NORTH SEA DIVING ACTIVITY DURING 1984

Commander SA (Jackie) Warner OBE, DSC
Chief Inspector of Diving, UK

It is once again my privilege to bring you the last year's situation report from the North Sea. We are well into the second decade of diving operations involved with the North Sea offshore industry. The progress that has been made in every aspect of offshore diving during that period has been fantastic. The standard of safe diving practice is only one part that has improved but there is no doubt that the work will always be potentially hazardous. The professionalism of the offshore diver is certainly of a much higher standard than hitherto but there is still a long way to go compared with the standards in such areas as international air travel. Progress has and will continue to be difficult as divers are not produced out of a common mould and the standardisation of the behaviour and techniques, which is sometimes regarded as professionalism, is difficult. The historical description of the diver's cavalier, buccaneer or even cowboy approach to life will take a long time to outlive. This is why I am glad to see that the training standards for divers and support personnel are getting away from the "wooden top" approach. It is not true that you have to be mentally subnormal to go under water. It has been said so many times "that diving is only a means of transportation" albeit it involves the application of the result of years of research into physiology, chemical engineering, electrical engineering, hydraulic engineering etc., but at the end of the day the diver has to be capable of carrying out useful work at depth.

Offshore activity is increasing on the UK continental shelf and at the end of 1984 there were 126 installations and 55 diving spreads working. Exploration work is continuing at a high level and is limited largely by the availability of mobile drilling rigs. Changes in gas prices and tax concessions are also encouraging activity. The trend in pipeline work is slightly different as there are few major operations but a larger number of smaller projects. Superimposed on this activity is an increasing need for surface and sub-surface inspection, maintenance and repair of existing installations and pipelines as they age in a hostile environment. All this adds up to a considerable amount of diving activity and makes the North Sea the major offshore operational centre in the world. In the Norwegian sector there has been a lot of deep diving activity involved in the laying of pipelines across the Norwegian trench. Last year diving was being conducted on a regular basis to 260 metres and training and selection has already commenced in preparation for this year's diving programmes to 350 and 380 metres aimed at providing a repair capability for new pipelines.

Training and Certification

The high level of diver activity in the North Sea is proving attractive to divers from all over the world but once again I have to stress the absolute need for UK training or UK recognised training qualifications before a diver can be employed. In past years I have explained the reason for the setting up of the training standards which appear to be justified by the improvement in the casualty figures. You may also remember that the need for training certification was introduced in 1981 but with a possibility of obtaining certification by experience. This was designed to look after the experienced divers who did not take advantage of the grandfather clause for a variety of reasons and who had not necessarily been to a recognised training school. At the same time this method of certification provided a loophole by which to avoid expensive recognised training and this is now considered no longer justifiable. Action is being taken to delete from UK legislation the possibility of obtaining certification just by experience or by some training and some experience. We believe that everybody who was justified in claiming under the scheme like the old and bolds who were diving prior to 1981 have now done so.

Accidents and Incidents

In 1984 there was one fatal accident, 15 dangerous occurrences, 17 serious injuries (and this includes Type 2 decompression sickness) and 7 minor injuries. Included in the total accident/incident list are 2 explosions which occurred whilst the divers were cutting/burning underwater, 3 trapping incidents, one of which almost severed a man's hand, 11 Type 2 bends, but as we are encouraging supervisors to treat all cases of decompression sickness as serious, one cannot place too much reliance on the Type 2 figures. There were 2 explosive decompressions of medical locks which I think supports our requirement for the fitting of interlocks. There was a minor fire resulting from a pillow leaning against an unprotected lightbulb, one incident in which it was suspected that the diver may have had more than the acceptable radiation exposure, 3 problems with dynamically positioned vessels which was entirely due to design failure and 2 bell recovery problems.

With the amount of diving activity in the UK sector during 1984 and the escalation of diver time subjected to pressure I believe that the diving industry has every reason to be pleased with the present safety record but, as always, we must all avoid complacency. This may sound like a lot of platitudes and OK phrases but it is a fact that the fatal accident rate in the North Sea is now fifty times better than hitherto.

In the UK we have now established a computer programme for recording and assessing diving accidents. It will take some time before this programme is of real value as we are dealing really with quite small numbers but for your interest, I can show you the figures and brief statements on all the fatal diving accidents of known diving fatalities involved in oil and gas operations in Northern Europe since 1971.

