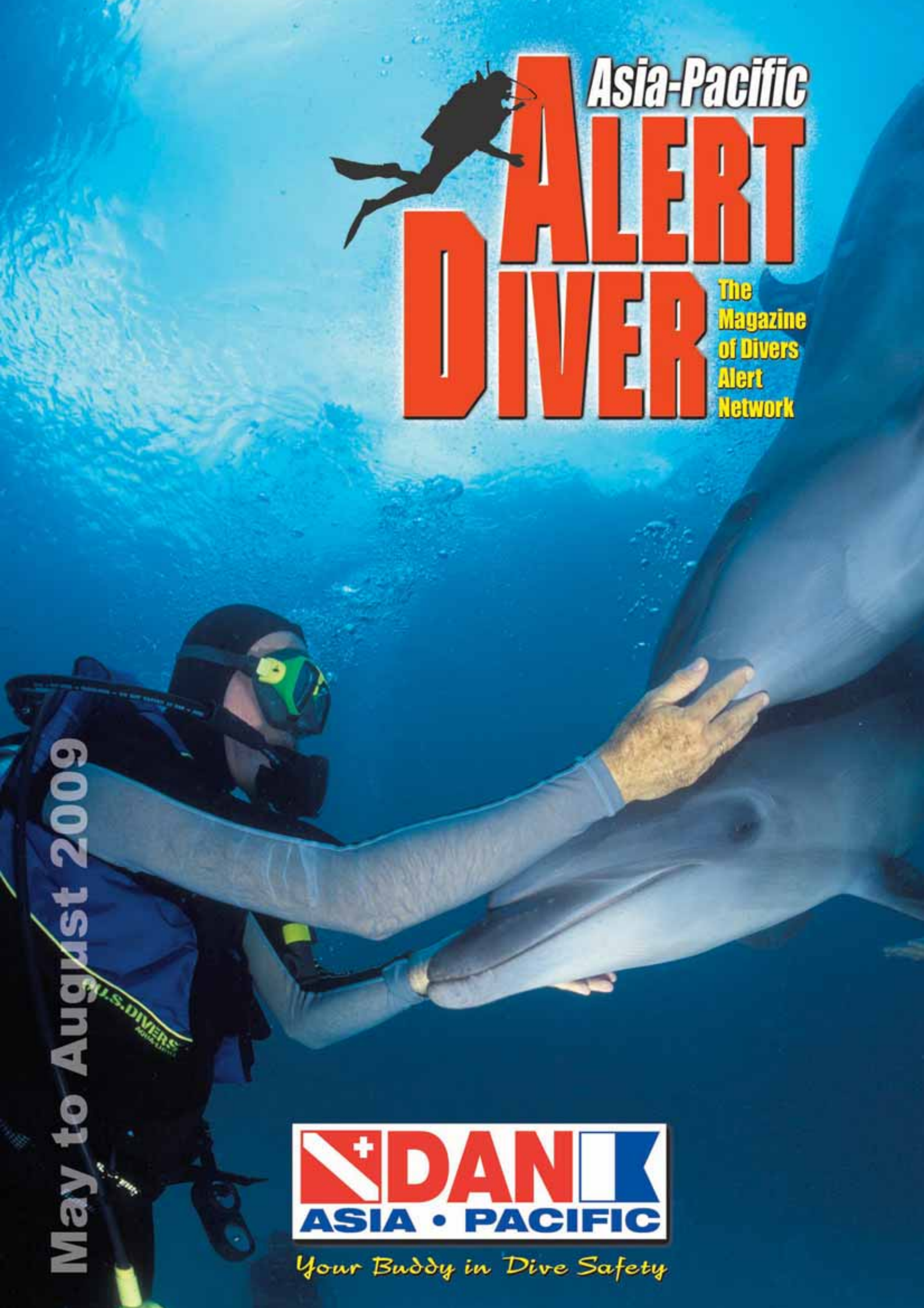


Asia-Pacific ALERT DIVER

The Magazine of Divers Alert Network

May to August 2009

DAN ASIA • PACIFIC

Your Buddy in Dive Safety

Director To You

from John Lippmann OAM

Busy with Decompression Illness.

Welcome to our first electronic edition of *Alert Diver Asia-Pacific*. We hope that you enjoy this format. At this point in time we are not planning to produce all issues electronically but are seeking feedback from members of your preference. In these harder economic times, an electronic magazine is cheaper to produce and it is also more environmentally friendly. We are trying to avoid or minimise an increase in membership fees and this is one way that this can be achieved. Both DAN Europe and DAN America have embraced electronic magazines and these appear to have been well-received by their members.

Over the past few months, DAN AP has been dealing with quite a few cases of decompression illness (DCI) in members. These have occurred in a variety of places, including Vanuatu, Indonesia, Thailand, Solomon Islands, Brunei, Malaysia, Truk and Australia, among others. Some of these cases have been mild, but others have been potentially very serious. Fortunately most of the divers involved have made reasonable recoveries. Following is a brief summary of six of these incidents, and is provided to give you a brief insight into some of the situations DAN deals with.

Case 1

This involved a dive instructor who noticed some sharp back pain while decompressing from a 50m dive. Soon afterwards, his legs became weak and later he was unable to urinate. After some delays he was evacuated and received five recompressions, and although he was then able to walk with assistance, he was still unable to urinate. He required extensive physiotherapy and rehab-ilitation and is slowly recovering. This diver had conducted the same dive without problems on many occasions but later recalled that he had a bad infection several days before and been feeling unwell prior to the dive, a factor that may well have contributed.

Cases 2 and 3

These separate incidents involved divers who were diving a deep wreck in another remote location. Both of these divers were diving to around 55m on air and had been doing repetitive dives over several days. One diver reported some post-dive symptoms to an instructor friend, who checked him and reported that he did not have DCI! On this basis, he continued to dive and, unsurprisingly, symptoms developed substantially. Oxygen was only provided several days later and, at that time, DAN was called. The diver flew home, received quite of number of treatments and is recovering slowly. The other diver refused assistance and was reportedly in a lot of pain during the flight home.

Cases 4 and 5

These separate incidents both involved inner ear decompression illness, which is potentially very serious, again occurring in a location remote from high-level care.

The first diver became very dizzy and nauseated immediately after a 70m dive on a rebreather. He had no problems during the dive and had done more decompression than indicated by the algorithm he was using. He was unable to be evacuated immediately due to impending darkness and was successfully managed on high concentration oxygen throughout the night. He was transported to the nearest chamber and, although he received several treatments, there were some residual balance problems.

The other diver became very dizzy and nauseated after two dives to just over 30m, with a three-hour surface interval. He had no problems at all during the dive and did a few minutes more decompression than indicated by his dive computer. Although an experienced instructor with a history of 4000 dives, he presumed he had a stomach virus and did not call DAN or begin breathing oxygen until the next day. Fortunately he was evacuated and responded to treatment better than was expected.

Case 6

This divemaster ascended quickly from 30m while trying to restrain a panicking student. He developed tingling in his forearms shortly after diving, which soon progressed to tingling and numbness in both hands and feet and altered sensations around his torso. He did not call DAN and instead went to a small island clinic where he spent the night on intermitent low concentration oxygen. He was eventually taken to a chamber the next day and DAN was called. He underwent two treatments and had no response and was discharged with the same symtoms.

What can we learn from these cases?

- **Use dive computers conservatively.**

All of these divers reported having dived well within the limits of their dive computers or decompression algorithm and suffered DCI despite this. Don't be lulled into believing that these diving aids are reliable - they are not, and need to be used very conservatively to minimise the likelihood of DCI.

- **The risk of DCI increases with increasing depth.**

All of these divers had been diving to 30m or more. Dive accident data shows that the likelihood of suffering from DCI increases with depth, with some indications that this increase occurs beyond about 24m. Decompression algorithms become less reliable with increasing depths (and also with increasing numbers of repetitive dives).

- **Call a DAN-supported hotline as soon as possible.**

If you have symptoms after a dive, call a DAN hotline as soon as possible to give us the greatest opportunity to help you. The sooner DAN is notified, the sooner diving medical advice can be given and appropriate action taken.

Do not rely on a divemaster or instructor to decide whether or not symptoms are DCI. They do not have enough training or experience to make this decision. Even diving medical specialists sometimes have difficulty in making this decision.

- **Breathe near 100% oxygen as soon as possible and continue until told to cease by a dive medical specialist.**

Breathing high concentration oxygen helps to reduce the size of bubbles in the diver's blood and body tissues, and to eliminate excess nitrogen from the body much faster than while breathing air. It also helps to provide oxygen to body tissues that are suffering from a shortage of oxygen and so reduces the likelihood, or extent, of damage to these tissues.

The higher the oxygen concentration and the sooner it is provided, the better this effect. It is also important to continue oxygen breathing for an extended period, often 4 to 5 hours or more, to flush as much inert gas from the body as possible.

- **Don't dive if you are feeling unwell.**

If you are unwell, your immune response will be heightened and your body may react more aggressively to the presence of nitrogen bubbles, so increasing the likelihood or severity of symptoms of decompression illness.

A good understanding of the factors that increase the risk and the effects of decompression illness is an important part of enjoying our magnificant recreational activity in safety. I hope that these insights will be helpful.

Safe diving,

DAN Training ... Not Just For Divers!

DAN is a world leader in the provision of accident management training for the diving community, home and workplace.

First Aid *
Training provided at Basic, Senior, Workplace, and Occupational levels.

Oxygen First Aid *
Basic to advanced training in the administration of oxygen.

Cardiopulmonary Resuscitation *
Basic life support techniques to manage an unconscious victim.

Automated External Defibrillators (AEDs) *
Recognise the warning signs of Sudden Cardiac Arrest and administer first aid using Basic Life Support techniques and AED's.

On-Site Neurological Assessment
Assess neurological signs and symptoms of decompression illness and certain other injuries in the field. *This course is not Nationally Recognised.*

First Aid for Hazardous Marine Life Injuries
Identify hazardous marine life, recognise possible injuries and administer first aid for those injuries. *This course is not Nationally Recognised.*

** Courses Nationally Recognised in Australia*

For more information visit www.danasiapacific.org, Email: training@danasiapacific.org or Call: +61-3-9886 9166

Emergencies Happen ... Are You Prepared?

SPECIAL BUNDLE SUBSCRIPTION

GET MORE FOR LESS!

☑ **Yes,** I would like to subscribe to one of the following options:

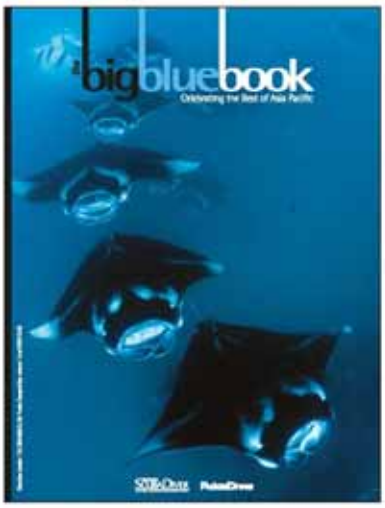
❑ Option 1:	❑ 1 year	❑ 2 year
❑ Option 2:	❑ 1 year	❑ 2 year
❑ Option 3:	❑ 1 year	❑ 2 year
❑ Option 4:	❑ 1 year	❑ 2 year
❑ Option 5:	❑ 1 year	❑ 2 year

Yours Free!

Subscribe to any bundle (options 3-5) and get "The Big Blue Book" (worth US$10)!*

The Big Blue Book
Annual Publication for *Scuba Diver AustralAsia* and *Asian Diver*

Collector's Edition ▸



*while stocks last

YOUR DETAILS

Name/Gift for/Renew (Mr/Mrs/Ms/Miss)

Address

Email:

Contact No: Date of Birth: / /
(For verification purpose)

PAYMENT

☐ My Cheque/Bank Draft for S$ _____ is enclosed, payable to **Asian Geographic Magazines Pte Ltd** *Only S$ cheques are accepted*

Charge my: ☐ VISA ☐ MASTER ☐ AMEX

Credit card payments will be processed in S$

Expiry Date: Signature:

Membership in the PADI Diving Society is the perfect complement to your lifetime certification card.

Option 1 - 1 year AD (6 issues) **/ 2 year AD** (12 issues)		**Option 2 - 1 year SDAA** (6 issues) **/ 2 year SDAA** (12 issues)		
	Singapore and Malaysia	Aust/NZ/South Pacific	Other parts of Asia	Outside Asia
1-year Subscription	SG$45	AU$50	US$45	US$50
2-year Subscription	SG$75	AU$90	US$75	US$80
Option 3 - 1 year AD (6 issues) **+ AGP** (6 issues) **/ 2 year AD** (12 issues) **+ AGP** (12 issues) **Option 4 - 1 year SDAA** (6 issues) **+ AGP** (6 issues) **/ 2 year SDAA** (12 issues) **+ AGP** (12 issues)				
	Singapore and Malaysia	Aust/NZ/South Pacific	Other parts of Asia	Outside Asia
1-year Subscription	SG$65	AU$75	US$65	US$85
2-year Subscription	SG$115	AU$135	US$115	US$135
Option 5 - 1 year AD (6 issues) **+ SDAA** (6 issues) **+ AGP** (6 issues) **/ 2 year AD** (12 issues) **+SDAA** (12 issues) **+ AGP** (12 issues)				
	Singapore and Malaysia	Aust/NZ/South Pacific	Other parts of Asia	Outside Asia
1-year Subscription	SG$100	AU$110	US$100	US$120
2-year Subscription	SG$175	AU$195	US$165	US$195

AD = *Asian Diver* | **SDAA** = *Scuba Diver AustralAsia* | **AGP** = *Asian Geographic PASSPORT*

***Asian Diver* is not affiliated with any dive agencies.**

Terms & Conditions: All promotions are valid for a limited period only or while stocks last. Please allow 3-4 weeks for your order to be processed. An acknowledgement letter will be sent to you either by post or email. Subscribers will receive magazines 2-3 days after newsstand release. All subscriptions are nonrefundable upon receipt. No official receipt will be issued for payment by cheque/credit card. You will be notified by email if you have won a prize. Payment by cheque and/or bank draft should be made payable to "Asian Geographic Magazines Pte Ltd"; only Singapore (S$) cheques are accepted. All credit card payments will be processed in Singapore Dollars (S$). For enquiries, please call our customer service at Tel: (+65) 6298 3241 or Fax: (+65) 6291 2068, or email **sub@AsianGeo.com**

Send this form to: ASIAN GEOGRAPHIC MAGAZINES PTE LTD. **Singapore Address:** No.1 Syed Alwi Road #06-01, Song Lin Building, Singapore 207628. **USA Address:** PO Box 7758, Menlo Park, CA 94026-7758. Or fax it to **+(65) 6291 2068.** Or visit ScubaDiverAA.com to join online today!

