dive Supervisor	• Follow the Project Emergency plan, Inform dive superintendent. • If the diver reports symptoms of DCS subsea, the dive supervisor orders the surface crew to prepare equipment on surface for the patient. • The patient is then escorted to the chamber. • Make sure all appropriate electronic recording devices are running both for dive helmets and chamber.
Diving Supervisor	• Preparation of stretcher and OXY BOX • Vent chamber to surface if main lock is pressurized. • Prepare for Table 6 according to the Norwegian Diving and Treatment tables. • Make sure recording devices are on according to Chamber checklist.
Patient	• Try to reduce stress level and/or high puls • Breathe O2 upon transportation to chamber • In chamber, move all limbs to get good circulation • Drink at least 5 dl water per hour in chamber

The above requirements were not adhered to when this incident occurred. Even though the Diving Decompression Chamber was blown down to 60 ft, the diver was not recompressed, and thereby the basic requirement for treatment as soon as possible was not adhered to.

Corrective Action

Always run training sessions before any dive campaign, and run an Emergency Drill with blow-down to 18 msw (60 fsw) according to Table 6. All supervisors need to be able to execute this drill, and be instructed in the use of the DDC in case of Emergencies.

It must also be emphasized that the Diving Doctor always shall be notified when Diving Campaigns are ongoing, thereby ensuring the Diving Supervisors have a qualified support in case of problems.

Rev.: A

Issued: 05.02.2019

5.7 Responsibility for the diver after arrival of the ambulance.

The incident resulted in the Spanish Health Services arrived and took over the treatment of the IP. This action then resulted in a treatment of the IP different from what would have been experienced elsewhere where commercial diving operations are taking place. The Otech Diving Doctors tried to get information from the hospital regarding the various tests, but none have been forthcoming as the hospital quotes Spanish law regarding Patient confidentiality.

6 Conclusion

The above report leads to the following conclusions related to the incident:

1 **Planning of the project was inadequate with regards to internal procedures**. The project was planned without appropriate regards to the depth and tables to be used. Necessary risk assessments related to the diving and the potential risks were not made related to the decompression aspect of the work. This is in breach of the instructions of IDMS-3.

2 **The diver was not recompressed immediately**. When the incident was manifest and the diver was defined suffering from a potential DCS, the diver was placed by the DDC, breathing Oxygen at surface. However, the diver was not put under pressure according to USN Treatment Table 6 or similar. The Otech Diving Doctor in Norway was not contacted. The Project had not involved the doctor in preparations for the Project. This is in breach of the instructions of IDMS-1.

3 **The Otech Diving Doctor was not notified**. The Otech Project Manager called the local 112 (emergency) number, but delays were experienced due to the fact that the Gran Canaria diving centre (Hiperbaricas Canarias SL) was closed for business, and further delays happened as it was decided to arrange transport by helicopter to the Hyperbaric Centre at Tenerife. Upon arrival here, there was immediate hyperbaric treatment according to Table 6, followed by Hyperbaric Oxygen Treatment. The diver has, at the time of the completion of this report, still not recovered completely.

4 **The Preparations for this project was in breach of several written routines described in the IDMS manuals.**

5 **The Emergency Response was not in accordance with the IDMS-1, and also not aligned with normal international "Best Practice".**

7 Further Actions

The Otech Management need to strengthen the Diving Competence at site in Las Palmas.

The Risk Reviews need to take into consideration the competence of the Diving Supervisors in Hyperbaric Treatment. The familiarisation needs to focus this more.

The Diving Doctor need to be involved in the start of any diving operation

The Dive Planning must be more conservative, and always compared with the Norwegian Diving Tables as these are quoted as the standard.

The Emergency Response training must encompass a full cycle with the diver being recompressed to 60 fsw as standard. DDC operation in such cases need to be highlighted.

If dependence on external suppliers continue for "Life Critical Services", such suppliers must be subjected to continual checks for availability.

