DIVING IN THE NORTH SEA DURING 1977 - SITUATION REPORT

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Mr Chairman, Ladies and Gentlemen, I certainly feel at home talking to the United States Association of Diving Contractors and associated members. I feel that my annual paper is becoming a habit. A habit which I personally am delighted with, both from the social and the professional point of view. Good communications, in my opinion are absolutely essential for the safe operation of the offshore diving industry throughout the world. Thank you for inviting me once again.

The first subject in my situation report from the North Sea for 1977 must cover accidents. Throughout the whole of the North European area there were five fatal accidents. Three of these were in the British sector and two in the Dutch sector. I am pleased to report that the improvement trend is continuing and, if one measures the accidents against “exposure to pressure time” the improvement is considerable. However, we must not become complacent because these figures are still not good enough.

What have we learnt from the accident investigations of 1977? Unfortunately with one fatality we have to admit that we do not know the answer. One can put forward many hypothesis and theories as to why a “bell man”, to all intents and purposes, fainted and fell with his face underwater. We have eliminated every checkable possibility and we are still without hard proof to support a factual conclusion. This is the worst type of accident that we have to investigate. How can one try and prevent it happening again if one cannot find the real cause?

In another case, almost certainly, the over centre clamp of the diver’s helmet came open and the helmet came off.

The other case in the British sector is still under investigation but we do know that the diver was wearing SCUBA with a free mouthpiece and diving in turbulent water around a stinger.

There have been a number of near misses and non-fatal accidents. Once again I have to report on a diver receiving an electrical shock from a defective electrically heated suit, plus one this year. In general, the area which has created the most worry during 1977 has been air diving. It would appear that many of the air diving supervisors can convince themselves that providing a dive is carried out to an acceptable schedule it is bound to be safe. Unfortunately this is not true. However, because of their apparent implicit faith in the schedules some supervisors have disregarded, or refused to acknowledge, the presence of serious symptoms and have always found excuses such as cramp to disregard these symptoms. I can find very little excuse for this approach. One only has to follow the “tick-off list” in the United States Navy Diving Manuals to avoid the very serious consequences that can arise if serious symptoms are not treated correctly. On three occasions in the UK sector last year what should have been a normal therapeutic treatment ended up as an air saturation therapy.

As I told you last year, I have a continuous process of analysing the facts and figures gathered from fatal accidents. The up-to-date break-down of this information (viz 39 fatal) is:

Human error was a factor in	19 cases
Poor physical condition in	3 cases
Inadequate training in	6 cases
Equipment failure in	10 cases
Lack of equipment or wrong choice of equipment in	4 cases

Inadequate medical supervision	2 cases
Poor diving supervision in	7 cases
Poor equipment maintenance in	4 cases; and
we do not know the answer in	3 cases

In 1977 it was necessary to prosecute a diving company and a supervisor in the same company for failing to comply with the regulations.

Last year I told you that the United Kingdom Government was combining the four different Statutory Instruments on Diving Safety into one set of unified regulations. I had hoped that by now they would have been issued to the industry for consultation but I regret to say that so far this has not yet been done. The policy is still the same and, although there is little or no change in the offshore diving regulations there will still be a considerable period allocated for consultations before the new regulations become law.

In 1977 there were two major blow-outs in the North Sea, one in the Norwegian sector and one in the Danish sector. Fortunately, on both occasions there were no divers under pressure. As you can imagine these accidents have generated considerable activity not the least of which has evolved around the safe evacuation of personnel. The safe evacuation of divers under pressure from a local emergency presents an extremely difficult potential problem. I say potential, because, to my knowledge, in the whole history of the offshore industry only once has it been necessary to evacuate divers under pressure. In fact in this particular case they could have remained on board with safety. However, I think that it is right that the industry should anticipate this problem and produce contingency plans to cope with it if and when it might happen. We must also consider the morale of the divers. All United Kingdom diving legislation requires action to be taken in the planning for total evacuation. However, ONE MUST NOT FALL INTO THE TRAP OF MAKING THE SITUATION MORE DANGEROUS BY PREMATURE IMPLEMENTATION OF BADLY THOUGHT-OUT EVACUATION PROCEDURES.

During the period 1955 to 1974 there were 70 major mobile rig mishaps and 20 minor mobile rig mishaps worldwide. The vast majority of these mishaps occurred during transit.

Evacuation can be necessitated by fire, collision, extreme weather, blowout, etc. It is essential that the <u>possibility</u> of such emergency be considered first and foremost with a view to <u>minimising</u> the risk, and second to develop a planning response to an emergency should it arise.

Whichever way one assesses the risk to divers under pressure it is minimal and if and when the need to evacuate divers arises there is no <u>one</u> technique that could possibly cater for all sets of circumstances that could arise. However, an emergency situation could always occur and emergency procedures and possibly special hardware may save lives. The undoubted fact that all disaster situations cannot be catered for should not delay action to cater for should not delay action to cater for an appreciable fraction of the eventualities.