DAN ASIA · PACIFIC

Alert Diver

Asia-Pacific Edition

May - August 2009

Editor
John Lippmann
Layout and Artwork
John Lippmann
DAN AP Board of Directors
John Lippmann OAM , Chairman
David Natoli
Dr. David Pescod
Mick Jackson
Dr. Mark Lipzker
Dr. John Finkelstein
Dr. Ben Luna
Malcolm Hill
Dan Orr
Dr. Andrew Fock
Stan Bugg
DAN AP Administrative Staff
John Lippmann OAM - Executive Director & Dir. of Training
Scott Jamieson - Co-ordinator - Instructor Certifications & Sales
Tegan Bert & Heidi Powell - Memberships & Certifications
Julie Parsonson - Certifications; Melissa Cefai - Marketing
David Natoli - Training; John Houston - Research
Michael Lippmann - Office Assistant
Patricia Kersey - Accounts

Alert Diver's Philosophy

Alert Diver is a forum for ideas and information relative to diving safety, education and practice. Any material relating to diving safety or diving medicine or accident management is considered for publication. Ideas, comments and support are encouraged and appreciated.

The views expressed by contributors are not necessarily those advocated by DAN AP. DAN is a neutral public service organisation which attempts to interact with all diving-related organisations or persons with equal deference.

Alert Diver is published for the use of the diving public and it is not a medical journal. The use and dosage of any medication by a diver should be under the supervision of his or her physician.

© Alert Diver's text, illustrations or photographs may not be reproduced or reprinted without the expressed consent of Divers Alert Network and its authors, artists and photographers. Many articles are reprinted with the kind permission of DAN America.

Australia Post Print Post Registration PP32887410022.

Alert Diver, Asia-Pacific Edition is a quarterly publication of
The Divers Alert Network (DAN) Asia-Pacific Limited
ACN 066 827 129,PO Box 384 (49A Karnak Rd)
Ashburton, Victoria, 3147, Australia.
Tel: +61-3-9886 9166; Fax: +61-3-9886 9155
Email: info@danasiapacific.org
For information on membership, insurances & training programs, visit our Website.

www.danasiapacific.org

Contents

Front Cover
Photo Scott Tuason,
design by
David Bryant, *Sea Pics*.

Diving Safety - Whose Responsibility?

An examination of legal investigations into diving deaths

This article was originally written over 10 years ago but its message is still highly relevant today. It has been revised and incuded here to provoke thought on this important issue.

For many years, and in many countries, professionals and providers of services, whether they be doctors, dentists, travel agents or plumbers, have been sued over dissatisfaction with services provided. Scuba diving instructors and suppliers of diving equipment and tours are also subjected to such damages claims. Often when there is a mishap resulting in injury or death, or loss, a search for someone to blame begins.

An obvious target for blame, rightly or wrongly, is the provider of instruction, equipment, or a service. If the provider is believed to be insured, there may be a far greater incentive to pursue a claim. In the hands of an industrious and aggressive lawyer, a painstaking scrutiny of the available evidence can result in at least an arguable case against the service provider. The person claiming to have been injured, or the family of someone killed will often have the psychological advantage of sympathy in any court proceeding.

Whilst the provider being sued may have been at fault, what is often lost sight of is that the "victim" may have also contributed to, or even caused the mishap. However, if there is an available target against whom a claim may be made, it is increasingly likely that litigation will follow.

David Bryant Photo

BY JOHN LIPPMANN AND TOM WODAK

The purpose of this article is not to suggest that legitimate claims should not be made. Nor is it suggested that providers of services should not do so mindful of their moral and legal responsibiity. Rather, the emphasis is on the need for everyone concerned, whether the consumer or the provider, to acknowledge that each has a duty to safeguard property, life and limb.

There seems to be a growing trend to overlook that genuine accidents do happen and mishaps do sometimes occur without anyone being at fault or negligent. Sometimes the cause of the incident is obvious and the person(s) responsible are easily identifiable. In the quest to identify someone to blame, the conduct of every participant, including the consumer should be examined.

What follows is an analysis of two diving incidents, each of which has resulted in consideration of the facts by a legal tribunal.

The first case involved a coronial inquest and, subsequently, a civil claim for damages. The second case, at the time of writing, led to a coroner's inquest.

The first incident

This case concerned a diver who died in a diving accident some time ago. The diver's widow claimed damages against the dive school which trained her husband and which gave the diver the name of a person he could contact about diving in another State shortly after his training. She also sued the interstate diving operator who provided some equipment for the diver, and who booked him to go on the particular dive on its dive boat.

The diver had completed an Open Water Course (OWC), followed immediately by an Advanced Open Water Course (AOWC). During these courses, the diver was taught a certain amount about the hazards of deeper diving, including nitrogen narcosis, exhaustion of air supply, buoyancy control, ascent rates and other things.

Before commencing what was to be the fatal dive, the diver had completed a total of nine dives. Seven of these dives were to depths shallower than 6 metres, one was to around 10 metres, and one dive was to 24 metres. All dives were training dives, with other students, under the direct supervision of an instructor.

The diver was enthusiastic, intelligent (having several tertiary qualifications) and a high achiever. He had little trouble with the practical and theory components of training and gained certification at each level.

One month later, having done no further dives, the diver decided to dive interstate. He used the contact he had been given by his instructor, and booked a dive to a wreck lying in temperate sea waters at a depth of 43 metres. At the trial, evidence was given that although both the diver and his buddy held very recently issued (temporary) qualification cards, they were asked very little, if anything, about their diving experience, prior to being booked onto this dive. The diver's buddy was a friend who had participated in the same courses, but who had also completed one further dive, for a total of ten.

The two inexperienced divers were buddied together. Since they were the last divers to enter the water, they were given the task of freeing the anchor at the end of the dive.

What went wrong during the dive remains largely speculative. However the diver was later found, in 45 metres depth. His buddy had made a very rapid ascent as he was low on air and was evacuated to hospital and treated for decompression illness.

Both divers were much too inexperienced to undertake such a dive. How could they have contemplated undertaking the dive? How could the dive operator have agreed to take them for the dive? Who, if anyone, was at fault?

The court did not answer these questions. On the eleventh day of hearing of the civil damages claim, the parties resolved the dispute, without requiring a decision of the court. Because the agreement made by all of the parties was confidential, its terms are, and will remain unknown.

What is clear is that the parties were all involved in expensive litigation for a considerable period of time. The cost of that to each of the parties was likely to be substantial. In addition to the actual costs, each party contributed much time to preparation, and in attending court. It is likely that each party endured considerable mental strain as a result of involvement in this process.

The second incident

This case involved an off-duty policeman who commenced a shore dive in circumstances which seemed reasonable for an inexperienced recreational diver. The dive was on reef at a depth of about 4-5 metres. During the dive, the buddy observed that the victim was breathing normally,

displaying good buoyancy control and that he was apparently relaxed.

After about half an hour, the buddy signalled to the victim to reverse direction. The signal was acknowledged and the return trip commenced. After a few minutes, the victim stopped suddenly, looked at his gauges and gave an ascent signal, to which the buddy responded. The victim then ascended rapidly from about 5 metres. When the buddy surfaced, he observed that the victim seemed calm and was checking his compass bearings. It was not known whether he inflated his BCD. The divers were about one to 1.5 metres apart on the surface and about 100 metres off shore. Waves were then about one metre high. There was no conversation. The buddy gave a descend signal which the victim acknowledged. The buddy descended. On the bottom he was unable to see his companion. He ascended, and then descended again before finally ascending without locating the victim.

Because of the waves, surface visibility was limited. After about 30 seconds, the buddy heard a distressed howling sound and saw a group of divers on the shore looking in his direction. The buddy heard a short, muffled cry, but saw no-one and yelled out not to panic and to inflate the BCD and ditch the weight belt.

Divers on the shore came to assist and the buddy left the water. A proper and systematic search was instituted. The victim's mask and snorkel were found on the sandy bottom in about 6.5 metres depth and approximately 150 metres off shore. The next morning the victim's body was found, lying on his back with nothing near or attached to him preventing ascent. Subsequent examination of his diving equipment revealed no sign of failure or malfunction that could have caused or contributed to the mishap. Death was deemed to have been caused by "immersion in association with asthma".

The victim was aged in his mid 30's, had been a good all round sportsman and was very conscious of retaining fitness. Since the age of 15 he had experienced bouts of asthma. He was considered to be cool-headed and methodical and had a background of army, flying and police training and experience. He had gained his OWC less than two months earlier. His buddy had 15 years diving experience and held several advanced diving qualifications.

Eric Chan Photo

Prior to commencing his OWC, the victim underwent a diving medical examination by a doctor selected by him and known to him to be a scuba diver. It was not his regular doctor. The victim completed a "Student Medical Statement", circling "asthma". When questioned by the doctor, he stated that he had suffered from it when younger, but that it was no longer a problem. The doctor discussed with the victim the danger of asthma and diving and physically examined him. The examination was normal. Lung function testing and a chest X-ray were performed. These revealed excellent respiratory function, no evidence of air-trapping and showed the lungs to be clear. The doctor concluded that the victim no longer had significant asthma and passed him as being fit to dive.

The victim completed an OWC, which included instruction in surface problem management, including anxiety, inflation of BCD and weight belt ditching. However, at the inquest, the Coroner found that he had failed to follow the BCD inflation and weight belt ditching procedure immediately prior to his death. The Coroner was satisfied that the training and certification of the victim was appropriate, as was the content of the course. He found that the victim was an asthmatic at the time of his death, and that had this been known to the doctor who examined him, a certificate of fitness to dive may not have been issued.

As part of his investigation, the Coroner considered whether the victim had contributed to the cause of his death. This required an

investigation of whether the victim knew that he was a current asthmatic. The evidence before the Coroner disclosed that whilst travelling to the dive site on the day of the fatal dive, the victim had used a Ventolin Nebuliser intermittently for about 10 to 15 minutes. (Ventolin is a broncodilator prescribed for, and used by, asthmatics to open the small airways in their lungs after constriction from an asthma attack). The victim had also taken pseudoephidrine, a decongestant containing a heart stimulant, before diving that day. At that time, this was a fairly common practice to reduce decongestion before a dive. A Ventolin nebuliser was found in the victim's BCD pocket.

In the 14 months prior to his diving medical examination, the victim had attended a medical clinic on four occasions, obtaining prescriptions for Ventolin and another asthma medication. However, none of this was known to the doctor who passed the victim fit to dive at the time of his examination of the victim. When informed about these matters at the inquest, the doctor stated that this level of medication was consistent with severe asthma and that had he been aware of it, he would not have certified the victim fit to dive.

The victim's medical history, and the finding of the Ventolin inhaler in his BCD pocket led the Coroner to conclude that the victim knew that he was currently an asthmatic. However, the Coroner was unable to determine whether the victim deliberately misled the doctor. Although the victim was a smoker at the time of his diving medical examination, on his Student Medical Statement he declared that he was not. The Coroner considered that this supported the view that he may have deliberately misled the doctor.

The Coroner found that in failing to fully and properly disclose his medical history and condition, and in diving with an awareness of the dangers confronting asthmatics when diving, the victim had contributed to the cause of his death. The Coroner also found that in the circumstances

the medical examination of the victim was appropriately conducted, and that it was reasonable for the doctor to certify him as fit to dive on the basis of the information available to him at that time.

Discussion

What can be distilled form these two cases, apart from the tragic fatal conclusions to what were intended to be enjoyable, recreational dives?

When considering the circumstances of the first incident, the questions which remain unanswered are: " How could they have contemplated undertaking the dive? How could the dive operator have agreed to take them for the dive? "

It is puzzling that two highly intelligent persons could be so unaware of the potential dangers of such a dive, and of their lack of training and experience and qualification to participate in the chosen dive. To try to answer these concerns, we have reviewed the course texts presented to the divers during each of the courses. The texts certainly provided some information and cautions about deeper diving. The course content included instruction that nitrogen narcosis can occur on dives deeper than about 30 metres, and can, to varying degrees, impair the ability of divers to function rationally and safely; that air is consumed more rapidly at depth and needs to be monitored more closely; that effective buoyancy control is important; that there are increased risks of decompression illness with deeper dives. During the AOWC, they would be trained and qualified to dive to depths of 30 metres but not deeper. The texts also explained and discussed techniques for buoyancy control.

Despite these warnings, and the considerable limitations of their training and experience and qualifications, one month later, the two divers were prepared to dive to 43 metres at a completely unfamiliar site. One could argue that the training let them down. It could be said, for instance, that the warnings and information given were simply not strongly enough emphasised, or sufficiently explained to make clear the real dangers involved. However, most novice divers do not attempt to stretch their newly acquired skills so far, so soon.

Several training agencies offer a course, the title of which includes the word "Advanced". Such courses are often available to divers very soon, if not immediately after completion of the OWC. Dive schools often encourage divers to participate in such courses as soon as possible. Although the extra training is valuable, the name of the course may give some inexperienced and vulnerable divers the illusion that they are far more skilled and knowledgable than they really are, despite the clear cautions and limitations that should be expressed during the "advanced" courses.

Deep diver courses are available for divers who plan to conduct deeper dives. Most such courses delve into the theoretical aspect of nitrogen

Divers, or those seeking to learn recreational scuba diving, must appreciate that they must disclose fully and frankly all that they know about their own health.

It is also important to realise that most doctors know relatively little about the physiological and medical demands of diving and how certain medical conditions are cotraindicated with diving. This is why, DAN encourages divers, where possible, to be assessed by doctors who have training in the assessment of fitness to dive.

narcosis, decompression illness, decompression planning and air consumption. The courses involve the participants performing deeper dives under direct instructor supervision. One potential benefit of these courses is for the participants to experience some of the physiological effects of diving to greater depth, such as narcosis, increased air consumption, buoyancy control problems and breathing denser air, under the watchful eye of the instructor.

Reading about nitrogen narcosis, and experiencing it are two very different situations. Most divers do not fully comprehend narcosis until they become disoriented at depth, concerned about air supply, and have tried to decide what to do about it! It is wise that such actual experience is first gained under supervision by an instructor appropriately trained to deal with these circumstances.

Unfortunately, in an increasingly commercial and litigious environment, many deep diver courses involve relatively few dives, so that a diver often has limited opportunity to carry out deeper dives and develop important skills, acclimatisation and experience under such close scrutiny.