8 Appendices

Appendix 1	Personal Statement – Supervisor
Appendix 2	Personal Statement - Project Manager
Appendix 3	Personal Statement – Supervisor 2
Appendix 4	Personal Statement – Night Project Manager
Appendix 5	Personal Statement - Diver

8.1 Appendix 1 - Personal Statement – Supervisor

Olivier Thewissen
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Rue Capitaine de corvette Jean Luc Alvar
83160 La Valette du Var / France

La Valette du Var, 12/12/2018

Witness report of Olivier THEWISSEN acting as supervisor when Lewis Beddows diving accident occur

On the 9/12/2018 at 22:55, Lewis left surface to install and weld (first welding run) the anodes of the thruster n°6 of the Ocean Great white of Diamond offshore in the harbour of Las Palma de Gran Canaria.

The datas of the dive are attached in this document.

The dive N°66 was organised with two divers at the same time in the water with Felipe Vera as divers n°2 and Tomasz Wrobel as standby diver supply on the third panel and stand by fully dressed on the surface ready to go in the water.

Due to the depth, the capacity of the bank and the capacity of the compressor, both divers in the water breath compressed air from the same compressor filling the bank n°1 and n°2 during the dive.

The job was done without in water incident, the divers left surface with two minutes of difference to be easier for a deck and umbilicals management with an access point by ladder.

Diver 2 (Felipe Vera) was responsible for assisting in the positioning and routing of the Anodes through the down line to assist the Diver No. 1 (Lewis) in welding them.

The dive was planned for a maximum depth of 18,3 msw and 63 min (without deco stop) of bottom time according with the USN decompression table rev 7 in use to be compliant to Spainish diving regulation and Otech company policy.

The divers n°2 reach a depth of 18,8 msw and I shorted him dive according to the table of 21,3 msw for max bottom time of 48 min (without deco stop).

The divers n°2 left bottom at 23:34 (41 min of bottom time) and arrived in surface at 23:38. His ascent was a bit long to make his umbilical free of different stuffs in water at the same time (down line, messenger, umbilical two divers, welding cable, semi sub anchor and chain).

During that time, all the anodes are in place with one run of weld on both side and I kept in water the divers n°1 (Lewis) to continue the welding 3 passes on the anodes located on the 5 o'clock position just above the pylon (about 16 msw depth).

He is welding on that position two anodes completely. At 23:51, I decide to recover to surface Lewis and he left bottom to reach the surface at 23:53. His total bottom time was 56 minutes for a table time max of 63 minutes.

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When we organize the next dive to continue the welding activities with the new diver (Tomasz Wrobbel) was already in the water on surface front of the ladder when I've been informed that Lewis was feeling unwell.

He's complaining to be unbalance and not able to stand up.

I decide to abort the dive of Tomasz, use O2 for Lewis and evacuate to shore side and call an ambulance to carry Lewis into the medical hyperbaric facility in the harbour.

I've informed David Bustillo of the situation, he comes immediately on work place.

When we left the work site (job suspended until investigation) and follow the ambulance, David was informed that the hyperbaric center will not take in charge Lewis before they go through the hospital and an emergency doctor have stated that Lewis need a hyperbaric treatment.

I had refused to use the DDC on site because the O2 analyser was not working and I can't control the amount of O2 in the chamber.

Also, I've been informed that the local regulation requires a hyperbaric doctor on site to re compress a casualty.

When we were in the hospital to take care of Lewis (David Bustillo, a DMT of quai side team, Sebastian Ruis and myself) the emergency doctor has a chat with the hyperbaric center under contract with Otech Las Palma and at that time we know that is not possible to have a hyperbaric doctor and access to this hyperbaric facility before 08:30 AM.

It took contact with the hyperbaric facility of Tenerife and decide to flight Lewis by medical helicopter to Tenerife.

After this, I decide to start the investigation and search if this accident is due to an issue of equipment or compressed air supply to the divers or if it was due to an error of my supervision of the dive.

