

The problem is that not everyone is a good learner. In the medical field it is a bit different. All of medicos are very good learners. They are in the top academic stream and are very good at learning things.

However I must tell you, as someone who has been out in the field teaching diving for a few years, the lowest common denominator is actually pretty low. Many people learn much slower than doctors do, and it is more of a challenge for us to teach them. We cannot actually teach people, within any reasonable time frame, the whole range of skills. That is why they are split up into different courses. As Drew said, we used to try it in the past, and the way we did it was we cheated. We would take them and teach them to dive, but then we would not let them get away! But there was a difficulty. If we wanted to teach them other things, we had to keep them on the course until they were relaxed enough. So what did we do with them? We just dreamed up things. We taught them to take their gear off and throw it onto the bottom of the sea and dive down and pick it up again. We did not care what they did, they just had to do things in the water. Underwater chess and writing the great New Zealand novel, on waterproof paper, would have been fine! The worst part is that we believed that what we taught them in those days was useful! But that is a secret!

What we did learn from the courses that ran over weeks and weeks was that it not work very well, because when we looked at those people later, they were not all that well trained. Even worse we cannot market the damn thing. We are in the real world and we just cannot sell it any more.

### What is the result?

I do not think the result is very good at all, because there are two gaps. I believe every training agency faces the first and most important gap. Just like PADI, SSI has got a lovely range of courses which divers should go through to pick up their skills. We start off with the Open Water course, then there is some Advanced Training, and then on to the Stress Rescue course. Later on one does the DAN Medical Course.

But the point is, people don't do them! The actual retention into those other courses is extremely low. So the reality is, that despite all this fine rhetoric, what is happening is that the vast majority of trainees do the Open Water course and then go out into the world to dive. They do not have any of the skills taught in these subsequent courses, they do not think about getting them and they are never likely to. Most divers out there do not have first aid skills, they do not have rescue skills, they do not have an in depth understanding of decompression illness and they will never have them.

I think there is a gap, and I do not think it has been well served by any training agency. But I do not know how

to fill that gap either. We have tried to bring some of those skills in house, rather than out source them, and as a consequence we are perhaps able to channel people into those other courses. This does two things. One, it is good because they learn at the other courses and two, we are in the business of teaching, so it makes common sense.

The other gap, again from a philosophic standpoint, is that when an instructor is teaching, it is important that he or she has a level of knowledge about the subject that is a degree greater, and in my view a considerable degree greater, than the actual material that they are teaching. That gap is only just being sorted out. For some years now, instructors have learnt how to teach the course by doing it and their level of knowledge is just the same. They are like the Monty Python parrot. They cannot go further.

So I think the biggest challenge that we face is that divers are still going out without any substantial rescue or oxygen administration or first aid skills, despite all the things we have put in place. It is just not happening.

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### DAN S.E. ASIA-PACIFIC OXYGEN PROVIDER PROGRAMS

John Lippmann

### Key Words

Accidents, equipment, first aid, oxygen, training.

### DAN SEAP structure and aims

The Divers Alert Network (DAN) is a not-for-profit organisation which was formed in 1981 in the United States to assist in the treatment of scuba diving accidents by providing a 24-hour emergency hotline.

To help fund its hotline, DAN established a membership program, initially providing subscribers with a diving accident manual and a regular newsletter, *Alert Diver*, dealing with various issues of diving safety.

As DAN grew, it expanded its operations to provide a free evacuation service for members and diving injury

treatment insurance as well as a variety of other services, including a highly effective and successful oxygen first aid training program designed specifically for divers but also applicable to general first aid. Another important function of the Network is collecting and analysing data on diving accidents and fatalities to improve the understanding of the causes of accidents, improve preventative measures and to develop better treatment methods.

DAN organisations have now been established in several countries. DAN Europe and DAN Japan have been operational for some years and provide similar services to DAN America. DAN S.E. Asia-Pacific (SEAP) was established in 1994, and provides services to countries in the S.E. Asian and Pacific Region. DAN Southern Africa is to commence operations later in 1997.

DAN SEAP is incorporated as a non-profit diving safety association based in Melbourne, Australia. Its aims include:

- 1 improving diver safety through education,
- 2 improving the availability of oxygen at dive sites,
- 3 providing evacuation and insurance services for injured divers,
- 4 supporting regional diving emergency hotlines,
- 5 supporting diving safety research, and
- 6 accident data collection and presentation.

DAN SEAP provides membership services to divers in Australia, New Zealand, S-E. Asia and some Western Pacific Islands. Membership includes:

- 1 subscription to *Alert Diver*,
- 2 a copy of *The DAN SEAP Diving First Aid Manual*,
- 3 cover for the costs of evacuation to a treatment centre,
- 4 access to dive injury treatment insurance,
- 5 access to and discounts on DAN products including oxygen equipment.