The diving industry has moral and legal obligations in training divers, in supplying and sevicing equipment and selling dives and tours. The onus is heavy, especially as scuba diving is a recreational activity which exposes its participants to risks of serious injury or death. Perhaps less well understood and accepted, is the proposition that the consumer must exercise responsibility and care for his or her own safety as well. It is not enough merely to rely upon the diving industry when one may be risking one's life. The Coroner's findings in the second case illustrate the extent to which a diver is responsible for any unwanted and unexpected tragedy.

At times, it may not be easy to determine where the duty of care owed by the diving industry ends and where the diver's duty of care for his or her own safety commences.

All involved in the diving industry, whether retailers, manufacturers, suppliers, instructors and those who arrange dive travel and tours, must set, re-evaluate and adhere to standards to ensure the delivery of goods and services reasonably suited to the requirements of recreational scuba diving. This is an on-going process.

Safe diving practices require goodwill, frankness and co-operation between the dive industry provider on the one hand, and the consumer or diver on the other. Whilst the diving industry is, and must be, commercially motivated, that raises the difficult balancing exercise which must be performed. Recreational diving must, and can honestly be, promoted as an exciting and enjoyable pastime in order to encourage participation in it. At the same time, it is not an activity suitable for all. A person interested in diving should be made fully aware of the physical and mental requirements and health criteria which need to be satisfied, and of the potential dangers associated with scuba diving. During any training, students should be clearly informed of the nature and extent of the qualification sought and of the limitations associated with such qualification.

Divers, or those seeking to learn recreational scuba diving, must appreciate that they must disclose fully and frankly all that they know about their own health. It is then for the doctor conducting the medical examination and evaluation to assess the person's fitness to dive, or continue diving. To fail to reveal something concerning one's health may detract, in a critical way, from the doctor's ability to assess fitness for diving properly. It is for the doctor to decide whether information is of use, rather than the patient determining that the doctor does not need to know something of which the patient is aware.

It is also important to realise that most doctors know relatively little about the physiological and medical demands of diving and how certain medical conditions are cotraindicated with diving. This is why, DAN encourages

divers, where possible, to be assessed by doctors who have training in the assessment of fitness to dive.

During training, divers are educated to identify potential hazards of diving and are given certain tools to reduce and manage the associated risks. Although, in general, this has proven to be effective, the process is not perfect and agencies and individual instructors should constantly assess the effectiveness of their programmes and improve them, where necessary. This is especially so when with increased sophistication in diving technology, more reliance is placed on instruments, such as dive computers, and there is a risk that less reliance will be placed on ensuring a proper understanding by divers of critical factors such as depth and time of diving, and intervals between dives.

Divers must be willing to accept that diving is an adventure sport where the risks are real, and be prepared to accept responsibility for managing the usual risks. Thus, divers and their families must be prepared, to a reasonable extent, to acknowledge their share of responsibility for any unfortunate consequences of venturing underwater whether during or after training. On the other hand, if an accident has occurred as a result of clear negligence of a dive instructor or operator, then the instructor or operator should be prepared to take appropriate responsibility.

Dive charter operators and divemasters should question divers about their experience with respect to a particular planned dive and should refuse to allow a diver from participating in a dive if it is felt that he or she lacks adequate experience and appropriate supervision or an alternative (safer) dive plan is not available. On the other hand, divers must be open and frank in revealing relevant factors about their health or physical capabilities and diving training and experience. Any temptation to suppress relevant information, whether it be of diving experience or medically important matters, must be resisted and all relevant information given. In addition, divers should not be afraid to ask questions about a planned dive and refrain from diving if concerned about their ability to conduct it safely.

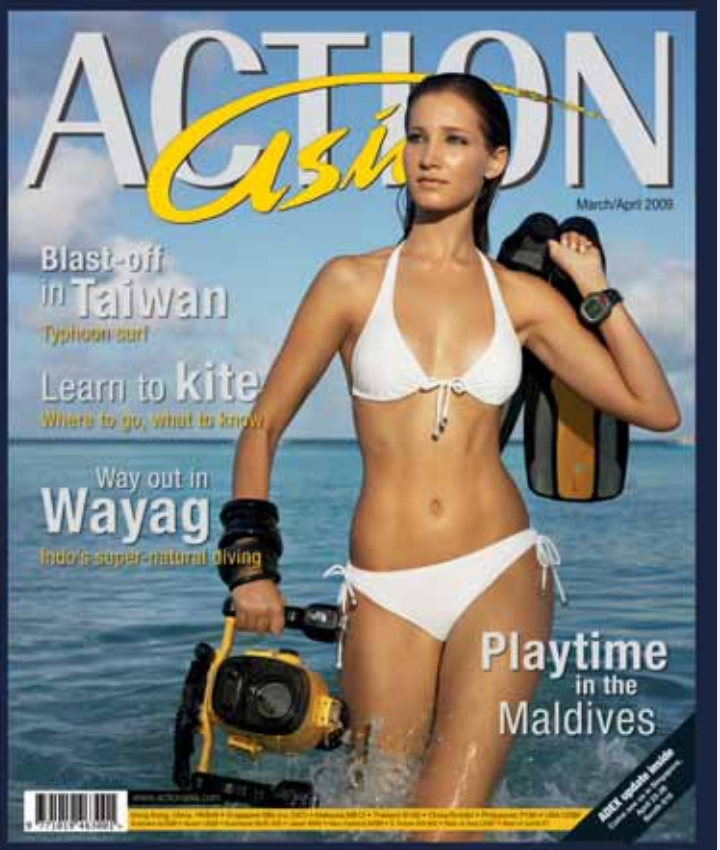
If all parties concerned work together conscientiously and honestly, diving can remain what it is and should be - an exhilarating recreational activity with a reasonably low incidence of serious mishaps.

About the Authors

John Lippmann is the Executive Director of DAN Asia-Pacific.

Tom Wodak is an ex-scuba instructor, previously a barrister specialising in medico-legal litigation who had appeared in litigation concerning diving accidents, and a recently retired Judge of the County Court of Victoria.

Immerse yourself in adventure



Subscribe NOW! Email sub@bluincmedia.com and get six action-packed issues a year plus our annual Action Diver supplement FREE with the July/August issue!

Medical Fitness for Diving: Is There Any Absolute Truth?

Fitness for diving is a dynamic health condition that is not well understood.

Bill Sandford Photo

Medical fitness to dive varies with each new day, sometimes for better and sometimes for worse. Dehydration, hang-overs, recent traumas or injuries and medications all have a significant effect on our fitness to dive, but few of us really understand this.

Unfortunately, once they are medically assessed or once they've checked all boxes as "No" on the Dive Medical Statement, some divers will consider themselves to be fit for diving from then on, as if they were resistant to aging and chronic diseases. Others may remain concerned about their current health and try to review their fitness to dive regularly.

DAN America receives on average 8,000 information calls and answers 3,500 emails a year from certified divers, dive students, family members and physicians. (Ed: Several thousand additional calls and emails are received by other DAN offices). Most are inquiries about fitness for diving. They might ask about diving while using a particular medication, possible effects of surgery, or a specific medical condition.

BY MATI'AS NOCHETTO, M.D.
DAN LATIN AMERICA MEDICAL COORDINATOR

In this article we will focus on questions about medications, which are some of the most commonly asked, and questions about asthma, diabetes and epilepsy, which are most challenging when it comes to satisfying the inquirers.

Compatibility of medications with diving is probably the most frequent question that comes through the DAN Medical Information Line. In some cases scientifically sound answers may be offered, but, unfortunately, evidence-based answers are rarely available.

Examples include drugs like topiramte, an anticonvulsant drug or the painkiller tramadol. Both act on the central nervous system and are used for a wide variety of conditions. Their uses in a dive setting have never been studied, but by understanding their effects, one could conclude they have potentially undesirable effects.

In these cases, only Expert's Opinions can be offered, with only the lowest level of scientific evidence.

Basic concerns with medicines are possible manifestations of known adverse drug effects while at depth and their interaction with the known effects of breathing gases (nitrogen narcosis, oxygen and carbon dioxide toxicity, cardiovascular effects, etc.). Some medication might pose a relatively small risk on a tropical, shallow, no-deco dive, but an unacceptable one on a deep dive on cold water.

Among those conditions that might interfere with our capacity to dive, asthma, diabetes and epilepsy are probably among the most asked about.

Diving with asthma

The main risk for divers with asthma is a lung overexpansion or arterial gas embolism due to possible air trapping.

Until 1995 asthma was considered an absolute contraindication for scuba diving. Even today there is no general consensus on asthma and recreational scuba diving, but most international dive medical associations consider it to be a relative contraindication that requires a case-by-case evaluation.

It is reasonable to consider asthma a relative contraindication since even if it is well controlled on the surface, the cold and dry air coming out of a scuba cylinder may trigger a sudden asthma attack. Due to increasing gas density with increasing depth, breathing resistance may exaggerate existing breathing problems.

So the question is this: Will divers with asthma be able to handle these conditions and new demands? Can anyone guarantee to these divers that they will not have a bronchospasm (a sudden narrowing of the bronchi that makes exhalation difficult and noisy) at depth? Many doctors simply don't want their patients to take this risk, but some others, unaware of these physiological changes while diving, simply ignore the risk and say: "You can dive, but just keep it shallow ..." as if greater depth was essential to provoke a lung overexpansion and consequently a pulmonary barotrauma and an arterial gas embolism. (Ed: this is an all-too-common fallacy and lung over-expansion injury can occur from ascent from as little as about 1.2 metres depth).

However, if the candidate has no symptoms and his asthma cannot be triggered by a medical test designed to provoke an asthma attack, he could be considered fit for diving, provided a specific test measuring his maximum expiratory flow shows less than 20 percent decrease when compared to normal.

Thus, in general terms, considering the history of his disease and the kind of diving he wants to practice, one might conclude his risk might be acceptable and that he could probably become a safe, certified diver.

Diving with diabetes

According to the American Diabetes Association, "There are 23.6 million children and adults in the United States (7.8 percent of the population) who have diabetes. While an estimated 17.9 million have been diagnosed with diabetes, unfortunately, 5.7 million people (or nearly one quarter) are unaware that they have the disease. It is estimated that 5-10 percent of Americans who are diagnosed with diabetes have type 1 diabetes." (Ed: A high incidence of diabetes is common in many other countries, both developed and developing).

The diver or the diving candidate must acknowledge and accept these potential risks. For someone's dive buddy and for the crew, it is equally important for a diver to provide an informed consent. These others need to accept and understand the risks and potential consequences.

While DAN has researched insulin-requiring diabetes and diving, the pathology that affects diabetics is well known. Diabetes is a prevalent pathology that unfortunately presents quite a misconception for divers. The word pathology comes from the Greek "pathos" (disease) and "logos" (study), and diabetes involves all sort of "-pathies" in medicine.

Diabetes mellitus is a gland-related disease (endocrinopathy), and a person wtih diabetes will sooner or later develop secondary health pathologies such as a disease of small blood vessels (micro-vasculopathy) and a disease of larger blood vessels (macro-vasculopathy), all sorts of neuropathies (nerve disease), kidney disease (nephropathy), disease of the bones and joints (osteopathies), eyes (ophthalmo-pathies), heart (cardiopathies), among others.

Some divers with the disease know how to adequately live with it; others believe they can just control their blood sugar levels and go diving, but they forget that managing blood sugar levels isn't the only factor to dive safely. All these -pathies play a major role in our ability and capacity to safely scuba dive as well.

Inadequate circulation constitutes another complication with diabetes. Larger blood vessels can be surgically addressed to increase circulation. However, smaller blood vessels can remain compromised. A stent (opening device) in a coronary artery might resolve a macro-vasculopathy, but it does not resolve a widely spread and well-settled micro-vasculopathy that occurs over many years. A stent might resolve someone's daily life demands, but will it be enough for diving, too? More people die while diving due to a related cardiovascular disease., that is more than any other cause.

Inadequate micro-circulation can also contribute to another condition, diabetic neuropathy, causing pain, loss of sensation and muscle strength. In the unlikely event decompression illness (DCI) would need to be ruled out, any pre-existing neuropathies would be a challenge to an examining physician as they could cloud the diagnosis. That's why the problem is not diabetes but the person with the disease. To what degree has diabetes affected the individual? Someone who wants to combine diabetes and diving should have a thorough medical assessment.

Diving with epilepsy

Epilepsy is perhaps one of the few worldwide diseases that most medical professionals agree is an absolute contraindication to safe diving. Some patients - and some doctors - still don't understand why someone with well-controlled epilepsy shouldn't dive. Arguments are emotional and often more concerned about the medication than they are about the condition. Such an argument might sound like this:

"My patient is perfectly well-controlled with his medicine, he is allowed to drive, and there is no reason for him not to have a normal life."

While that might be absolutely true in many cases, we first have to agree that diving is far from being a normal and everyday activity. It poses measurable physiological challenges and requires one to use life-support equipment. Though driving might be stressful, it does not significantly change your physiology, and you definitively don't need life-support equipment to drive your car.

Also, we should remember that a variety of internal and external stimuli can trigger seizures. An individual won't lack those stimuli while scuba diving. These might vary from lighting effects to sounds, emotions that may lead to fears, anxiety and potentially panic, not to mention cardiovascular and pulmonary issues with major blood shifts and barometric inner-ear stimulation.

Can anyone guarantee that a diver with well-controlled epilepsy is and will be safe while diving? Are all dive settings equally challenging? Where is the line that defines a safe or unsafe dive? Once the door for someone to dive is open, when will that person undergo that next medical exam for fitness to dive?

The answer is, unless by personal choice, probably never.

So scuba diving, like many other sport/recreational activities, has its own risks. The diver or the diving candidate must acknowledge and accept these potential risks. For someone's dive buddy and for the crew, it is equally important for a diver to provide an informed consent. These others need to accept and understand the risks and potential consequences. This allows preparation to deal with any related emergency.

DAN's role is to provide the diver with information and guidance necessary to make an informed decision about any given health concern and associated risks and benefits of participation in scuba. We hope the physician and diver together will decide on the safest course, one that is less likely to cause injury.

So a diver can be fit for diving and not technically healthy. That is no mystery. It's a combination of too many relative contraindications that can make a not-so-healthy individual unfit for recreational scuba diving.

On the other hand, someone can be perfectly healthy but unfit for scuba diving. A tall, strong adolescent may lack the mental maturity to understand the risks and may accept the responsibilities involved in scuba diving. But that's a topic for a separate - and probably endless - discussion.