The quality of air was tested on a BOB filled at 18:00 when come on shift and another test on the air content into the bank supplied diver n°1 (Lewis) during his dive.

The test of air in the bank connected to the diver n°1 show 35gr/m3 of humidity, <100 ppm of CO2 and 0 ppm of CO (mean largely under limit by the EN12021 breathable air quality regulation 45mg/M3 for humidity, 3 ppm of CO and 500 ppm of CO2).

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The test realized on the BOB show a bit more humidity (+/- 50mg/m3) and 0 ppm of carbon monoxide and 100 ppm of carbon dioxide. This show again an air quality in the range of the expected, according to the EN12021 regulation for breathable quality of compressed air.

I also try to recover the video file of the black box for both divers to review the video and check again all timing etc, unfortunately the sound was not recorded into the BB and the files are too big to be recovered by dvd.

It was not possible to check by reviewing the dive (still waiting speaker ordered since the mob to check if the sound is recorded).

The operation was resumed by the day shift and I don't know if the video file can be recovered by another way than the dvd burning disc.

Olivier Thewissen

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Olivier Thewissen
Les Hameaux du Soleil bâtimetn B entrée B, Quartier Saint Jospeh
Rue Capitaine de corvette Jean Luc Alvar
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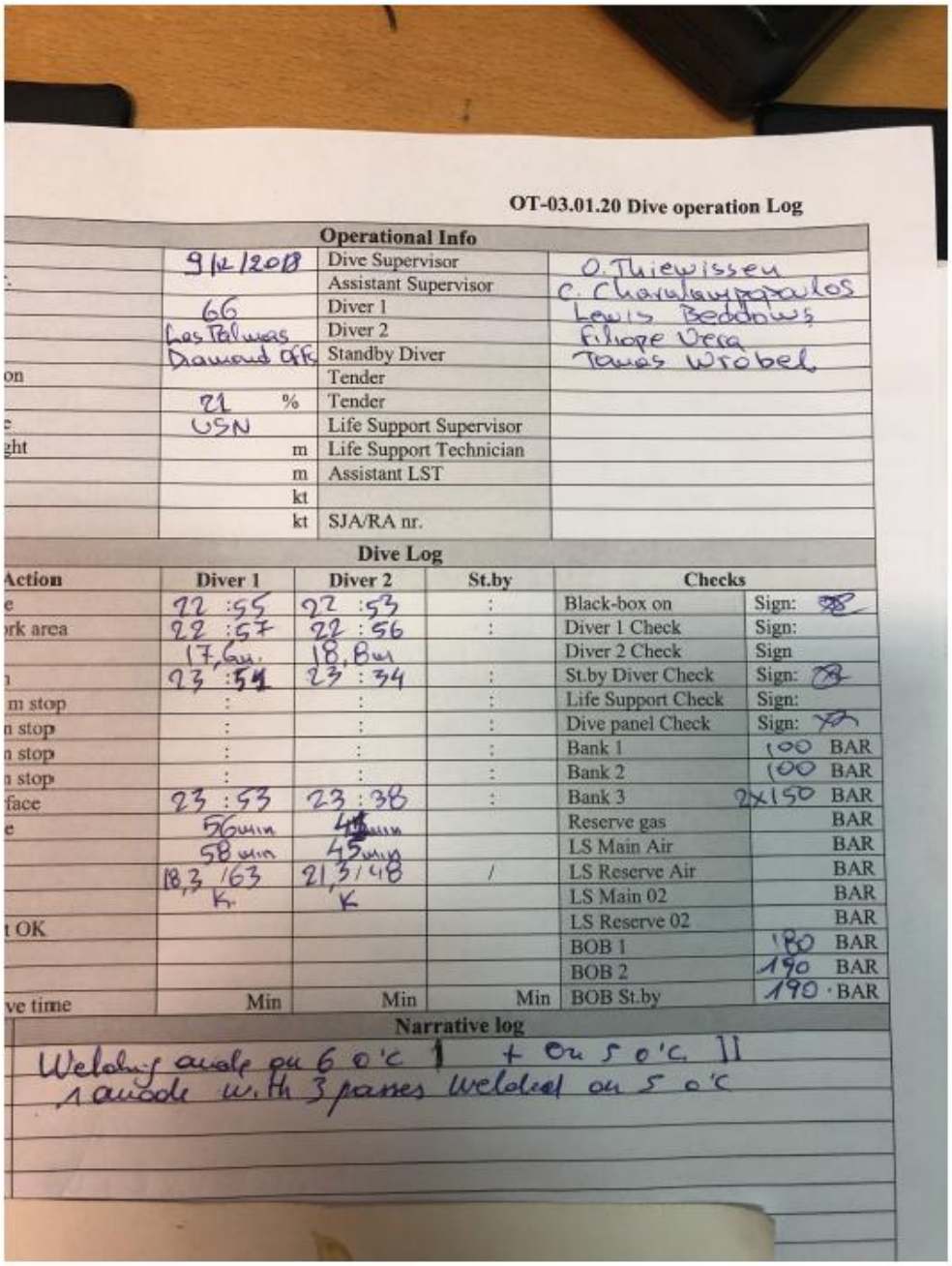