1984 Research Projects

We are continuing to invest money in research into diving problems. However, I must admit that I considered it a very sad day when the industry initiative aimed at improving diving safety was disbanded.

Breathing Gas Purity

We are continuing to assess the toxicity of contaminants likely to be introduced into the chamber atmosphere from

the work site, for example, epoxy resin, crude oil, silicone rubber solvents, etc. We have undertaken a study to predict the identity and quantity of likely contaminants in the chamber/habitat atmosphere and to establish maximum acceptable levels.

The offshore analysis of gases breathed by divers is particularly difficult if we are looking for trace contaminants. Ideally we require an on-line technique which can be operated, and results interpreted, by non-specialist personnel. We are undertaking a survey to identify the technique most likely to meet these ideals within a reasonably short development time.

Hyperbaric Evacuation

A great deal of money has been invested by the industry in various pieces of hardware for evacuating teams of divers under pressure from a threatened offshore installation. A number of these devices have been the cause of some concern in the terms of:

(a) ultimate recovery;

(b) thermal stress for the occupants.

We have recently undertaken some trials addressing both of these concerns. Our conclusions include:

(a) The marine recovery of a buoyant chamber mounted within a substantial steel framework is considered much more feasible than that of a chamber mounted inside a GRP "lifeboat".

(b) As with the lost bell situation the occupants' thermal balance is essential for their survival. However, with a hyperbaric rescue vessel thermal stress can be due to cold when we have a few occupants pressurised to significant depths, or it can be due to excessive heat when we have a large number of occupants at relatively shallow depth. In either case, the thermal stress can be life threatening within a matter of hours.

So far we have only studied the heat stress situation where the ambient air and sea temperatures dominate the rate of cooling possible with the limited self contained power sources normally associated with hyperbaric rescue vessels (HRVs). It would seem that provision for the net extraction of heat of around 110 watts per diver from the chamber is essential for thermal equilibrium to be maintained. This requires reasonably sophisticated techniques when the ambient temperatures are above 10°C for the sea and 15°C for the air.

Air Decompression Schedules

We have been receiving anecdotal evidence that currently used air decompression schedules may be causing an unacceptably high incident rate under certain conditions. We are undertaking a survey identifying dive parameters and associated incident rates to identify (a) if there truly is a problem, and (b) if so, what particular combination of diving parameters and decompression schedules is causing the problem. As I told you last year my own sift of the raw data suggested an across-the-board decompression sickness percentage of less than 1%.

Long Term Effects of Diving

One common method for assessing early signs of potentially hazardous toxic fumes or ionising radiation is to examine the type and frequency of modifications to chromosomes in blood cells. Early indication showed that 4% of the diving population studied showed unreported level of chromosome damage in only 2% or less of their white blood cells. This compared with less than 1% of the non-diver control group. The chromosomal damage has been related to general medical history, type of work, degree of exposure to X-rays, smoking, alcohol consumption, chemical exposure, diving experience including types of diving, hours of exposure, partial pressure of breathing gas constituents, working depth range, deepest dives, diving related illnesses and accidents. NO, and I must repeat NO correlation between any of the above and the occurrence of severely damaged cells has been found. The conclusion to date is that diving per se is not the cause of these damaged cells. It could be that some sporadic activity is the most likely causative factor with divers showing a higher propensity.

Also we are undertaking a study to identify the possible role of oxygen in the initiation of bone necrosis. A hypothesis linking an elevated partial pressure of oxygen with a reduced blood flow, and thus reduced gas transport out of bone tissue during decompression, is being tested.

Finally, I am pleased to report that the UK hosted the first meeting between the various international diving contractor organizations in Aberdeen last year. Representatives from the AODC (Europe), the ADC (America) and the CADC (Canada) informally agreed to exchange information. Also present were the Diving Inspectors from the Governments concerned. There was a strong willingness to co-operate and to standardise certain procedures. The whole theme of the meeting was based on "communication" and it is hoped that this is another step in the direction of international standardisation.

This paper was presented at the Association of Diving Contractors' International Symposium, 1985. This was Commander Warner's tenth paper, as the UK Department of Energy's Chief Inspector of Diving, to this forum.

Commander Warner retired in May 1985. His successor as Chief Inspector of Diving for the UK Department of Energy is Mr Roy Giles.

THE WORLD UNDERWATER FEDERATION PASSES ITS FIRST QUARTER CENTURY

A Press Release

In Paris on 14 January 1984 the World Underwater Federation celebrated the 25th anniversary of its foundation.