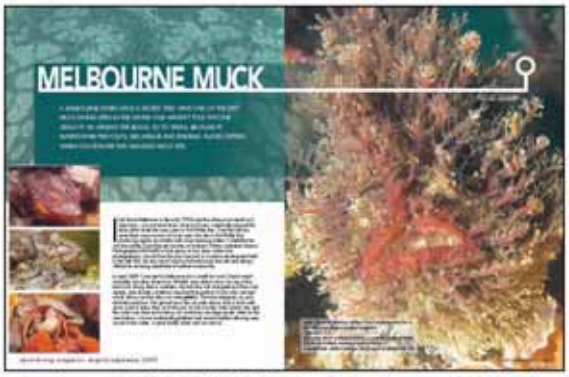
The only real truth in the matter is that absolutes can be invalid. As Les Luthiers, a comedy-musical group from Argentina, said "absolute truth does not exist, and that is absolutely true."

Eric Chan Photo

If you love reading about scuba diving, you'll love

Established for 40 years Sportdiving Magazine is packed full of great reading.

Regular contributor Kelvin Aitken continues his fascinating series on Digital Photography...



Regular contributor Nigel Marsh takes us muck diving in Melbourne...

Allan Wiggs explores Bunaken Marine Park in North Sulawesi...

Every issue of Sportdiving, Naturalist Neville Coleman identifies your photo of unknown critters.

Pierre Larue explores La Dieppoise - A five star dive

108 pages packed full of great features and regular columns, a wealth of information and knowledge on diving.

Sportdiving Magazine is a world authority on scuba diving!

Available now from your favourite dive shop or your local newsagent.

www.divetheblue.net

DAN ASIA · PACIFIC

Catching

Examining

A recent online survey by Scuba STAR Network took a look at common regulator problems experienced by divers and at issues such as regulator care, maintenance and safety checks. The more than 150 divers responding to the survey tended to be a rather experienced lot: About a third of the respondents were instructors with more than 1,000 lifetime dives. Preliminary results of the survey reveal several interesting facts that can help us prepare for problems with regulators and prevent them from occurring.

Common maladies

Divers responding to the survey report a low incidence (3 percent) of regulators failing to provide air, thus highlighting the reliability of modern regulators. Twenty-nine percent of divers reported that they have never experienced a problem with a regulator while diving, and those who have experienced problems reported that problems occur rarely (i.e., in fewer than one of 10 dives).

Seventy-one percent of divers reported that they have experienced regulator problems at least once while diving. Table 1 lists the percentage of divers who reported experiencing the various problems identified in the survey. The most common problem is that of a free-flow condition, with nearly half the respondents reporting they had experienced this problem.

The next most common problem is wet breathing, or water entrained (carried into) in the breathing air; 28 percent of reporting divers experienced this problem. Mouthpiece failure or separation is next on the list, with 21 percent of the divers reporting this problem.

As anecdotal evidence suggests, what might appear to be a minor oversight can evolve into a serious condition or even a full-blown emergency. Consider the following incident report.

"In a predive check I noticed the tie wrap was missing from my mouthpiece. Not having a spare, I made the dive without it. Near the end of the dive, we entered a shallow cave. My buddy signaled low air and turned to leave. As I turned, the regulator mouthpiece came free from the regulator, but since the mouthpiece was still in my mouth, I thought the regulator was, too. I inhaled, took in nothing but water, cleared, took a second breath of water, and then chased my buddy.

David Bryant Photo

There's no question that the most critical iten
regulator. Without air to breathe, a diver's tim
best.

While today's modern regulators are well-engi
experience problems with their breathing apparat
inhalation of highly moisture-laden air or even an
becomes: What problems are most likely to oc
with them?

BY RICK

Your Breath

Regulator Safety

n in a diver's ensemble of dive equipment is the
e underwater is limited to only a minute or so at

neered and highly reliable, divers do occasionally
tuses. Conditions such as free-flow, hard breathing,
abrupt stoppage of airflow can occur. The question
cur, and what can we do to prevent them and deal

LAYTON

"We made contact outside the cave entrance and began to share air. During the initial exchanges, we were drawn to the surface by heavy surge. Very large waves at the surface slammed us against the rocks, resulting in my buddy being knocked unconscious. I dragged him away from the rocks, he regained consciousness, and we safely exited. I carry spare tie wraps in my kit now."

Strategies for prevention

Perhaps the most important strategy for avoiding regulator problems is to conduct a thorough predive inspection and function check of your regulator. Divers are generally faithful in the conduct of such inspections and checks.

While only 76 percent of the responding divers reported that they inspect their regulators before most or all dives, 92 percent of divers surveyed reported they performed a function check either for all dives or most dives.

When it comes to the specifics of the regulator inspection and function checks, we see broad variations among divers. Table 2 shows the percentage of divers who reported they had performed the various checks and inspections.

Not surprisingly, most divers perform the more obvious checks, such as verifying that the regulator delivers air, that the first stage doesn't leak and that the purge button functions. Relatively few perform some of the other simple checks, such as verifying that the inlet screen is not blocked. This is an uncommon condition, but it is one that can result in failure of the regulator to deliver air. Relatively few divers perform an inhalation test with the air turned off to verify the seating and condition of the diaphragm. A split or cracked diaphragm could result in entrained water, or a failure of the second stage.

Divers responding to the survey also pointed out a few additional items that can help ensure the integrity of the total breathing air system. For example, many regulators have adjustments that the user can make, and these should be checked regularly. Respondents also pointed out the importance of checking the O-ring on the pillar (cylinder) valve, the zero reading of the submersible pressure gauge and the function of the alternate air system after entering the water.

The good news is that divers can avoid the most prevalent problems through careful predive inspection and preventative maintenance. As part of the predive check, divers should closely inspect the mouthpiece to ascertain its condition and security. More than one in

five divers reported they routinely omitted such procedures. Divers should also perform an inhalation function test to verify the condition and seating of the second-stage diaphragm - a procedure followed by only 56 percent of respondents. This step can identify a problem leading to entrained water and second-stage failure.

Routine maintenance

An interesting finding of the survey is that divers tend to keep their regulators for a relatively long time. The average age of regulators used by the respondents was about five years, with a range from just a few months to more than 15 years. The largest percentage of divers - about three-quarters - reported that they purchased their primary and secondary regulators at the same time.

Divers who plan to use a critical life support item for an extended period of time should invest in routine and preventative care and maintenance to ensure the reliability of that equipment. For example, checking and adjusting the intermediate pressure and other vitals could help prevent some free-flow situations. Eighty percent of the divers responding to the survey reported they addressed this yearly through professional maintenance of their regulator or per manufacturer recommendation.

A few divers with the tools and knowledge to do so reported that they maintain their own regulators. About 5 percent reported that they have their regulators serviced only when a problem develops.

When it came to caring for their regulators, divers seemed to recognize the importance of careful handling and routine cleaning. Most divers reported that they rinse and/or soak their regulators after every day of diving (46 percent) or after every dive (26 percent). A smaller number (17 percent) reported rinsing or soaking their regulators after every dive trip.

Failure to take steps to remove or prevent salt deposits can present problems. Reported one respondent: *"On one occasion my second stage had seized due to salt deposits, after not being rinsed properly. I was unable*

Table 1. Regulator Problems Experienced by Divers

Problem or Malfunction	Percentage of Divers
Free-flow	49
Entrained water in air	28
Mouthpiece separation or failure	21
Hard breathing/normal conditions	14
Hard breathing/strenuous swimming	13
Hard breathing/air-share	4
Failure to deliver air	3
Unable to purge	2
Other	2

Table 2. Percentage of Divers Performing Regulator Inspections & Checks

Inspections and Checks	Percentage of Divers
Inhale function (air on)	94
First stage leaks	85
Purge function	85
Hose conditions/leaks	79
Mouthpiece condition	79
Mouthpiece security	72
Inhale function (air off)	56
Inlet screen condition	46

Table 3. Alternate Air Systems Used by Divers

Type of Alternate Air Carried	Percentage of Divers
Octopus regulator	64
Pony bottle/redundant regulator	19
Integrated air inflator	15

to start that dive but was able to remedy the problem by leaving the second stage immersed in fresh water overnight."

Ready for trouble

Dealing with a regulator problem at depth can be stressful. About 15 percent of the divers who reported having regulator problems also reported that they had at some point experienced anxiety or panic as a result.

Regardless of how thoroughly we inspect and check our regulators, the potential exists that we could experience a problem that requires a quick solution: That means having an alternate air source available or a buddy close enough to quickly share air.

All divers are not equipped with the same type of alternate air system (see Table 3), so having a working knowledge of the various systems, and especially those of our buddies, can be important when trouble arises.

Taking aim on safety

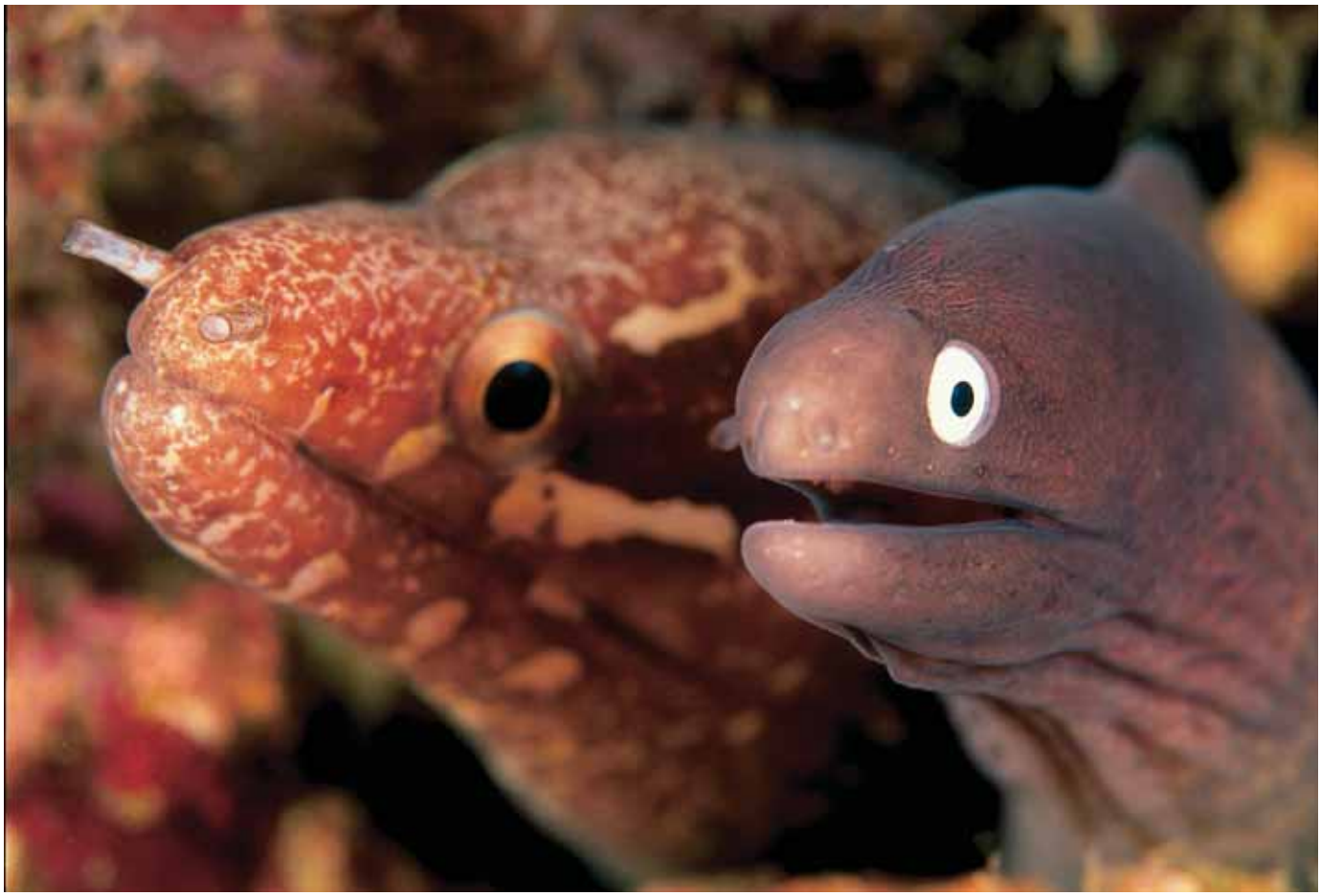
A regulator problem that occurs underwater can leave us struggling to catch our breath. By adopting an attitude of professionalism and taking the proper steps, we can avoid many of the troubles that might come our way.

As one diver sums it up, "*I have my regulators serviced at our club shop by a professional service engineer, and that gives me peace of mind when I dive. Predive checks on the air delivery system are also vitally important to me. I believe these were designed to keep you alive underwater, so you better look after them.*"

In fact, it might be possible to reduce the number of regulator problems that divers experience by 50 percent or more simply through regular care and maintenance and thorough predive checks. As for those problems we can't foresee and avoid, at least we can be ready to deal with them.

About the Author

Rick Layton is an experienced diver and longtime DAN Member who writes regularly on the subject of dive safety. He invites DAN Members to visit http://www.scubaSTARnet.com to participate in future safety surveys and to report equipment, training and procedure-related diving incidents.



PORTFOLIO: Scott Tuason

Underwater Photographer.

Scott has been diving for 27 years and taking underwater pictures for 20 of them. He has dived widely throughout the Philippines, as well as in many exotic international locations. He contributes regularly to Asian Diver, Sport Diving Australia, Scuba Globe Asia Pacific and Action Asia, including their "Adventure guide to the Philippines". He has had over 85 articles and 25 magazine covers published in various magazines all over the world. He has also won a variety of other international photography awards and his works are used widely to promote diving in the Philippines.

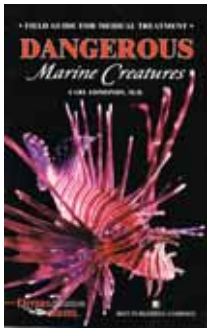
Scott has produced three coffee-table books, the second of which was a large format picture book on the marine animals of Anilao that won an award for photography at the 19th Philippine National Book Awards, and the World grand prize for underwater image books at the 27th World Festival of Underwater Images in Antibes, France in 2000. He has just recently launched his fourth book entitled *BAHURA* – A Passage through Philippine Reefs, which is a large format picture book shot on location all over the Philippines.

Over the past several years Scott has aided in the conservation of whale sharks in Donsol, Sorsogon and is a founding member of the Concerned Divers for the Philippines, a non-profit organization that brings awareness to environmental issues affecting the oceans.

Scott lives in Makati City, Philippines, with his White-tip African prairie dog, "Santa's Little Helper". His books are available from libros.com and scubadiveraustralasia on-line store.