OT-03.01.20 Dive operation Log

Operational Info			
	9/12/2018	Dive Supervisor	O. Thiewissen
		Assistant Supervisor	C. Charalampopoulos
	66	Diver 1	Lewis Beddows
	Les Palmiers	Diver 2	Filippe Vera
	Diamond Offs	Standby Diver	James Wrobel
on		Tender	
	21 %	Tender	
	USN	Life Support Supervisor	
ght	m	Life Support Technician	
	m	Assistant LST	
	kt		
	kt	SJA/RA nr.	

Dive Log

Action	Diver 1	Diver 2	St.by	Checks	
e	22 :55	22 :53	:	Black-box on	Sign:
rk area	22 :57	22 :56	:	Diver 1 Check	Sign:
	17,6m.	18,8m		Diver 2 Check	Sign
	23 :54	23 :34	:	St.by Diver Check	Sign:
m stop	:	:	:	Life Support Check	Sign:
n stop	:	:	:	Dive panel Check	Sign:
n stop	:	:	:	Bank 1	100 BAR
n stop	:	:	:	Bank 2	100 BAR
face	23 :53	23 :38	:	Bank 3	2x150 BAR
e	56min	45min		Reserve gas	BAR
	58 min	45min		LS Main Air	BAR
	18,3 163 K.	21,3/48 K	/	LS Reserve Air	BAR
				LS Main 02	BAR
t OK				LS Reserve 02	BAR
				BOB 1	180 BAR
				BOB 2	190 BAR
ve time	Min	Min	Min	BOB St.by	190 BAR

Narrative log

Welding anode on 60'c 1 + on 50'c. II
1 anode with 3 panes welded on 50'c

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8.2 Appendix 2 - Personal Statement - Project Manager

PERSONAL STATEMENT

DATE: 12/01/2019

NAME: David Bustillo Losa

ADDRESS: Doctor José Guerra Navarro. Nº5-2ºA

POSITION IN THE TEAM: Project Manager of the project.

POSITION AT THE TIME INCIDENT: Off shift at home.

OTHER MEMBERS OF THE TEAM PRESENT: Olivier Thewissen (Supervisor), Charalampopoulos Christos (Assistant supervisor), Alejandro Lluch (Night coordinator).

PERSONNEL IN CHARGE: Olivier Thewissen (Supervisor), Alejandro Lluch (Night coordinator).

DESCRIPTION OF INCIDENT, PREFERABLY WITH TIMES IF POSSIBLE:

As I was not on-site during the incident I collect the following information from the crew on-site (Alvaro Garate DMT-quay side team).