As a non-profit company DAN SEAP is subject to an independent annual financial audit. Excess revenue is directed towards improving diving safety within the Region. For example, DAN SEAP provides full funding for the DES Australia hotline and has begun to provide some support to other regional hotlines.

DAN SEAP has recently established a National Office, known as DAN SEAP-Philippines, at the Makati Hospital, Manila. It appears that a New Zealand National Office may be established at the RNZN Hospital in 1997. It is planning to establish National Offices in various other countries within the Region to better serve members in those countries.

Current membership is approximately 3,500 and, after a relatively slow start, DAN SEAP is beginning to enjoy a more rapid growth rate.

## Oxygen equipment for divers

An oxygen demand valve is usually the simplest system to use with a breathing casualty. A pocket-style mask with oxygen inlet is the easiest method for ventilating a non-breathing casualty. *These techniques require far less initial training and continued practice than other methods and can be done effectively by one trained person.*

Bag-valve-mask devices (BVMs), manually triggered ventilators (MTVs) and closed circuit oxygen resuscitators (CCRs) all require considerably more initial training and continued practice to achieve and maintain proficiency. In addition, it often requires two trained operators to effectively ventilate a non-breathing casualty with these devices in the field.<sup>1,2</sup> So, even though such devices are capable of delivering higher oxygen concentrations for resuscitation (an inspired oxygen percentage of up to 100% with MTVs compared with approximately 50% with a pocket-style mask with supplemental oxygen inflow of 14 l/min), in practice they may often be less effective because of the greater skill and manpower required.

## DAN Oxygen Units

Although there is a variety of oxygen systems available, many of the units are unsuitable for use by the general diving community. Some units require too much on-going training and practice, others don't provide sufficiently high inspired oxygen concentrations. To remedy this situation, DAN America assembled an oxygen unit, known as the DAN Oxygen Unit, designed specifically to cater to divers' requirements. Various configurations and modifications to this original unit are now available through DAN SEAP.

A DAN Oxygen Unit is not only effective, but also easy to use and so requires minimal training. It consists of a multi-function regulator with at least one high flow outlet; a variable flow outlet providing flow rates up to 25 l/min; a demand valve, hose and tight-sealing mask; a Pocket Mask with oxygen inlet; a non-rebreather mask and a waterproof case.

Adaptors are available to enable a pin-index regulator to be fitted to oxygen cylinders with various types of threaded fittings. These oxygen units are easy to assemble, easy to use, effective and durable.

## DAN oxygen programs

In the increasingly litigious environment in which we live, there is now more pressure than ever for diving instructors and dive charter operators to ensure that *appropriate* oxygen equipment and properly trained and

qualified oxygen providers are available where diving is conducted. In fact, all divers are strongly advised to undergo training in resuscitation and oxygen provision. The skills developed are extremely valuable, not only in the diving environment, but in all walks of life.

Oxygen provider training is available through several first aid training agencies. However, most of these courses are not diver-oriented and many have not been reviewed and aligned to current experience, recommendations and protocols. Some years ago, DAN America developed a 4-hour Oxygen Provider program to provide divers with appropriate training to use a DAN Oxygen Unit or similar equipment.

The DAN Oxygen Provider Course has become the fastest growing and generally the most highly regarded oxygen program for divers, worldwide. DAN America had itself certified 9,419 Oxygen Providers to 1995.<sup>4</sup> This has led to an increase in the provision of oxygen as first aid in diving accidents. In 1995, oxygen was provided in 32% (190/354) of the diving accidents reported to DAN America.<sup>4</sup>

### **DAN SEAP Oxygen Provider Course**

DAN SEAP has adapted the DAN America program to better conform to the Australian Resuscitation Council (ARC) protocols, to suit the needs of this Region. First aid protocols vary from place to place, as does equipment and standards of training. DAN SEAP has worked hard to address these issues and has made several modifications to the DAN America program.

The DAN SEAP program is suitable for divers of all levels, from novice to instructor. It consists of a 4-hour Oxygen Provider Module, supported by an additional Resuscitation Module, where required, and several Extension Modules for divers who require further training.

Most injured divers are breathing and require supplemental oxygen.<sup>4,5</sup> The Oxygen Provider Module is designed to teach the skills needed to perform this task safely and effectively. Topics covered include:

- diving accident recognition
- the benefits of oxygen provision
- when to provide oxygen
- review of various types of oxygen equipment
- precautions and safety procedures
- the DAN Oxygen Unit
- oxygen provision to both conscious and unconscious casualties
- oxygen supplemented expired air resuscitation
- dealing with a diving accident
- assessment

Participants are certified in the use of the DAN

Oxygen Unit, or an equivalent system. Certification is valid for one year in Australia and New Zealand and two years elsewhere.

The Resuscitation Module is also a 4-hour program.