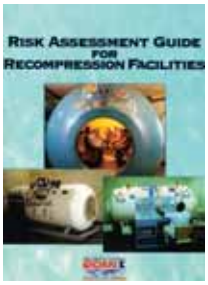
+ DAN Safety shop

Dangerous Marine Creatures



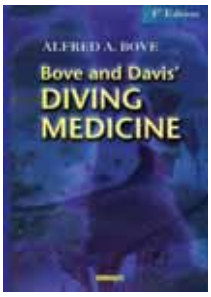
This popular field guide for medical treatment of injuries by marine animals includes colour photographs to help with identification and first aid. By Carl Edmonds, M.D.; 276 pgs; softcover; 1995
Member Price: $55
Weight: 400g
Code: DMC

Risk Assessment Guide for Recompression Facilities



This provides an innovative and easy-to-follow tool for chamber technical personnel to evaluate their facilities safety and to help with their compliance with internationally accepted standards. 67 pgs; softcover; 2001.
Member Price: $35
Weight: 190g
Code: RISKASSESS

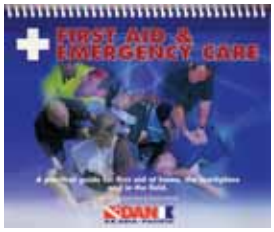
Diving Medicine (3rd Edition)



Comprehensive, step-by-step approach to the treatment of diving injuries. By Alfred A. Bove, M.D. & Jefferson C. Davis, M.D.; 333 pgs; hardcover; 1997
Member Price: $230
Weight 1.4kg
Code: DIVMED

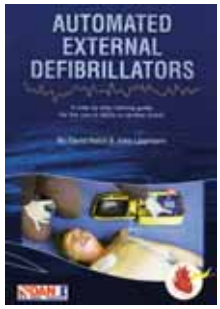
First Aid & Emergency Care

A practical guide for first aid at home, the workplace & in the street. - 4th Edn. by John Lippmann & David Natoli. A must for every first aid kit!



Member price: $29
100 pages, full colour
Weight: 370g

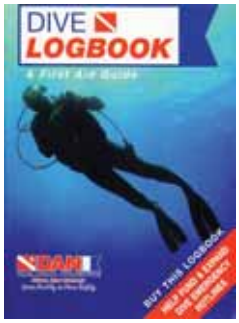
Automated External Defibrillators



A step-by-step training guide for the use of AEDs in cardiac arrest.. by David Natoli & John Lippmann; 36 pgs; soft cover; 2005.
Member Price; $7

Weight: 80g
Code: AED

DAN Dive Logbook & First Aid Guide



A very useful booklet that includes 30 divelog pages, important first aid guidelines and emergency procedures. 48 Pgs; 2004.
Member Price: $7
Weight: 76g
Code: LOGBOOK

Advanced Oxygen First Aid

by John Lippmann. A step by step training guide for the use of bag-valve-masks and manually-triggered oxygen resuscitators. 32 pgs; softcover; 2005.
Member Price: $6
Weight: 70g
Code: ADVO2

First Aid for Hazardous Marine Life Injuries (Asia-Pacific Edition)

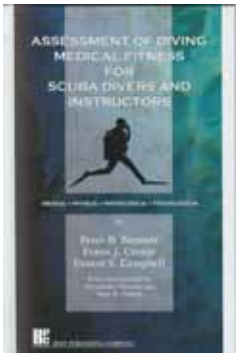
Edited by John Lippmann. This handy reference is a text for the DAN Hazardous Marine Life Course. 44 pgs; softcover; 2003.
Member Price: $8
Weight 80g
Code: INTER

Report on Australian Diving Deaths 1994-98

Interesting and valuable reading for all divers. A review of the 92 divng and snorkelling-related deaths in Australia during that period. By Dr. Douglas Walker; softcover; 60 pgs; 2002.
Member Price: $20 Code: AUSTDEA98
Weight: 200g

Deeper Into Diving - 2nd Edition

An informative, interesting and useful book for all serious divers, technical divers, instructors and dive medical professionals. By John Lippmann & Dr. Simon Mitchell; 512 pgs; softcover 2005. Member Price: $70
Weight: 1.2kg
Code: DEEPER



Assessment of Diving Medical Fitness for Scuba Divers & Instructors

An informative & interesting book dealing with how various medical conditions can impact on diving. By Drs. Peter Bennett, Frans Cronje & Ernest Campbell. 241 pgs; hardcover 2006. Member Price: $65 Weight: 0.6kg Code: AMFDI

Health & Fitness in Plain English

What are the six worst stretching mistakes, the best workout routines for back and biceps? Diving physiologist and DAN member Dr. Jolie Bookspan emphasises that health, fitness and nutrition can be fun. By Jolie Bookspan, Ph.D.; 357 pgs; softcover; 1998.

Member Price: $47
Weight: 760g
Code: HEALTH

Diving Physiology in Plain English

This book is for all scuba divers. It answers divers' frequently asked questions about physiology and covers a wide range of topics. By Jolie Bookspan, PhD.; 246 pgs; softcover; 1995.

Member Price: $67
Weight: 750g
Code: DIVPHY

Oxygen First Aid - *3rd Asia-Pacific Edn*

This fully revised edition provides a wealth of information on resuscitation and oxygen administration equipment and techniques. By John Lippmann; 160 pgs; softcover; 2006.

Member Price: $17 Weight: 250g
Code: 02F/A

Report on Australian Diving Deaths 1972-1993

A thorough review of the 301 known diving and snorkeling related deaths in Australia between 1972-1993, including discussions about lessons to be learned from these deaths.
252 pgs
Member Price: $30
Weight: 670g
Code: AUSTDEA

The Physiology & Medicine of Diving (5th Edition)

If you can only own one text on diving physiology and medicine, this is it. Invaluable for medical professionals and all technically minded divers. New chapters include fitness to dive, hyperbaric oxygen therapy and the long term health affects of diving. Edited by Drs. Alf Brubakk & Tom Neuman.; 780 pgs; hardcover; 2003.

Member Price: $390 Weight: 2.2kg
Code: PHYMED

The DAN Emergency Handbook

This book contains important information about the recognition and management of diving injuries, as well as other useful material on avoidance of decompression illness and accident management. By John Lippmann and Stan Bugg.

Member Price: $12
Weight: 115g
Code: DANBKA

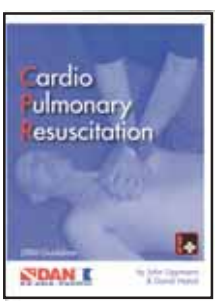
The Sports Diving Medical - 2nd Edition

The most readable yet comprehensive guide to medical conditions relevant to scuba diving. By Dr. John Parker; 180 pgs; softcover; 2002.

Member Price: $39; Weight: 350g
Code: SPMED

Cardiopulmonary Resuscitation

A valuable and easy to read reference and memory prompt for those trained in CPR, or a training text for CPR courses.
32 pgs; softcover; 2007.
Member Price: $9



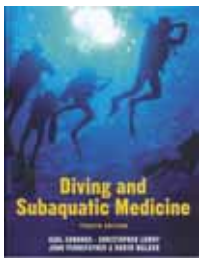
Weight: 40g Code: CPR

Basic First Aid - at home & at work

A basic text that deals with CPR and emergency life support. By John Lippmann & David Natoli.
32 Pgs; full colour; 2006.
Weight: 110g
Members $12
Code: BLSCOL

Diving & Subaquatic Medicine - 4th Edn

by Edmonds, Lowry, Pennefather & Walker. The standard text of diving medicine.
720 Pgs; 2002.
Weight: 1.65kg
Members $150 soft cover, $225 hard-cover.
Code: SISUB



Scuba Diving Safety

by Dan Orr and Eric Douglas. Covers topics ranging from preventative planning to exercising assistance. Useful reading for all divers.
196 Pgs; 2007
Member Price: $30; soft cover. 500g
Code: SDS

DAN AP Polo Shirt is available in black and is embroidered with the DAN AP logo on the breast . Available in sizes: S,M,L,XL
Members Price: $32
Weight: 283g
Code:TSPOLO

FEATURE PRODUCT

CITIZEN CYBER AQUALAND NX

Code: WCA

200m
DCIEM computer algorithm
Nitrox features
Auto altitude adjust
5 year warranty
Much more ...
Weight 2.5 kg

... normal retail $1699

Special to DAN members $1190

Citizen 200m Diver Watch is a purpose designed diver's watch rated as water resistant to 200m.
Recommended retail price is $340.
Members Price: $240.
Weight: 350g
5 year warranty
Code: WAT200

Actar Manikin
Torso resuscitation manikin available as a single unit, 5-set or 10-set. Very light & portable.
Single: Members: $180
Weight (kg³): 8kg* Code: ACTAR1/5/10
* Freight charges calculated on cubic measurement

Laerdal Little Anne Manikin simulates a normal adult anatomically and physiologically. Characteristics include: Sound confirmation of correctly performed procedures, travel bag and mat for exercises. It is supplied with an exchangeable face, mat/travel bag, manikin wipes, disposable lungs,and instructions.
Members Price: $310 Weight (kg³): 8kg*
Code: ANNE
* Freight charges calculated on cubic measurement

DAN AP General & Aquatic First Aid Kit is designed as a very useful general first aid kit, packed in a compact waterproof case. It includes a variety of bangages and dressings, gauze swabs, betadine swabs, saline, eye pad, gloves, as well as other useful items.
Members Price: $99
Weight: 1.4kg
Code: GENFIRST

DAN AP *Pro* First Aid Kit is designed for both diving professionals and others. It has all the usual general first aid supplies PLUS more ... including a SAM® Splint, Resuscitation Mask and emergency blanket. Housed in a sturdy spray resistant case.
Members Price: $260
Weight: 7kg
Code: PROFIRST

DAN AP *Pro Plus* First Aid Kit contains the same items as the DAN AP Pro First Aid Kit but comes in a waterproof Pelican 1400 case
Members Price: $350
Weight: 7kg
Code: PROFIRST

Resuscitation Mask with oxygen inlet (and strap) for mouth-to-mouth ventilations. This mask provides additional oxygen to the non-breathing injured diver if used in conjunction with rescue breathing and constant flow oxygen.
Members Price: $13
Weight: 155g
Code: MASKO2

Automated External Defibrillators & Trainers
Contact us to enquire about our range of AEDs and AED training products.

DAN First Aid & Safety Products - Oxygen Equipment
The DAN AP Oxygen Unit
This Australian configuration comprises:
Allied Brass Multi-function regulator, DAN demand valve, sturdy waterproof case (orange), Tru-Fit™ Mask, resuscitation mask, Handwheel, Demand valve hose (1.8m), Non-rebreather mask, Pin-index with bull-nose adaptor, Oxygen manual.
Members Price: $1050
Weight: 4.5kg
Code: OXUNIT

The DAN AP Unit is also available in King Pelican case for an additional $255 and a cylinder can also be included, if required.

DAN AP Budget Oxygen Unit
This is a similar configuration to DAN AP Mini Unit with cheaper demand valve and regulator.
Members Price: $910
Weight: 1.8kg
Code: BUDGET

The DAN Economy Unit consists of a multi-function regulator with high flow and low flow outlets, demand valve (Fraser-Harlake), oronasal mask and 1.5m hose, and hand wheel.
Members Price: $540
Weight: 1.8kg Code: ECON

The DAN Economy Unit PLUS consists a multi-function regulator with high flow and low flow outlets, demand valve (Fraser-Harlake), 1.5m hose, handwheel, pocket-style and non-rebreather masks, all housed in a small waterpoof case.

Members Price:
Pin index ... $570
CGA 540 ... $570
Weight: 2 kg
Code: ECONPLUS-PIN; ECONPLUS - CGA

The DAN (America) Standard Oxygen Unit (U.S. Standards) is a specially designed demand-valve oxygen unit with jumbo-D cylinder for scuba diving injuries. It contains a multifunction regulator, demand valve with 1.5m hose, resuscitation mask, non-rebreather mask, valve-wrench/hand wheel with chain, and a waterproof King Pelican case.
Member Price: $1320
Weight: 14kg
Code: STANUNIT

The DAN Dual Cylinder Unit (U.S. Standards) is designed for the diver who dives more than an hour from medical assistance or who desires more oxygen than is provided in the Standard Oxygen Unit. The Dual Cylinder Unit is housed in a specially designed King Pelican waterproof case which contains the same components as the Standard Unit plus an extra Luxfer Jumbo-D cylinder.

Members Price: $1520
Weight: 18kg
Code: DUALUNIT

The Mini Oxygen Unit (U.S. Standards) is a cylinderless unit which takes the hassle out of air travel. It contains the same hardware as the Standard Unit (multifunction regulator, demand inhalator valve, clear Tru-Fit Mask, resuscitation mask, non-rebreather mask, valve-wrench/hand-wheel with chain, and a smaller Pelican 1400 waterproof case. Fits in most airline overhead compartments and dive bags.
Members Price: $930
Weight: 4.5 kg
Code: MINIUNIT

The DAN Charter Boat Unit (U.S. Standards) contains the same components as the Mini Oxygen Unit, except the multi-function regulator has the CGA-540 threaded fitting system designed for use with large, non-portable oxygen cylinders. It is housed in a Pelican 1400 waterproof case.
Member Price: $975 Weight: 4.1kg
Code: CHARTER

The DAN Rescue Pak (U.S. Standards) is a redesigned model of DAN's Standard O2 unit, offering around 15-25 minutes of oxygen flow to an injured diver. Packed in a custom Pelican 1450 case, it is a lightweight, easy-to-carry package containing a multifunction regulator, demand valve, M9 cylinder, resuscitation mask, and non-rebreather mask.

Member Price: $990
Weight: 6.5kg
Code: RESCUE

The EMT Resuscitator (MTV-100) Hose and Mask is a manually triggered ventilator which can be attached to a portable or central oxygen source.

Member Price: $650
Weight: 1.5kg
Code: MTV-100

410 Litre Oxygen Cylinder
C Cylinder configured to meet Australian requirements

Members Price: $305
Weight: 6kg
Code: CYLA

Jumbo-D Cylinder 635 litre U.S Oxygen Cylinder.
Member Price: $220
Weight: 6kg
Code: JDCYL

The DAN AP *OxyPro* is an Australian configuration which comprises: Allied Brass Multi-function regulator, MTV-100 valve and hose, LSP Plastic case (orange), Tru-Fit Mask, Resuscitation mask, Handwheel, Non-rebreather mask, Suction, Oxygen manual, and optional cylinder.

