

decompression), and surface intervals for their repetitive and multi-day diving.

However, this study has shown the profiles to be safe. The incidence of DCI has been less than 0.01%.

It appears that the most important contribution to the success of the PPA profiles is the slow ascent rate at 3 msw/minute. The pearl divers mode of diving would not suit other divers, but the profiles have made great contribution towards diving safety in repetitive and multi-day diving.

The profiles are being continuously assessed and evaluated.

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## **AN EXCELLENT SAFETY RECORD DESPITE THE RISKS**

Rod Punshon

### **Introduction**

PRO DIVE Cairns is one of the largest diver training centres in the world. We currently train, under the PADI system, approximately 4,000 divers each year. This number is made up of predominantly open water certifications (80%) with the balance being advanced or higher level training.

PRO DIVE Cairns has been in operation since September 1983 and has trained 35,000 (thirty-five thousand) divers to date. In addition to diver training, PRO

DIVE also carry certified divers on their three day/two night live-aboard trips, approximately 1,000 per annum.

In conducting these activities, we can accurately calculate the number of dives carried out each year from our vessels as follows:

- 1 Divers under training, 12,800 per annum
- 2 Dives conducted by newly certified divers whilst on their certification trip, 16,000 per annum
- 3 Divers engaged in higher level training, 7,200 dives per annum
- 4 Certified dives (non-training), 10,000 dives per annum
5. Staff dives (Instructors), 5,000 dives per annum

Therefore, the total non-staff dives equal 46,000 and total staff dives equal 5,000, totalling 51,000 dives conducted annually, as multiple dives in multiple days, from our two vessels.

### **Dive location**

Since our inception, all of our diving has been conducted at the same three reef locations on the Cairns outer reef. Common influencing factors at these three sites are as follows:

- a Open water training dives are conducted in a maximum depth of 18 m, but all skills training is conducted between 8 and 12 m. Non-training and higher level certification dives are to maximum depth of 30 m (excluding deep dive training).
- b Visibility is normally 10 - 30 m.
- c All dives are conducted where current is less than half a knot.
- d Temperature variates between 22 and 29°C in Cairns.
- e All dives are conducted on the protected side of the reef where surface conditions are negligible even in reasonably adverse weather.
- f All moorings have been strategically located to minimise the need for prolonged swims to the dive site.
- g All equipment supplied is current model and undergoes a quarterly preventative maintenance program. 5 mm wetsuits are provided to all divers as part of their equipment.

### **Decompression illness**

We have broken down our reporting of incidents into a six and a five year period, 1983 to 1989 and 1990 onward. Our reason for this was that in 1990, our Company Code of Practice and operational procedures was revised in light of current industry knowledge and practice.

In the period 1983 to 1989, we recorded 21 incidents of decompression illness (DCI) requiring treatment at the chamber in Townsville, which in those

days was located at the Australian Institute of Marine Science (AIMS). Thirteen of these required evacuation, the remaining eight presented after completion of the trip and the vessel's return to Cairns, some time after their last dive.

Reports from the chamber indicated that, with few exceptions, these incidents were of a minor nature. Of the 21 cases, three were suffered by staff members, giving an incidence of three cases per 30,000 staff dives, or one per 10,000.

There were eighteen incidents in non-staff divers, giving a ratio of eighteen incidents in 276,000 dives or one per 15,300 dives.

In the period 1990 to date, we have had four cases of DCI, all requiring evacuation from Cairns. These were all non-staff injuries. In this period staff conducted 25,000 dives. It should be noted however, that our instructors were, until January 1993, doing as many as 50 ascents on any one three day trip and most of these were in rapid succession. After January 1993, the number has been reduced to a maximum of twenty ascents on any three day trip. These ascents are generally conducted in eight to ten m of water.

The four non-staff injuries were incurred during a total of 230,000 dives, giving a ratio of one per 57,500, an improvement of nearly 400%.

We can attribute this improvement in results to:

- 1 Strict adherence to "deepest dive first". This policy is enforced by a mandatory break of a minimum of 12 hours out of the water for any deviation from this basic policy.
- 2 A limiting of maximum depth for certified divers, unless under direct supervision or training, to 30 m.
- 3 Limiting alcohol intake and encouraging more rest. We actively discourage partying on board during trips.
- 4 We now calculate and check all dive profiles and ensure compliance with "no decompression" table limits on each dive.
- 5 Any accidental entry into decompression is penalised by a minimum of six hours out of the water, depending on the severity.

In summary, we feel that the improved basic safe diving principles we have introduced in the last five years have significantly improved our safety record.

While we are not qualified, and have no intention of trying, to draw medical conclusions from these limited statistics, we feel that it is vitally important to put these statistics forward as actual data for consideration and evaluation by this group.

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## A CASE FOR SAFETY

Phil Percival

### Australian regulatory structure

Australian offshore production operations are at present conducted in the States of Western Australia and Victoria, and in the Northern Territory. Those operations located within State waters are under State jurisdiction, whilst operations in Federal waters, generally beyond 3 nautical miles from land, are covered by Federal jurisdiction but controlled by the adjacent State authorities on behalf of the Federal Government. The effect of this arrangement is to provide uniform offshore petroleum legislation throughout Australia.

### Offshore facilities

Australia has a wide range of offshore production facilities which include Northern North Sea style platforms such as North Rankin A and Goodwyn A, smaller Southern Gasfields type platforms in the Bass Strait and floating production and storage vessels like those in the Timor Sea. There are also a variety of unmanned platforms and jack-up rigs serving as production platforms. As the development trends take us into deeper waters, new and cost effective methods of hydrocarbons recovery will be found. The use of concrete platforms has already been introduced in the Bass Strait, and is being examined in Western Australia. Large gas fields are awaiting favourable economic conditions for further development on the North West Shelf.

### Piper Alpha, a catalyst for change

The Piper Alpha offshore production platform disaster in the North Sea was a catalyst for a significant