Topics include:

- recognition and management of the unconscious casualty
- expired air resuscitation
- cardiopulmonary resuscitation
- modifications for infants and children
- complications
- cross infection
- assessment

Given that the vast majority of diving accident victims are breathing and will benefit from oxygen provision and that only a small percentage require resuscitation (possibly 8 to 9%)<sup>4,5</sup> there is a strong argument for encouraging divers to learn oxygen provision before resuscitation. However, in Australia, the Resuscitation Module (or equivalent resuscitation training) is a pre-requisite for the Oxygen Provider Module to remain consistent with the ARC oxygen training protocols. In certain other countries the Oxygen Provider Module can be taught before resuscitation training.

### **DAN Oxygen Instructor Training**

DAN SEAP also provides instructor training to people, who have done the Oxygen Provider course, who wish to teach the DAN Oxygen Provider Program. DAN SEAP Instructors, who are generally qualified scuba diving instructors (or equivalent), have all participated in an extensive training program, usually under the close scrutiny of an experienced diving medical specialist.

DAN America or DAN Europe trained Oxygen Instructors have participated in a one-day Oxygen Instructor Training program in addition to their initial Oxygen Course. However, before June 1996, DAN Oxygen Instructors trained in Australia and New Zealand (under DAN SEAP) had participated in a two-day Instructor Program. One part of the DAN SEAP program consisted of physiology, resuscitation and diving medicine and the other concentrated on oxygen equipment and its administration. These programs have been very successful and participants have generally found them challenging and enlightening. However, it has often been difficult to schedule the programs to suit the requirement to have both an Instructor-Trainer and an approved Medical Specialist available. In addition, it has been difficult to accommodate Instructors who have obtained DAN qualifications in one region and then travel to work in another.

DAN SEAP has now rearranged the components of

the two-day course into two separate one-day modules:

#### *Instructor Module 1*

This includes all of the components necessary to enable the successful participant to teach the 4-hour DAN Oxygen Provider Module. It is compatible with the DAN America and DAN Europe Oxygen Instructor Courses and is presented by a DAN SEAP Instructor-Trainer.

Topics covered include DAN Mission and overview; revision of physiology and anatomy; management of the unconscious casualty; EAR; recognition of a diving injury; benefits of oxygen provision; handling and storage of oxygen; oxygen delivery systems; teaching the use of the DAN Oxygen Unit; cross infection and cleaning; legal issues; and course preparation, standards and procedures.

A person who successfully completes Instructor Module 1 becomes a Level 1 DAN Oxygen Instructor. As previously mentioned, a Level 1 Instructor can conduct the DAN Oxygen Provider Module but cannot teach the DAN Resuscitation Module.

#### *Instructor Module 2 - Resuscitation and Diving Medicine.*

This module, which is presented by both a DAN SEAP Instructor-Trainer and a Diving Medical Specialist (often with anaesthetics experience), includes advanced physiology, resuscitation theory and practice, injury recognition and management for diving and certain non-diving illnesses, hands-on practice with a variety of oxygen delivery systems and accident management scenarios.

A person who successfully completes both Instructor Modules becomes a Level 2 DAN Oxygen Instructor. A Level 2 Instructor is sanctioned to teach both the Oxygen Provider and Resuscitation Modules to the diving community, and beyond. In other words, they are a DAN Oxygen Instructor as well as a DAN CPR Instructor.

A Level 1 Instructor can upgrade to become a Level 2 Instructor by attending an Instructor Module 2.

DAN SEAP also conducts DAN Oxygen Instructor-Trainer Programs to prepare people to train DAN Oxygen Instructors.

Although DAN SEAP believes that DAN-style units fulfil the needs of most dive professionals, it has developed Extension Modules to train people in the use of more advanced oxygen equipment for those who have a specific need or desire for such training. Extension Modules include MTV- 100, Bag-Valve-Mask and Closed Circuit Oxygen Resuscitator training.

By attending an appropriate extension program, which vary from 4-6 hours in length (in addition to the initial provider training), Oxygen Providers can, if desired,

gain an endorsement to use such devices. The programs concur with recent Australian Resuscitation Council guidelines for such training.<sup>6</sup>

To date, DAN SEAP has certified around 1,700 Oxygen Providers, 320 Oxygen Instructors and 30 Instructor-Trainers (15 trained under DAN SEAP, 15 US trained) within this region.

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#### **Update**

The above was current at the time of presentation at the SPUMS Annual Scientific Meeting in Waitangi, New Zealand (April 1997).

At the end of April 1998 DAN SEAP membership had increased to approximately 4,200 and DAN SEAP has trained just over 500 oxygen instructors and almost 3,000 oxygen providers. In addition the DAN SEAP New Zealand office has been established at the Royal New Zealand Navy Hospital under the directorship of Dr Simon Mitchell.

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