Members Price: $1740
Cylinder extra
Weight: 5.5kg
Code: OXYPRO

DAN AP "Basic" Oxygen Unit is designed as a cheap, basic entry-level oxygen unit for the ordinary diver. (It is not suitable for the dive professional as it doesn't include a demand valve). The unit includes a brass multi-function regulator, handwheel, non-rebreather mask, resuscitation mask and compact water-proof case. It can be upgraded when required with a demand valve(s).

Members Price: $360 Weight: 1.8 kg
Code: BASICUNIT

DAN AP "Basic" Oxygen Unit SOFT has the same components as the "Basic" Unit but comes with a spray resistant vinyl case that can hold a 400-600 litre oxygen cylinder.

Members Price: $415 Weight: 2 kg
Code: BASICSOFT

The DAN Otoscope is a verstile pocket examination light designed for ear, nasal and oral examinations. Easy to use and durable.
Member Price: $70 Weight: 200g
Code: OTOS

NOTE: Prices of oxygen units may change from time to time due to currency fluctuations.

FEATURE PRODUCT

SCUBA DIVING SAFETY

Useful reading for all divers. Written by Dan Orr and Eric Douglas.
196 Pgs; 2007.
Code: SDS
Members: $30

**** AUSTRALIANS NOTE: 10% GST added to orders in Australia (except contents of oxygen units)***

Deep stops, Deep trouble?

Some questions raised about the safety of deep stops in deep diving.

Jamie and Bob had been tech diving for about a year. While they had done their tech diving course together, Jamie usually let Bob do the planning and deco schedule, after all, he had been diving longer and enjoyed doing it.

As they headed out to the dive site, a small wreck located at the base of a reef in 50 metres of water, both laughed about all the paraphernalia they now dived with. It seemed only yesterday that they would have been diving to almost the same depth on a single tank and recreational gear. Now they had twin back-mounted cylinders filled with air and two sling cylinders filled with nitrox 36 and oxygen to decompress on. Bob joked about how difficult all this gear was. How would they ever carry enough gas to dive to 100 metres?

They struggled as they lifted the gear and did a giant stride into the clear, warm tropical water. The sudden weightlessness was an incredible relief even after just those few short minutes.

The descent to the wreck was textbook and once they reached the bottom each diver headed out in his own direction. The visibility was good so they thought thre was no need to keep close buddy contact.

The plan had been for 25 minutes on the bottom. So Jamie was rather surprised when Bob appeared at his side at just under 20 minutes looking a bit agitated and signalling that he wanted to "turn" the dive. Jamie responded and turned around to get the attention of one of the other divers to let him know they were leaving. When he turned back, Bob was gone. Jamie ascended up the reef to the first of the deco stops that Bob's plan dictated. It was one of the new bubble models and Bob always used the conservatism set high so the first stop was at 42 metres. Jamie was relieved to see that Bob was already at the stop and he swam over to check that all was OK.

However, all was not right. As he approached, he noticed that Bob was breathing from his stage cylinder containing 36% oxygen. Jamie queried Bob with the OK signal but Bob just stared back at him with a wild look. Fearful that Bob might convulse at any moment from oxygen toxicity, Jamie grabbed his long hose from his back gas containing air and offered the regulator to Bob, but Bob wouldn't take it. Jamie insisted, but Bob pushed him away. The pair had now sunk several metres deeper. Suddenly Bob seemed to realise his peril and started swimming vigorously towards the surface. Jamie began to chase him upwards and the pair ascended rapidly to 36 metres. Jamie could hear his instructor's voice yelling at him in his head, "a decompression stop is a virtual ceiling, break it and you ***will*** suffer permanent injury or death!" Reluctantly he stopped chasing his friend and Bob sped to the surface.

Bob broke the surface like a breaching whale, white froth emanating from his mouth. By the time the boys in the boat made it over to him he was already blue and clearly not breathing. Neither had any first aid knowledge, not that it would have likely done any good anyway. With a substantial struggle they pulled his limp body into the boat and waited for the other clients to return and tell them what to do, Bob's now lifeless body was resting on the floor of the boat.

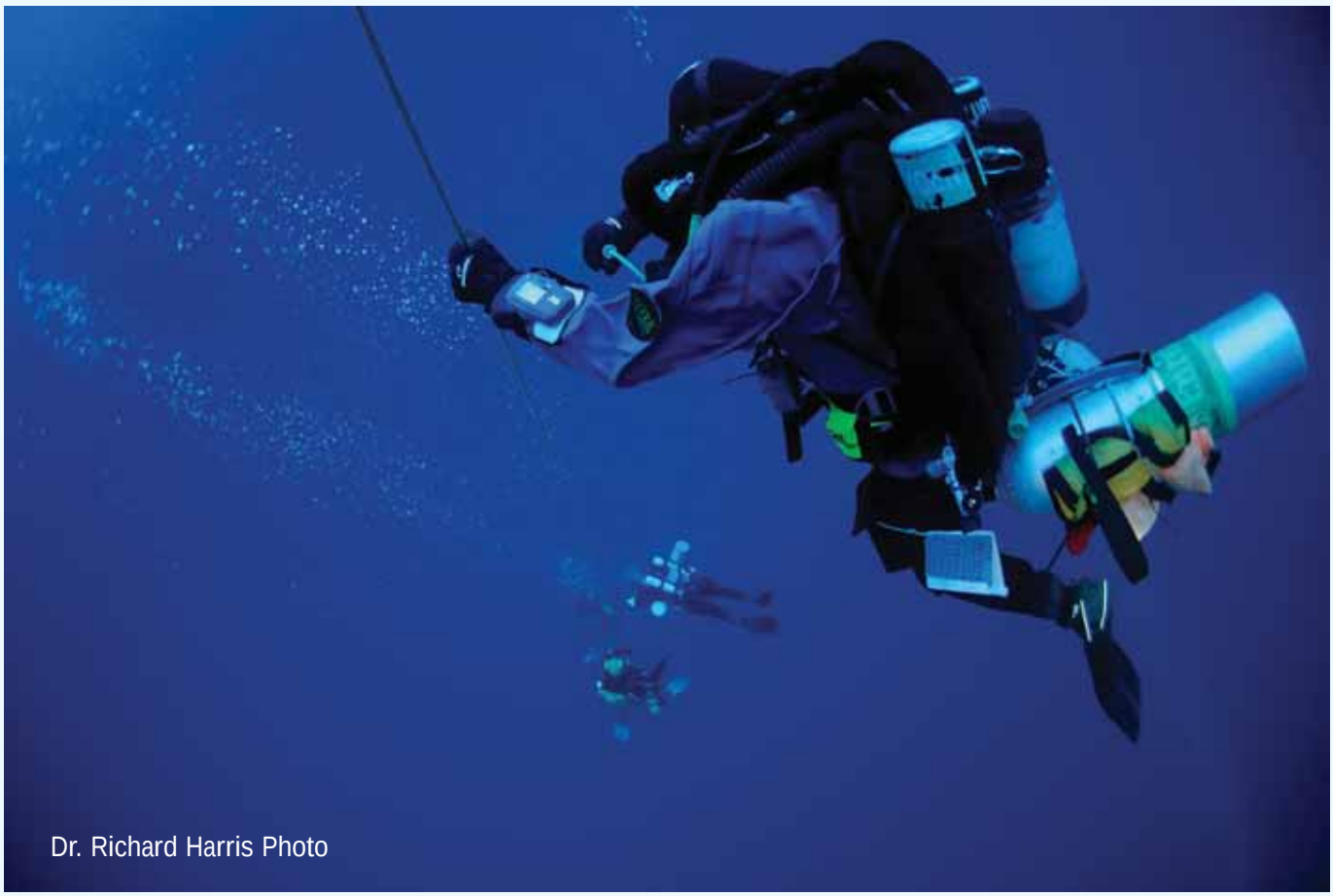
While some of the facts have been altered, this story is largely based on a real event. As it turned out, Bob's isolation manifold was shut and this had led to him running out of back gas. But the question that struck me was why did he stop at 42 metres?

The answer possibly lies in deep stop theory.

Deeps stops are a *sine qua non* in technical diving. Everyone knows how good they are and how you will get bent if you don't do them, just look at any internet forum!

Most technical divers ascribe their origins and popularity to the American Ichthyologist Richard Pyle in the late 1980's. However, while Richard certainly helped to popularise the idea with the diving community, deep stop theory predates his contribution by more than 15 years.

Back in the 1970's diving physicians began to ultrasound divers looking for gas bubbles in their blood post dive. These bubbles are called venous gas emboli (VGE). The diving decompression theory of the time said that if the model was correct then there should be no bubbles. Unfortunately, the studies showed that bubbles were occurring, sometimes even before reaching the surface. The conclusion the researchers came to was, that if bubbles were occurring during the decompression, then the model must be wrong even though no one was actually developing decompression illness. The reasoning was that the divers were developing sub-clinical decompression illness and that the tables then compensated for this by having to have a long time at the shallow stops to fix the problem..... ***"Bend then mend"***. Therefore it



Dr. Richard Harris Photo

seemed reasonable that if they did deeper initial decompression stops then they would not need to do the long shallow stop and that they might actually be able to reduce the total time of decompression, a win / win situation.

Unfortunately it didn't work. When DCI was used as an endpoint, the deep stop profiles usually required far more decompression time and seemed to offer no advantage. The researchers moved on to exciting stuff like saturation diving and much of the knowledge of these trials were lost in the literature mountain.

However, some research continued. Reasoning that the basic premise was correct and basing his ideas on the behaviour of bubbles in gelatine, David Yount developed VPM (Variable Permeability Model). This was then welded to the Buehlmann gas compartment model to produce a usable decompression model based on bubble behaviour. The underlying assumption of this model was that if the number and volume of the bubbles created during a decompression could be limited and controlled using bubble theory, then a safe decompression would result. The model's profiles were compared to other more traditional models and found (in the air diving range) to have generally longer total dive times and deeper initial decompression stops and was hailed as a significant step forward. However, no manned testing was performed.

The model and its underlying principles were then further developed along two parallel streams, RGBM and VPMB. Both have had a significant following from the technical diving community and both have been readily available over the internet - both support their products with testimonials and large data bases of reputedly successful dives.

However, all was not rosy ...

Several high profile dives were conducted with these profiles and resulted in significant DCI incidents. Invariably, blame was placed on the user ... the wrong version was used ... or the stops were not accurately followed ... or the diver was dehydrated ...

Nevertheless, the reported success of these models and technique resulted in the U.S. Navy and the French Navy taking notice. Unlike the tech divers, they wanted some evidence before changing their ways - even if it was a foregone conclusion.

The results of these studies were presented at the 2008 Undersea and Hyperbaric Medical Society (UHMS) workshop into Deep Stops held in Salt Lake City in the U.S.A.

The meeting had a number of high profile speakers from all over the world. And, while much was said anecdotally in favour of deep stop profiles, I will limit this discussion to the scientific experimental studies that were presented.

Wayne Gerth, from the U.S. Navy Experimental Unit presented a study

where they compared two diving profiles for an air dive to 51 msw (170 fsw) for 30 minutes using U.S. Navy divers. The two profiles were matched for total dive time, but one had deep stops as derived by a U.S.N. bubble model, and the other shallow stops as per a Haldane-type model. It was expected that the deeps stop model would show both a lower DCI rate and lower VGE scores. While some 750 dives were planned, an interim analysis was conducted half-way which resulted in the trial being terminated. At this point some 11 cases of DCI had been observed in the deep stop profile while only 3 had been seen in the shallow stop profile. In addition, the deep stop profile was associated with significantly higher VGE scores than the shallow stop profile, a result that was quite opposite to what deep stop theory would suggest should happen.

Jean-Eric Blatteau, of the French Navy, also presented their work on deep stop profiles. They have done both air and trimix diving, comparing deep stop and traditional models using VGE scores as their end point. In general, their profiles are not matched for time so that in some cases the deep stop profiles have longer total dive time than the comparable shallow stops profiles. Some profiles also included oxygen decompression. Their finding was that, for the air range dives (50-60 msw), there was no statistical difference in VGE scores for deep stops versus shallow stops. However, in the study group who did a repetitive dive, the deeps stop group showed significantly higher VGE scores. In the deep dive trimix group, the deep stop profiles produced significantly higher VGE scores even when the profile total dive time was considerably longer than the shallow stop profile.

Finally, Alf Brubakk's group from Norway presented their data on decompressing pigs. They compared two types of dives, a long shallow dive and a deep, short dive and looked at each with deep or shallow stop profiles. Interestingly, in the long, shallow dive, the deep stop profile produced significantly lower VGE scores than the shallow stop profile. However, in the deep, short dive, it was the deep stop profile that once again produced significantly higher VGE scores than the shallow stop, traditional type profile.

So what does all this mean?

From these studies it would appear that deep decompression stops are associated with both higher VGE scores (i.e. more bubbles in the blood) and a higher rate of DCI. For longish, shallow dives, the addition of a decompression stop has been seen to reduce VGE in some studies.

But why should this be?

If we look at the traditional models, we find that they were based on human or animal experimentation, the limits prescribed by the model being based on the appearance of decompression illness symptoms. If we compare some of the newer bubble models (BM) to these experimentally-based results, we see that for an air range dive, the traditional model would see the result from the BM as being quite conservative. However, if we move into the deep trimix diving range, the situation is reversed and the result from the BM would be expected to have a significant (though not guaranteed) DCI incidence due to the increased time spent at depth (and uptake of extra gas) and the failure of the model to increase the shallow time enough to account for it. Therefore, from the perspective of the traditional model, the experimental results are not unexpected.

So how does this relate to Bob?

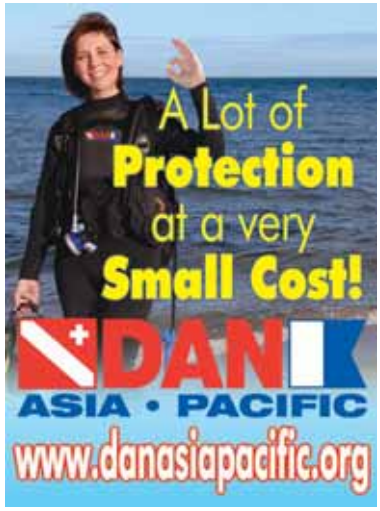
Had Bob understood the limitations of deep stop theory, he would have known that there is in fact no evidence to support stopping so deep from such a dive. An emergency back-up table based on a more traditional decompression model such as a Buehlmann model would have allowed him to ascend to less than 20 metres before requiring a decompression stop. This may have allowed him to remain on his back-gas until he reached the correct switch depth and would have allowed him to ascend to a depth where he could safely breathe his deco mix without having to worry about oxygen toxicity. He then could have completed his decompression schedule without needing to worry about running out of gas.