-Around 00:12 Dive Boat personnel contact quay side team, Quay side team receive the message one diver from the dive boat still being evacuate.

-00:16 quay side team ready to recover the diver from the quay side

-00:19 112 ACTIVATED according Emergency Response Plan activated. (Alejandro Lluch did the call)

-00: 20 they arrive with the injured person lying on the stretcher and breathing O2 at 25 l / min

The diver felt dizzy and manifested discomfort in one ear. Breathe normally but the pulse is 102 puls / min. It is appreciated that he is nervous, but his level of consciousness is high. They tell us that the first symptoms appear 10'after reaching the surface.

-00: 18 Main chamber pressurized to 60 ft

-00: 31 the pulse remains high (102 puls / min). Normal breathing, He reports dizziness and remains nervous. It seems that the temperature of the diver is high, you start to control this sign. Neurological examination is performed constantly, and no deterioration is seen.

-00:32 First contacted with the hyperbaric facility contracted in the port area.

-00: 34 Manifest that his ear is blocked. Continues with neurological examination and with O2.

-00: 40 The O2 ends and the injured person moves to the entrance of the chamber to continue supplying O2 normobaric on demand, through the BIB of the entry lock. The

supply works well and breathes normally. Neither deterioration at the neurological level nor appearance of any other symptom is seen.

-00: 45 neurological ok. Pulse 86 puls / min. The temperature is correct

-00: 46 begins to notice nausea and vomits after removing the O2.

-00: 50 Increase the pulse, 100 puls / min and again show nervousness.

Physical and neurological evaluation continues for three DMTs. There are no changes.

From this moment, I intervened in the attention to the injured person, so I did not register several important data.

-the doctor comes from the platform

-00:53 The ambulance arrives 112 activated the protocol for accidents.

- On the way to the Hyperbaric Center, Alex tells me by phone, that the contracted doctor requires that the injured person be treated at the hospital before handle.

-01: 13 arrival at the hired hyperbaric center. Closed

-01: 15 confirm that we should go to the hospital.

-01: 20 the ambulance arrives at the Insular hospital. The injured person is admitted to the emergency room.

-01: 38 They tell us that the injured person should be transferred to Tenerife.

-01: 43 The doctor from the Insular hospital speaks with the contracted hyperbaric doctor.

-02: 01 is approved for transfer to Tenerife.

-02: 54 The ambulance arrives for the transfer to the helicopter. They tell us that the helicopter will fly at 3:30.

-03: 00. They inform us that they have already transferred the injured person. We go back to the dock.

I received a call from Oliver and Alejandro when the diver was on quay side and and jump from the bed at home to the site I cannot confirm how long took me to reach the site.

When I arrived the 112 was already activated and I needed to provide as responsible to the police (onsite) with the details of Lewis.

With the 112 activated I followed the ambulance with my car. The ambulance went straight to the hyperbaric facility where OTECH has a 24 hour contract an is in the port 8´time distance

(checked during a drill) from the workplace and was not available, the ambulance drove to the main hospital in Las Palmas where they decide to transfer Lewis to another Hyperbaric facility where Otech has a contract in Tenerife by the use of an Helicopter.

ACTIONS TAKEN AT SITE, ACTIONS NOT TAKEN AT SITE:

Actions not taken on site: Use the onsite dive chamber.

Actions taken on site:

