

SECTION 1. INTERNATIONAL LAW OF THE SEA

1.1. United Nations Convention, limits of jurisdiction & Council of Europe

In 1982 The Law of the Sea, United Nations Convention on Law of the Sea (UNCLOS) (Official Text 1983, published by Croom Helm, and St. Martin's Press, for the United Nations) was signed in Jamaica. The Convention document must be ratified by national legislatures before it becomes international law, but in the meantime it may be regarded as a norm to which many countries adhere in principle, in whole or in part.

There are no specific references to diving at sea in UNCLOS but there are many references to the conduct of marine scientific research. When scientists from one country conduct research on a ship which enters into the Exclusive Economic Zone (EEZ) or the territorial sea of another country, there are many obligations concerning notice of intent to conduct research, offer to accept observers and sharing the data which result. Much diving research is conducted from the shore, and when diving is conducted in foreign countries, scientists often work in collaboration with colleagues from the laboratories of that country. When direct collaboration is not involved, there may still be a requirement to obtain permits to dive from the civilian or military authorities.

The key point to note is that the UNCLOS requires that, even if you do not land or enter territorial waters, you should obtain permission to conduct diving research if you are within an EEZ, which commonly has a width of at least 200 miles.

Outside the EEZ the waters are international high seas, and the obligations of scientific divers are the normal ones of prudence and safety. The legal regime will be determined by the flag of registration of the vessel.

There are sections of UNCLOS relating to marine archaeology (Articles 149, 303). Article 149 describes artifacts found in the International Areas of the seabed. Article 303 encourages states to enforce national legislation on the protection of submarine cultural artifacts out to a distance of 24 miles from their coasts.

Council of Europe: The Council of Europe has drafted a Treaty on the Protection of the Underwater Cultural Heritage. The membership of the Council of Europe extends from Sweden and Norway to Spain and Turkey, including all the coasts of Europe with the exception of Albania. The Treaty requires the strict reporting of any archaeological finds, and very strict control of site disturbance, which must be supervised by officially appointed or approved archaeologists. If in doubt, documents can be obtained from the Council of Europe, Strasbourg, France.

1.2. International recognition of diving training certificates

Several national organizations produce diving training qualification records (2.7) or identity cards which are recognized beyond their national boundaries. The American "C" card, which is issued by several certifying agencies, is widely recognized as a sports diving qualification. Some large scientific laboratories and university marine science departments, especially in the United States, run their own scientific diving programmes, and issue recognized qualification documents. Specialized groups, such as cave diving groups, provide qualification records that

are specialized and restricted only to the relevant kind of diving or environment. At a truly international level CMAS produces certificates which are linked to national standards by a procedure of equivalence. This is restricted primarily to sports diving training using scuba equipment (Appendix 13), although the 3-Star standard is accepted as suitable for scientific diving in almost all countries.

Since the conditions of work, insurance (2.5) and legal liability are different for an employed person, as opposed to a sports diver on vacation, CMAS introduced in 1980 a certificate for Scientific Divers (4.12; Appendix 10). This certifies internationally that the holder is authorized to work as an employed scientific diver in a place of research in their country of origin. The Scientific Diver Brevet is only issued to a diver who already holds the CMAS 3-Star Diver qualification. Countries which have a very strict regime of legal and insurance requirements for scientific diving may not regard the CMAS Scientific Diver card as sufficient proof of status. However, the card is an international guarantee of one simple fact: the holder is authorized to dive at work as a scientist in the country of origin. That guarantees a certain minimum status, after which further enquiries may clarify special details. Application forms for the Scientific Diver Brevet can be obtained from: CMAS, 47 Rue du Commerce, Paris 75015, France.

1.3. Cooperative projects

Some of the most effective diving research programmes have been multinational. In the planning of such a project it is vital to ensure that such aspects as legal responsibilities and liabilities are fully understood, and that all parties know what legal regime applies in the area of work. Insurance standards should be clearly stated, both personal accident and third party liability.

In the planning of multi-national projects, due regard must be paid to the probability that divers will be used to different types of equipment and methods of use. Time should be allowed for familiarization. It is essential that the Dive Supervisor in charge of on-site diving and the Diving Officer of the host establishment make clear to all divers what rules and code of practice(s) are to be used. This is especially important when divers from several institutions or countries join to work on a research ship. There must be formal briefings to establish the rules to be used and, if necessary, practice dives together, no matter how experienced the individual divers. The hallmark of a good scientific diver is an ability to support the diving team and improve its productivity by increased teamwork and efficiency, not to promote small, procedural points of particular diving practice.