While there were a multitude of contributory factors to this accident, running out of breathing gas at depth and his subsequent failure to understand the realities and limitations of the decompression programs that kept him deep, exacerbated the problem.

So, despite their popularity on the internet, the best available scientific data would not appear to currently support the deep stops as currently practised. Whether there is some middle ground that may provide the best solution is yet to be determined, but before blindly adopting deep stops, stop for a moment and think whether deep stops are going to cause you deep trouble.

About the Author

Dr. Andrew Fock is an anaesthetist and consultant in diving and hyperbaric medicine at the Alfred Hospital in Melbourne. He is a keen technical diver and rebreather user and has a special interest in decompression algorithms. Andrew is a member of the Board of Directors of DAN AP.



AUSTRALIA'S BEST

Aboard Spoilsport explore the best mix of the Coral Sea and the Great Barrier Reef. Dive with giant potato cod at the Cod Hole and enjoy the deep walls and shark action of Osprey Reef. Walk in Captain Cook's footsteps at Lizard Island and cruise the turquoise chain of Ribbon Reefs.

- Witness 30 sharks in a feeding frenzy at the Amphitheatre.
- Swim with napoleon wrasse, tuna and barracuda at North Horn.
- Explore spectacular walls adorned with massive soft corals.
- Glide down to the Manta Cleaning Station at Fast Eddies.
- Swim with grey and silver-tip whalers and white-tip reef sharks.
- Hang with hammerhead sharks off the wall, April – October.

4 or 7 nights / unlimited dives.

Mike Ball Dive Expeditions AUSTRALIA

www.mikeball.com

t: 1800 643 216 e: resv@mikeball.com

The Diver Emergency Service (DES)

DAN Asia-Pacific provides funding and/or support to a variety of diver emergency hotlines in the Asia-Pacific Region. These include DES Australia, DES New Zealand, the DAN AP - Korean hotline, and the DAN AP - China hotline. These hotlines have been established to provide diving medical advice to divers in need, whether or not they are DAN members.

The Australian Diver Emergency Service (DES) is based at the Hyperbaric Unit at the Royal Adelaide Hospital in Adelaide, South Australia.

Calls to the DES hotline are initially answered by a paramedic telephonist at the South Australian Ambulance Service Call Centre. This service receives and handles all emergency calls throughout South Australia. The call-taker will first ask questions and record details such as the name of the caller, the call-back telephone number, the name and location of the injured diver and the nature of the problem. The call-taker will then page the on-call dive physician and connect the caller directly to this physician. This process typically takes about 2-4 minutes.

The doctor will then request further details about the nature of the problem and, if possible, will speak directly to the injured diver. If the injured diver is a DAN member, it is important that the caller tells the doctor this and provides membership details, if available. If this is done, the doctor will notify DAN of the problem and DAN will then become directly involved in the management of the accident, and/or monitor the diver, as appropriate.

After taking a thorough history, the doctor will then advise the caller or injured diver on what action should be taken, such as oxygen administration and level of medical care required. The doctor will provide advice only, and does not get actively involved in managing the case. This is where DAN takes over if we are aware the diver is a DAN member. A person who is not a DAN member will generally need to organise their own transportation and medical care, partly depending on where they are.

Although DAN AP pays all the running costs for the service, the doctors who take the calls do so on a voluntary basis and DAN AP would like to take this opportunity to thank them sincerely for this on behalf of all divers. Specific thanks to Dr. David Wilkinson (who co-ordinates the service) and to Drs. Roger Capps, David Teubner, Susie Szekely, Nicola Rondello and Richard Harris, who have all taken calls in the past year. Special thanks also to Steve Goble for collating the data.

The following Tables provide details of the calls received by the DES during the 2008 calendar year. In all, there were a total of 282 calls to the DES in that year. This has increased slightly from 243 the year before. One of these was to report a diving fatality.

Table 1: *Location of callers*

Australia	
NSW	91
Qld	16*
Vic	15
SA	27
WA	15
ACT	3
Tas	0
NT	4
Other countries	
Indonesia	23
Malaysia	6
Philippines	4
Solomons	5
Thailand	14
Micronesia	4
Vanuatu	12
PNG	22
Singapore	5
Fiji	3
China	1
Maldives	2
Hong Kong	3
India	1
East Timor	2
Egypt	1
New Zealand	1
United Kingdom	1

** This is down from 60 in 2007*

Table 2: *Symptoms reported*

Pain	117
Paraesthesia	55
Dizziness/Vertigo	38
Nausea	36
Headache	31
Fatigue	19
Skin Rash	16
Weakness/Paralysis	13
Loss of Concentration	7
Visual Disturbance	4
Loss of consciousness	3

Table 3: *Diagnosis*

DCI	41
Possible DCI	47
Ear/Sinus problems	41
Marine Envenomation	8
Other	145

Table 4: *Referral*

Referred to Hyperbaric Unit	58
Referred to local Hospital	32
Referred to Diving Doctor	7
Referred to GP	50

Table 5: *Oxygen first aid*

Breathing 100% O_2	9
Breathing unknown/ Other percentage of O_2	35

Table 6: *Callers*

Injured diver	133
Doctors	35
Medical enquiries	33

Table 7: *Time of call*

0800-1800	175
Other	107

RECENT DIVE FATALITIES

Following is a list of diving or snorkelling fatalities between 1 May and 31 August 2009 of which we are aware. **Please contact us if you have information on these, or know of others fatalities that are not listed.**

6/5/9 Guam, Micronesia
10/5/9 double fatality, Pattaya,Thailand
16/6/9 Tasik Kenyir, Malaysia
19/6/9 Marshall Islands
25/6/9 near Cebu, Philippines
8/7/9 Saxon Reef, Qld, Australia
11/7/9 Williamstown, Victoria, Australia
29/7/9 near Lombok, Indonesia

An additional dive fatality we have become aware of from earlier this year is one that occurred on 8/3/9 at Lizard Island, Qld, Australia.

In addition, there were two fatal accidents near Phuket in Thailand involving the deaths of divers who were on board live-aboard dive boats:

9/3/9 Six dive tourists and one boat staff died following the capsize of a liveaboard dive vessel during the night.
24/5/9 A tourist diver missing, presumed dead, after a collision between a fishing boat and dive liveaboard boat.

DAN AP News

Dive Show in Kuala Lumpur

DAN Executive Director John Lippmann and Marketing Co-ordinator Mel Cefai attended the Malaysian International Dive Exhibition (MIDE) in Kuala Lumpur in July and were impressed by the number and enthusiasm of exhibitors and attendees at this show.

It is clear that diving remains very popular in Malaysia and receives strong support from governmental tourism agencies.

Next year at MIDE, DAN AP plans to offer a variety of dive safety and accident management training programs, including some that are soon to be released.

Mel Cefai and John Lippmann at MIDE.

DAN Donates Oxygen Unit in Vanuatu

The annual meeting of the South Pacific Medical Society (SPUMS) was recently held in Port Vila, Vanuatu. This meeting was well attended by doctors, mainly from Australia and New Zealand, and there were many interesting dive medicine-related presentations.

While there, John Lippmann took the opportunity to present an oxygen unit to Pro Medical which was taken to Santo to be available to divers requiring oxygen.


Dr Glen Hawkins, John Lippmann, Shelley Flintoft and Bob Ramsay.

DAN Involved in Regional Jellyfish Project

As you might be aware, DAN AP has been collecting information on, and photographs of, jellyfish in the region to try to identify dangerous species present in various parts of the Asia-Pacific. This has been in response to some fatal and potentially fatal stings in Thailand.

We have now identified potentially fatal species not only in Thailand, but also in Malaysia and the Philippines and we expect to find them elsewhere in the tropical waters of this region.

DAN AP is part of a enthusiastic research team which includes Dr. Peter Fenner, Dr. Lisa-Anne Gershwin, Andrew Jones and Dr. Ken Winkel, among others.

This project, as well as the media surrounding some of the cases, has stimulated action by the Thai Government to assess the extent of the problem there and hopefully to implement some preventative measures.

DAN AP applied for and received a grant from the Australia-Thailand Institute, which is part of the Australian Department of Foreign Affairs and Trade, for the Thailand-related part of the overall project,

known as *Marine Stinger Safety and Education in Thailand*.

DAN AP and other members of the research team are supplementing the grant with additional funding, administrational and educational support. We plan to bring some Thai doctors and marine scientists to Australia to meet with some experts in dangerous jellyfish and to view and discuss strategies that could be implemented in Thailand for both the prevention and management of serious jellyfish envenomation.

DAN Re-Launches Diver Below Campaign

Five years ago, in response to several incidents where divers were maimed or killed after being struck by boats, DAN AP launched a campaign to try to heighten awareness and hopefully reduce these incidents. Unfortunately, there have been several such incidents over the past year, including two fatalities in Malaysia and at least one each in the Philippines and Thailand, prompting DAN to re-launch this campaign.

To this end, we have prepared flyers and posters in English and Traditional Chinese that we will be distributing in areas of concern.

DAN Diver Day Extravaganza in Melbourne (Feb 2010)

DAN Asia-Pacific will be hosting the next International DAN Meeting in Melbourne in February 2010 and is planning to hold a one-day Diving Safety Seminar in conjunction with this. The seminar, to be held in association with the Alfred Hyperbaric Centre, will take place on Sunday 21 February and will include an array of international and Australian speakers.

Tickets will become available soon so keep watching the news section of our website for details. DAN Members will receive a discount.

Bob Ramsay (Hyperbaric Health), Dr. Mike Bennett (Prince of Wales Hospital / President SPUMS), Dr. David Wilkinson (Royal Adelaide Hospital / Co-ordinator of DES Hotline), Dr. Glen Hawkins (Hyperbaric Health) and technicians at the chamber in Port Vila.

When the

© istockphoto.com/devon stephens

I recently struck up a conversation with a seasoned veteran from the island of Roatan. Doc was his name. When he made the off-hand observation that "visibility is highly overrated," I tilted my head and gave him a sideways look.

For a full 10 seconds I reflected on some of the low-viz surprises I've had while diving. We leaned back in our chairs, warmed up to the subject and talked about some of those episodes and the particular magic of Roatan.

BY ELIZABETH COOK

Wind Blows

Less than 40 miles long, Roatan is by far the largest of Honduras' Bay Islands. Nearby Utila and Guanaja are tiny in comparison. They are a little more difficult to get to but also well-loved for their diving.

The island of Roatan is long and relatively narrow. A mountainous backbone runs the length of the island and slopes off to sandy beaches, mangroves and the fringing coral reefs that surround the island. These reefs are part of the largest coral reef system in the Western Hemisphere. The system encompasses the eastern coasts of Mexico's Yucatan Peninsula, Belize, Guatemala and Honduras.

Underwater photos by Robert Yin

I often stay on the south side of the island at a modest all-inclusive resort. The attraction? It offers some of the easiest shore diving you could ask for. The hook is a shallow, sandy channel leading to deeper water. The channel has an easily accessible wreck, walls and ledges that run in either direction from the wreck.

Diving anytime

Framing the edge of the water is a boardwalk where the staff routinely leaves freshly filled tanks for your convenience. No slogging back to the dive locker for air in between dives, unless you want to rinse your gear. You can dive whenever you want. I particularly appreciate this because it frees me from having to be anywhere at anyone's pace other than my own.

Stepping off the boardwalk, you drop in an ankle-slapping 15 cm of water - slightly deeper at high tide. The sand channel gently slopes toward a small platform that intercepts you halfway to deeper water. This is a good stopping place to adjust gear, check your regulator and air, and make a final check of cameras and flashlights. Then you simply lay yourself forward in the water and start finning.

Bewitching encounters

Let me be perfectly clear: There is nothing wrong with the visibility around Roatan. In fact, I've enjoyed spectacular conditions on every side of the island that rival the best dive sites anywhere in the world. I've also had some pretty funny and bewitching encounters when the skies were not magazine-ad bright and sunny, days when the winds had kicked up and the visibility was abysmal. But on Roatan, when conditions turn on you, you just need to know where to go.

Low-viz rule #1

The platform is a dandy place to practice studying the dull and the boring. On both sides of the channel are beds of turtle grass. This is a haven for those days when "surf's up" and you don't want to be on a boat. You can also snorkel this area any time you need to log some serious surface interval time.

The area actually looks pretty darn monotonous. There simply is not much exciting about sand and turtle grass, especially after your big fins stir up the fine, white sand into a Caribbean snowstorm. But if you look closely, you'll find holes in the sand with rocks arranged neatly around the entrances. Wait patiently. Eventually a wide-mouthed, bug-eyed jawfish should appear.

Once these cautious critters think the coast is clear, they'll come at least part of the way out of their burrows. If you push a pebble toward the hole or lay a small twig across it, the jawfish will doggedly rearrange the offensive object. If you get lucky, you may see a male with a mouth full of eggs. Getting a good photo of the eggs requires tremendous patience and a steady hand.

In addition to jawfish, the turtle grass is home to small eels like the dainty looking sharp-tailed eel. If spooked, these eels disappear down a hole or underneath the sand. Sailfin blennies also burrow in the sand around the platform. As with the jawfish, if you wait, they come out of their burrows. When comfortable with your presence, they reward you with the unfurling of their exotic sailfins.

Some of the larger holes likely contain mantis shrimp. If you value your digits, do not poke your fingers too close. A mantis shrimp's claws, sharp and lightning fast, can take off the tip of one of your fingers.

Low-viz rule #2

One not-so-sunny day, I went past the wreck of the Prince Albert to try to find a safe haven from weather that was churning up the water. I slowly crept along the floor and poked in here and there. For the most part, visibility was better in these sandy cul-de-sacs, and I was enjoying a nice assortment of macro life.

After a while, I discovered a long, promising ledge to look under. Simultaneously, I poked my flashlight under it along with my head when a hefty grey animal shot past me and smacked my face with its tail. Surprised, I floundered backward trying to get out of its way, backing up ungracefully onto my equally surprised dive buddy.

We scrambled on the sand for a few seconds, sorting out fins and regulators and which way was up and out. I took a few more seconds to slow down my air-sucking pulse rate.

My dive buddy and I looked at each other with eyes wide open. Finally, realizing that the nurse shark had not eaten us, we had a good laugh through our regulators. Ever since that dive, I've been much more careful about sticking my head or hands in places where I can't see.

Low-viz rule #3

I think of night diving as another form of low-viz diving. Even if the water is clear, your visibility is limited to the strength of your dive light.

Night diving in Roatan, like night diving anywhere, lets you see creatures and activities you don't ordinarily find during the day. One night, we headed to the wreck of the Prince Albert.