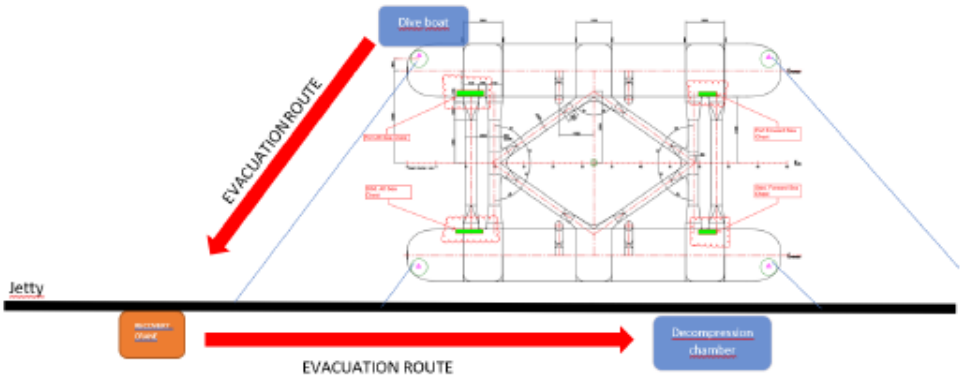
-Review of dive log.

-Function check of chamber.

-Gas analysis main gas and BOB gas.

ACTIONST AKEN AT SITE AFTER DIVER WAS TAKEN AWAY:

DRAWINGS:



8.3 Appendix 3 - Personal Statement – Supervisor 2

PERSONAL STATEMENT

Date: 12/01/2019

Position in the team: Air Diver Welder/Trainee Air Diving Supervisor

Position at time of incident: At the diving control panel

Other members of the team present: Olivier Thewissen (Supervisor)-Alejandro Lluch Guerrero (Project Manager)

Personnel in charge: Olivier Thewissen

Description of incident, preferably with times if possible:

On the 09/12/2018 Diver Lewis Beddows arrived at Surface 23:53 and report well. Approx 2-3 mins later from the Deck they informed as that Lewis didn`t feel well. He was feeling dizzy he had strong pain inside his ears and couldn`t breathe very well. Loss of balance.

Actions taken at site, actions not taken at site:

Provided O2 all the time and kept the diver warm. 5 mins later while the situation was the same we followed all the procedures and we place the diver to the stretcher with the O2 and we used the rescue crane to carry the Diver to the FRC and finally to the dock where the DDC was. We kept providing O2 from the Chamber`s BIBS until the Ambulance came. DMT did the neurological test and Project Manager was all the time in contact with the Hospital. DMT and Supervisor escorted the Diver to the hospital. In addition we provided the diver with his Dive Log so that the hyperbaric doctors could act accordingly.

My personal estimation regarding the actions that we should have taken and we didn't was that we should have used the Otech DDC immediately (treatment table 6) with direct communication with the hyperbaric doctor and not wait for the ambulance and the Hyperbaric facilities of the island because Lewis had obvious neurological signs and symptoms of DCI. The delay was quit long and critical.

Actions taken at site after diver was taken away:

We kept the panel as it was for further investigation. The client made a visit and checked the workplace and whether the actions taken were the correct once and in compliance with the company`s procedures. Later on the project manager and Supervisor carried out a breathing air test.

8.4 Appendix 4 - Personal Statement – Night Project Manager

PERSONAL STATEMENT

DETAILS RESUME

LOCATION: Las Palmas de Gran Canaria (Spain), Puerto de La Luz, Reina Sofía jetty. Ocean Great White semisub rig. External pontoon, PS-AFT.

PROJECT: Ocean Great White – LPA

CLIENT: Diamond Offshore

DIVING STATION: DC-01 on board vessel MARESA DOS

DATE: 10th December 2018 during the night shift (the night between the 9th and the 10th)

TIME: around 00:10 PM

BRIEF DESCRIPTION

Diving team 2 was diving from diving station DC-01 on board diving vessel ``Maresa Dos´´. They were cutting anodes with the hydraulic tool on the 2nd quadrant (Thrusters 3 & 4) located Portside Aft.

Diver 1 (Lewis Beddows) jumped in the water to continue with the cutting operation at the bottom of the thruster. At that time supervisor in the panel was Olivier Thewissen, assistant supervisor in the panel was Charalampopoulos Christos, diver 2 was Felipe Vera and night coordinator was Alejandro Lluch.

Diver 1 performed a normal dive below the limits of the diving table he was diving with.