Good communications between drilling operatives and the diving supervisors to ensure that diving is not undertaken during operations involving high risk is essential. Such things as: ballasting of semi-submersibles, rig work overs, drilling operations when entering known or suspected hydrocarbon zones, etc. should form the basis of communications between the drilling operatives and the diving supervisors.

The North Sea is now covered by a “helicopter lift” chamber evacuation system and diving companies have been encouraged to make their chambers compatible by the fitting of the necessary adaptors or spool pieces. Once again this system does not cater

for all sets of circumstances, but it could be invaluable under some conditions.

As I have said before we may be dealing with a completely impossible situation for providing total coverage but I am convinced that we can cut a minimal risk to an even smaller minimal. We can erode the possible dangers by planning to cater for the problem which may arise under various sets of circumstances.

Evacuation under pressure must be classed as the ultimate emergency, the emphasis being placed on prevention, continuing awareness and immediate response. However in the final analysis we must accept that in every walk of life there has to be an acceptable level of risk.

I personally think that many of our problems could be overcome in the very long term by diving companies and manufacturers getting together and agreeing a common chamber and bell mating technique and common sizes.

RESEARCH

The UK research programme is continuing and the numbers of projects are increasing.

Research into diver unconsciousness is progressing as is that into the use of anaesthetics under pressure.

For many years we have been extremely worried about electrical safety underwater. There are so many widely divergent theories on what is safe. It is our intention to publish a document covering all the points that are known and understood. We then intend to identify the areas where knowledge is either thin or completely lacking. We will then investigate those particular areas.

The project investigating the safe comfortable temperature tolerances under helium pressure is well underway.

There is already an extensive literature concerned with thermal balance in the human being in hyperbaric oxyhelium environments; both theoretical and experimental studies are numerous. Many groups of workers have reported on widely varied conditions. Our main objective is to attempt to draw together this literature and formulate from it the most appropriate thermal balance equations for any specified set of conditions. Some experimental measurements will be made and used to test the validity of the equations. Once reliable thermal balance equations have been derived it should be possible to draw up guidelines for safe thermal conditions.

The doctor carrying out this particular project has said “Some of my reading on food intake and weight loss in divers has led me to suspect that the usual form of thermal balance equations (as applied to 1 ATA air) may be inadequate in hyperbaric oxyhelium. At the moment this is no more than an idea but because of this we are keeping an open mind about the format of the equations.”

I hope that in the very near future we shall be supporting further research into “air saturation” diving because there is very little doubt that this technique could become very attractive in the installation, inspection and maintenance phase of the offshore industry.

As we all know saturation diving is a relatively new kind of potential occupational hazard where individuals are exposed for weeks on end to an environment abnormal in every respect. Except for short term effects such as otitis caused by infection the only known long term indication of physiological or pathological damage is the broadly investigated phenomenon of bone necrosis, but less than a decade is a relatively short

period to assess other possible long term damage.

If there are any potential long term ill effects an early indication of these would be most desirable to determine which aspects of the occupation were responsible for such effects. If in fact there were any, this would be the first step towards prevention.

It is our intention to initiate research to cover this. Information received from these various research projects will be made public.

In 1977 15 diving safety memorandas were issued and covered such things as:

Diving medical emergency information
Diver qualification requirements
Defective Synflex fittings
Requirement for diver heating
Manning levels and frequency of diver practice
Danger of surface orientated diving
Possible dangers of high oxygen partial pressure in NOAA air saturation tables
The use of air tuggers
Error in the marking of some high pressure hoses
Cathodic protection
Protective headgear
Transfer under pressure by helicopter
Neck clamp of Kirby Morgan 16 helmets
US divers regulators
Accident reporting

Mr Chairman, gentlemen, I have intentionally kept my paper short this year because I feel that the question period is so important and I would like to make myself available for all your questions.

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SNIPPETS

Some people are abnormally sensitive to decompression sickness. One New Zealand diver is so liable that he must limit himself to 20 foot depth maximum.

Chest pain after a dive may indicate mediastinal emphysema or myocardial ischaemia.

Many divers are too buoyant to maintain a 10 foot or 20 foot decompression stop depth. Sport divers should avoid dives requiring decompression stops.

Cold gives little warning of the onset of Hypothermia. Abnormal behaviour (forgetfulness) may occur. 70% of the human body is within 2.5 cms of the surface. Activity increases heat loss. Danger period continues after the victim has been removed from the water. Heat loss occurs even in “warm” water. Severe but reversible hypothermia may produce a deathlike appearance and therapy be wrongly thought useless.

In-water oxygen therapy can be limited to 10 metres by so limiting the length of the gas supply hose.

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