I like to night dive on this wreck because I am familiar with its layout. I can concentrate on the animals rather than worrying about where I am. The wreck is well-marked and easy to get to, and the path back to the dock is also well-marked.

As a matter of ritual, we added glow sticks to our tanks. I had strobes with modeling lights to use as my main dive light. I also carried a mid-sized dive light powered by fresh C-cell batteries. My dive buddy packed a similar backup light in his BCD pocket. He also carried an HID light (which stands for high-intensity daylight) that seemed to illuminate the whole ocean. Needless to say, the first-time night divers were happy to follow him in remora-like fashion.

Thus armed, we trudged down the channel to the platform. We reviewed our dive plan and checked our air supplies and regulators. Slowly finning our way toward the wreck, the nearly full moon gave so much ambient light that we turned off our lights.

Our eyes adjusted rapidly, and the water magnified the moonlight and the bioluminescence. We scrutinized the turtle grass as we moved along and caught glimpses of a small eel and a couple of heart urchins performing their night maneuvers.

Reaching the wreck, we turned our lights on and headed toward the stern. My friend led the way, and before long he waved his light back and forth over an octopus wrapped around a crab. The octopus tried to elude us while holding onto its prize. It didn't take long for him to tire of our high beams and jettison into the dark.

My friend moved to the upper deck. I followed underneath and slightly behind. His HID light was particularly alluring to swarms of smaller fish. This in turn attracted larger fish. Before long, he found himself in the middle of a small feeding frenzy. Blood and fish scales were floating in the water as the larger fish snapped up the smaller ones. Suddenly, I heard him yelp through his regulator and saw his light beam slashing wildly. Moments later, the light went out. As I later learned, the feeding frenzy had gotten out of control when he found himself as part of the menu.

Now, I've seen single fish get picked off at night when you spotlight them for too long with a dive light. But I have never seen the action caused by that HID light. Perhaps less is better when it comes to night diving, at least from the fish's point of view.

Around the island

There are many places to dive around Roatan. It would take a month or more to explore it thoroughly. There are walls, cracks, spurs and sandy channels; boat diving, beach diving and 24-hour-a-day diving. People love the warm water, the great visibility and the alternatives if the winds blow.

I've met divers who have been here 20 or more times. When asked about their favorite fish story, they light up and talk about experiences with squadrons of elegant spotted eagle rays, flocks of diminutive reef squid looking like tiny alien ships with flashing skin, or even the occasional jolt of a whale shark.

And on those days when the wind blows, they can float in the sand channel, hunker down in the protection of a wall or just hang out in the hammock on the end of the dock.

Bites and Bumps: Dealing with the Down Side

What happens if you have a less-than-friendly encounter in low-viz waters? What if, like the writer, you surprise a nurse shark enough to be thumped by a fleeing tail? Or what if you're bitten, as in the case of the writer's friend? Would you know what to do?

The first rule is to stay calm. Often that seems easier said than done, but it helps you and your buddy to manage the situation more effectively.

Next, get to safety so you can assess how badly - or not - you've been injured. Control bleeding, if needed, and take note of whether you've received an open wound, as this type of injury is nearly always contaminated with bacteria, frequently with foreign bodies and occasionally with a venom.

Get help as quickly as possible. Depending on the severity of the injury, you'll need to have an oxygen unit ready to use as well as a stocked medical kit.

Try to identify the animal you've encountered; it can be helpful in determining treatment. Sometimes symptoms may not appear for hours after the contact; or perhaps you may not have seen or recognized the creature at the time of contact. Treatment, then, has to be based on the presentation of the injury with limited information as to the cause. We can often determine the most likely source by careful examination of the wound.

These are just the basics, however. Dealing with specific injuries such as bites, puncture wounds, contusions, lacerations, avulsions and even amputations requires training.

You can do it, though. Take the DAN course First Aid for Hazardous Marine Life Injuries for a more in-depth look at managing dive injuries from encounters with underwater creatures.

Remember, most marine animal injuries are the result of a chance encounter (such as swimming into a jellyfish) or a defensive maneuver by the animal (a stingray wound, for example). Injury is rarely due to an aggressive action on the animal's part. Marine animals are generally harmless unless deliberately or accidentally threatened or disturbed. The wounds that result, however, still require treatment.

The best protection against most injuries is a healthy respect for these animals. When in doubt, keep your distance. If that fails and you are hurt, seek help right away.

Prepare for those times when a dive buddy may need help, however, take the course. To find an instructor near you, contact training@danasiapacific.org.

About the Author

Elizabeth Cook is a free-lance photojournalist and technical writer. When not diving and shooting underwater photos in Southeast Asia and off the coast of California, she makes her home in San Diego. Elizabeth has been a committed DAN Member for a decade.

Robert Yin is a free-lance photojournalist and a DAN Member from San Diego. He dives mostly in the tropical Pacific. His photos appear in many books and dive magazines. He has authored 24 books in the “Marine Life for Young Readers” series and a coffee-table book, *Beneath Philippine Seas*.

DAN AP ACKNOWLEDGES AND THANKS THE FOLLOWING

ORGANISATIONS FOR THEIR SUPPORT AND SPONSORSHIP

PLATINUM CORPORATE

Platinum Plus

Hyperbaric Health - *Melbourne, Australia*
Ph: 61-3-9558 0816;
www.hyperbarichealth.com

Herbert Geer & Rundle - Melbourne, Australia
Ph: 61-3-9670 6123; www.hgr.com.au

Hyperbaric Technicians & Nurses Association - Townsville, Australia
Ph: 61-7-4781 9476; www.HTNA.com.au

J.L Publications - Victoria, Australia
Ph: 61-3-9886 0200;
www.submarinerpublications.com

Mike Ball Dive Expeditions - Queensland, Australia
Ph: 61-7-4053 0500; www.mikeball.com

Sportdiving Magazine - Victoria, Australia.
Ph: 61-3-5944 3774;
www.divetheblue.net

Asian Diver Magazine - Singapore
Ph: 65-6324 1230; www.asiandiver.com

Scuba Diver Magazine - Singapore
Ph: 65-6298 3241; www.asiangeo.org

PNG Dive Association - Papua New Guinea
Ph: 675-320 0211; www.pngdive.com

GOLD CORPORATE

Dive Centre Manly - Sydney, Australia
Ph: 61-2-99774355;
dcm@divesydney.com

Eye to Eye Marine Encounters - Port Douglas, Australia. Ph: 61-7-40985417
www.marineencounters.com

GoIndustry - DoveBid - London, U.K.
Ph: +44-20-7098 370
www.go-dov.com

Rainbow Divers - Nha Trang, Vietnam
Ph: 84-58 524351
rainbowdivers@hotmail.com

Sangalaki Dive Lodge - Indonesia
Ph: +60-88-243336
www.sangalaki.net

Undersea Explorer, Pt Douglas, Australia. Ph: 61-740-995911;
www.undersea.com.au

ARE YOU A DAN SPONSOR OR SUPPORTER?

DAN Sponsors and Supporters are dive businesses, corporations, organisations, professionals, philanthropists and enthusiasts who believe in and promote the Divers Alert Network while receiving important recognition and benefits.

Sponsorship is available and greatly appreciated at the Gold and Platinum Levels. These Levels incorporate very significant visibility benefits as well as participation in the Rewards Scheme.

DAN AP Supporters are dive businesses that have committed to supporting DAN. The Promoter Scheme involves no cost and Supporters have full access to the DAN AP Rewards Scheme. Contact DAN AP for further information.

International *DAN* Offices

DAN Mission

To be the most recognized and trusted organization worldwide in the fields of diver safety and emergency services, health, research and education by its members, instructors, supporters and the recreational dive community at large.

DAN Asia-Pacific

P.O. Box 384 (49A Karnak Rd)
Ashburton, Victoria 3147
AUSTRALIA
Tel +61-3-9886 9166
Fax +61-3-9886 9155
E-mail info@danasiapacific.org
Web Site: www.danasiapacific.org
Exec. Director: John Lippmann

Diving emergencies:
DES Australia
within Australia 1800-088200
outside Australia +61-8-8212 9242
DES New Zealand 0800-4DES 111
DAN AP Korean Hotline
010-4500 9113
DAN AP Chinese Hotline
+852-3611 7326

DAN America

6 West Colony Place Durham, N.C. 27705
USA
Tel +1-919-684-2948
Fax+1-919-490-6630
E-mail dan@DiversAlertNetwork.org
Chairman: Dan Orr
Diving emergencies:
DAN America
+1-919-684 8111
DAN America-Mexico
+52-5-629 9800 code 9912935

DAN Europe

P.O. Box DAN
Roseto 64026 ITALY
Tel +39-085-893-0333
Fax +39-085-893-0050
E-mail mail@daneurope.org
Chairman: Prof. Alessandro Marroni
Diving emergencies:
+39-06-4211 8685

DAN Japan

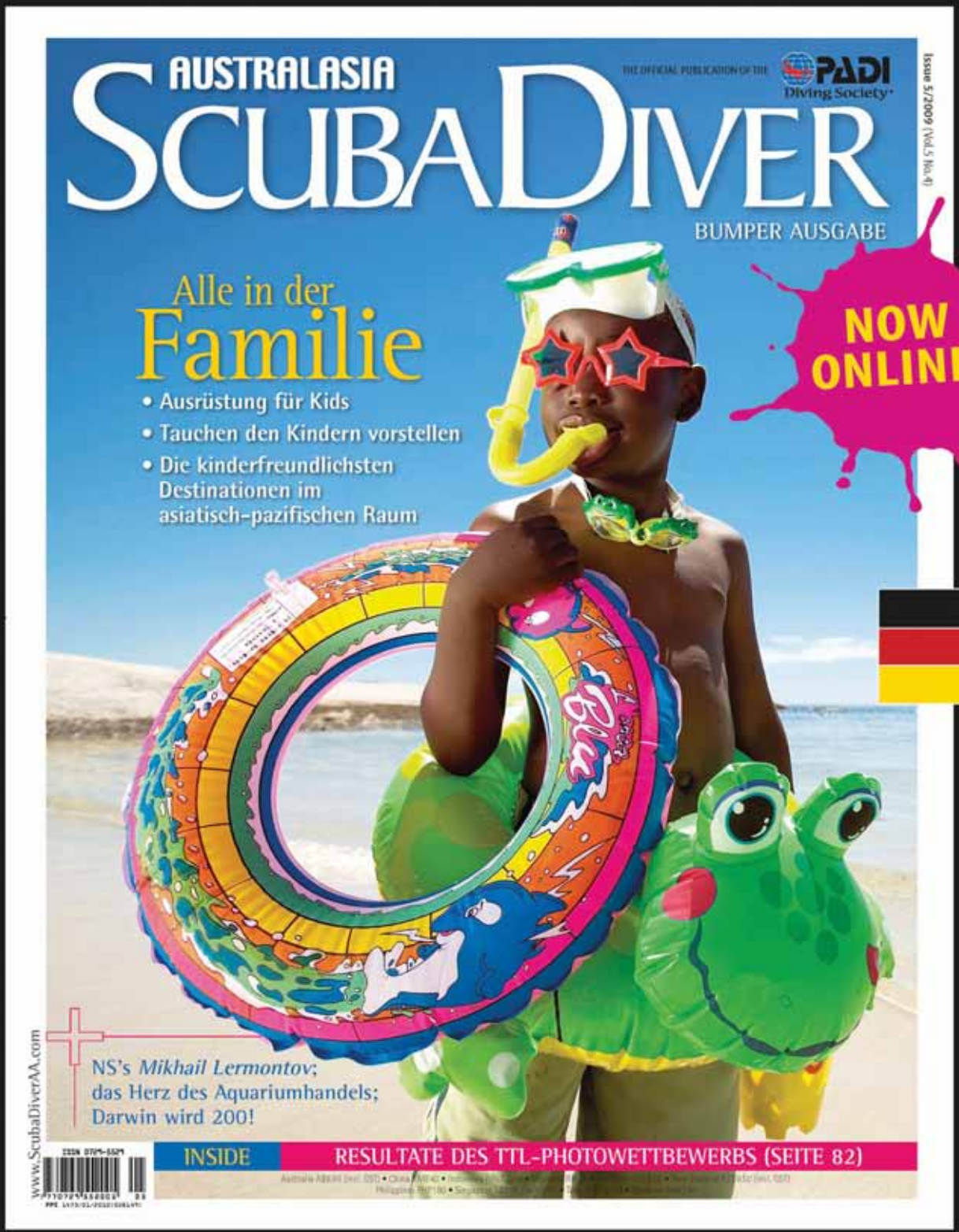
Japan Marine Recreation Association
Kowa-Ota-Machi Bldg, 2F,
47 Ota-Machi 4-Chome, Nakaku,
Yokohama City, Kagawa 231-0011 JAPAN

Tel +81-45-228-3066
Fax+81-45-228-3063
E-mail dan@danjapan.gr.jp
Chairman: Prof. Yoshihiro Mano
Diving emergencies:
+81-3-3812 4999

DAN Southern Africa

Private Bag X 197 Halfway House 1685
SOUTH AFRICA
Tel +27-11-254 1991
Fax: +27-11-254 1993
E-mail mail@dansa.org
Exec. Director: Dr. Frans Cronje
Diving emergencies:
inside South Africa:
0800-020111
outside South Africa
+27-10-209 8112

WE ARE GOING PLACES!



FREE e-magazine of *Scuba Diver AustralAsia*
is now in **GERMAN**

Check out **ScubaDiverAA.com**

FIRST AID & OXYGEN EQUIPMENT AND TRAINING

Divers Alert Network Asia-Pacific offers the most comprehensive range of First Aid and Oxygen Equipment, plus Automated External Defibrillators, all designed to be the most suitable Emergency Equipment available whether the need is diving or workplace related.

DAN ASIA-PACIFIC OXYGEN UNITS

DAN INTERNATIONAL OXYGEN UNITS

Resuscitation Manikins and Equipment

SPECIALTY FIRST AID KITS FROM DAN AP

DAN Pro First Aid Kit

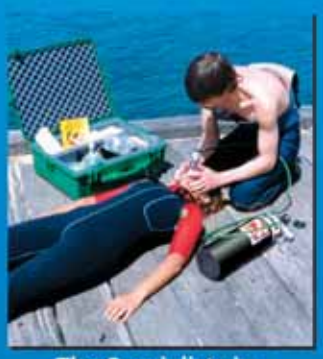
The Specialists in First Aid Training & Equipment

DAN ASIA • PACIFIC

Your Buddy in Dive Safety

www.danasiapacific.org

or contact us on +61 3 9886 9166



The Specialists in Oxygen Provider Training & Equipment