Once he was out of the water, he reported being OK and went to get change. Around 5 minutes later he came out of the vessel´s cabin telling me that he was feeling dizzy, so I called the DMT´s and supervisor and we immediately started supplying oxygen to the diver, keeping him in a safe position and warm. After 5 minutes the diver was not feeling better, so we decide to activate the emergency plan. The diver was secured on the stretcher together with the oxygen and transported from the diving vessel into the FRC. Meanwhile the night coordinator was calling the crew at the pier to be on standby were the second rescue crane was installed (pier) with the car ready and the hyperbaric chamber on standby, also the emergency services were activated by calling the 112 and a medicalized ambulance was requested. Night coordinator called also the Hyperbaric center (Servicios Medicos La Luz) for having them on standby with the chamber ready as well and follow instructions of the hyperbaric doctor.

Hyperbaric center reported they were ready with the chamber in 15 minutes. After explaining the symptoms to the hyperbaric doctor, he believed it was not a decompression sickness. Anyway, night coordinator took the decision to bring the diver to the hyperbaric center as it was 6 minutes way from the work site and with a hyperbaric doctor for attending the diver.

Diver was transported to the pier with the FRC, once arrived the crew on the FRC secured the stretcher again to the rescue crane and the crew at the pier received the diver on top of the pier with the stretcher, the diver was located then in the car and transported 50 meters to the door of the chamber. Once there DMT´s did an examination and no bends or decompression sickness

symptoms were diagnosticated, however the diver was reporting pain on the internal ear, and he was feeling dizzy but conscious and able to speak and move all the parts of his body.

Night coordinator performed a second call to the emergency services (112) asking for the status of the ambulance requested as it was already an interval of 10 minutes from the first call. Port Police informed the night coordinator that the ambulance had been demobilized at the entrance of the port by the Hospital as it was not a medicalized one, and a second ambulance was already on the way.

At his time the project manager (David Bustillo) arrived. He was called during the process.

Diver continued being attended by the DMT´s, monitored and breathing oxygen. Due to the dizzy feeling diver puked while he was in the stretcher.

The ambulance arrived after 25 minutes and the diver was put inside. They were told to bring the diver to the hyperbaric center in the port. At this point the diver was feeling still dizzy and with pain in the inner ear but still conscious and able to speak and move.

At this point the hyperbaric center was called again for informing the diver was on the way and they started refusing to accept the diver at their facilities saying that he needed to go first to the general hospital and then the hospital could send the diver there if they consider that.

Once diver left the work site, night coordinator came on board the rig to report the OIM and relevant personnel about the incident. OIM asked for a meeting with all the crew involved at the pier and night coordinator was doing a speech explaining the situation and showing the OIM all the first aid equipment that was used and the emergency plan that was followed

Diver was transported finally to the general hospital from where they called the hyperbaric center to request the chamber treatment. They were still refusing to accept the diver. The second hyperbaric chamber where Otech Spain have a valid contract was activated then and the diver was transported there to start the treatment.

8.5 Appendix 5 - Personal Statement - Diver

Videresendt melding:

Dato: 10. januar 2019 kl. 15:24:42 CET
Til: Jens Koch <jko@otech.no>
Kopi: Morten Emil Sørenes <mso@otech.no>
Emne: Incident report: Ocean Great White

Hi Jens,

This is my account of the incident involving Lewis Beddows, during the project on the Ocean Great White on the 10th December 2019.

At the time of the incident I was dressing in as the next standby diver on the work boat, doing my checks and by the time I noticed anything was wrong, Lewis was already lying down being administered O_2.

I then stripped out of my standby gear, donned a lifevest and went to start the FRC. Henry Coker had already started it and I then brought it underneath the man winch and we proceeded to load Lewis who was by now on a stretcher, onto the FRC. The winch wire was too long so we couldn't lift him out properly but we used it as a safety measure and managed, with many hands, to get Lewis aboard the FRC. (We did address the winch after the incident and both shortened the bridle and lengthened the pole itself. It is not ideal but it works in pinch.)

Once we got to the quayside we winched Lewis up on the man winch and there were people ready to receive him. I was still in command of the boat at this time so I don't know exactly what happened but I believe a van had been brought to the man winch which was a hundred metres away from the chamber, in order to transport Lewis to the chamber.

At this point I went back on the FRC with one other crewman to get Olivier, our dive supervisor, from the boat where he had collected the dive log, and I brought him back to the quay.

From my point of view, everything up until this point had been done correctly. Lewis had been on O_2 and Sebastian Ruiz our appointed DMT was talking to him, checking vitals and carrying out dynamic neurological assessment. From here, however, things went down hill.

When we got to the chamber area, Lewis was being taken out of the back of the van where he was on a stretcher. I had assumed he was being taken straight to the Hyperbaric centre so was surprised to see him still on the quayside when I got back from the second run on the FRC. He now had a space blanket on him. I did not get close to speak to him as there were a lot of bodies and he had, I assumed, the care he required. Shortly after I got there and found him in the back of the van, he was moved to the entrance of the chamber so that we could use chamber BIBS as our portable O_2 had run out. I enquired as to why Lewis was even still here, and then again as to why he was not being put into the chamber. It was at this point that Lewis threw up for the first time (that I saw) and from where I was stood, about 15 metres away, appeared to be having spasms in his legs. I am a trained DMT and from my experience I would class that as a type 2, neurological DCI, the treatment for which is immediate re-compression and USN treatment table 6. He was exhibiting all the classic signs yet people were coming up with outrageous comments such as "it's just reverse block" (on account of him saying he had ear pain) The vestibular symptoms he had been exhibiting such as vertigo, dizziness and now vomiting told me he had a bubble in his ear and he needed to be placed in a chamber, at depth, immediately.

I do not know the exact reason that Lewis was not in a chamber the moment we had him at the door to one. I can tell you that myself and several other people were trying desperately to overcome the strong resistance to put him in the chamber but it did not happen.

I understand that the ideal situation would be to have Lewis in the hyperbaric centre with unlimited gas, hyperbaric doctors and round the clock care, rather than in our chamber on site, provided that the former option happened in a timely fashion. As it was, a decision was made not to take him by van to the hyperbaric centre and to wait for an ambulance, I believe this was because he would have been off O_2 for the short duration. The ambulance however, took far too long and as I understand it, there was a complication with the wrong type of ambulance being sent. I understand that there are preferred methods of handling a DCI but there has to come a point in time where you say "enough is enough" and blow him down in the chamber we have on hand.

Another issue that was raised as to why Lewis was not immediately re compressed is that the O_2 analyser on the chamber was broken. Under such circumstances there would be no way to regulate the amount of ambient O_2 in the chamber. This could easily be overcome however, by venting the chamber, topping up with fresh gas and maintaining the correct depth. The response to this was that there was not enough gas. I don't know if that is true or not. We had quads and we had a compressor. It is my belief that we had a chamber capable of treatment, we had a casualty who needed treatment, and for some reason the decision was taken not to treat him in it.

Another reason given for not blowing him down was that under Spanish regulations, the decision has to be taken by a hyperbaric doctor. To me this is ludicrous. We had plenty of trained medics, specifically trained to deal with DCI's who were all happy to make the call and blow him in, but the call was not ours, and our voices were shouted down. There were many people at this point not happy with the way the incident was progressing, or not progressing.

It was said at the time that a hyperbaric doctor was on the phone advising on the situation but from what I learned afterwards, the doctor on the phone was in fact not a hyperbaric doctor at all.

I do not know whether the O_2 analyser was working or not, we took it as fact when we were told it was not working. The following day when it was checked, it was working.

That is all the first hand information I have. If you feel I can answer any more questions you may have, please ask without hesitation.

Best regards