SECTION 2. NATIONAL LEGAL ASPECTS AND ADMINISTRATION

2.1. Introduction

The purpose of this section is to describe and compare briefly the legislative regimes in a few countries. The subjects raised, and documents referred to, cannot be exhaustive, but they illustrate the topics which are the subject of legislation in many countries. In countries where no legislation at present controls the standards of either working diving or sports diving, the documents referred to here may serve as guidance as to what standards are desirable, and what would be excessive. A fuller review of these topics is given by Flemming (1985).

Regulations concerning diving safety and training are designed to apply to nationals in each country. Regulations do not usually contain any specific reference to the qualifications required of visiting divers from other countries. It is reasonable to assume that host institutes will check that visitors' standards are comparable with their own, and in many institutes there are established procedures and forms for making these checks. Foreign diving teams working without a host organization will probably dive according to their own regulations. In these circumstances they should still check to make sure that their practices will be compatible with those of the host country.

Traditionally most countries have only had diving laws which protected antiquities, or installations of a military nature, banned spearfishing or controlled access to marine parks. In the last ten years, statutory regulations have been introduced in many technically advanced countries, controlling the standards of diving training and safety. This is particularly true of France, the United Kingdom, Scandinavia, South Africa, Australia, the Federal Republic of Germany and the United States. The legislation has often been introduced rather hurriedly, and then modified. Since legislation designed to control commercial diving in offshore oil fields concerns quite different techniques and equipment from those used by scientists, such legislation is usually inappropriate when applied to scuba diving for research purposes. In several countries, scientific representatives have succeeded in obtaining complete exemption from commercial diving legislation, or at least partial exemption.

The legal situation tends to be complex in the technically developed countries, and changes from year to year. Scientists working outside their own country should enquire as to whether there are any statutory regulations about training levels, conduct of dives, medical standards, equipment, and insurance, etc. Scientific divers from many countries have been in contact with CMAS, and there is a general awareness of the problems caused by inappropriate legislation.

2.2. Examples of national legislation

National laws applicable to diving are usually subsections of wider legislation. Thus, diving regulations may be enforced as part of the regulation of offshore oil production, as part of the construction industry, as part of general safety regulations of factories or as part of universal safety regulations. It follows that the population to whom the regulations apply will differ from case to case. In one country diving in inland waters and coastal waters may be controlled, but not outside territorial limits. In another country, diving will be controlled if one is working with the oil industry, but not otherwise. Yet again, diving may be controlled if one is working for a

salary, but not if one is an amateur or unpaid volunteer.

Most regulations specify standards of training and experience, but not a necessary route for obtaining the standard. Only the United Kingdom, the Federal Republic of Germany and South Africa at the date of writing this Code actually require that working scientific divers attend training schools which are approved by a government agency, and every training certificate is checked by a government agency. The United Kingdom has now successfully exempted this requirement for scientists and has reinstated sports diving standards as the recognized diving qualifications. In most countries sports diving training is accepted as sufficient for scientific diving using scuba, provided that employing institutions have an adequate supervisory program.

The following examples of legal documents applying to diving are given in alphabetical order by country. The comments are illustrative only, and should not be taken as an interpretation of the law. The original documents must be referred to.

Australia: To date there are no legislative requirements aimed specifically at scientific divers. Australia is a federation of six states and two territories, all of which have constitutional authority to legislate on matters affecting conditions of employment, fisheries, coastal navigation and maritime matters, historic shipwrecks, parks and inland waters. Additionally, the Federal Government has responsibilities for navigation, declared historic shipwrecks, national parks, resources and fisheries.

Legislation exists in some states as to the qualifications and registration of 'working divers', which could include divers employed on scientific work. It is necessary under the various employment awards for minimum wages and conditions to apply to some categories of employed divers. This includes workers compensation cover.

Some equipment, including cylinders and valves must meet the standards of the Standards Association of Australia, Australian Standard Rules for Underwater Breathing Operations, 1976 and State Legislation.

Most universities and research organizations using divers have some form of code of practice; possibly the best known is the Code of the Great Barrier Reef Marine Park Authority. It would be difficult for a diver in Australia to hire equipment or have cylinders filled if a recognized diving qualification could not be produced. A CMAS 2-Star brevet or higher would normally be recognized but a check-out dive may be requested.

There is currently a code for basic diver qualifications, with a follow-on unit for scientific diving being drawn up by the Sub-Aqua Association of Australia (SAA). Within two years this code could be expected to be enforced by State Legislation.

Austria: There are no special laws and restrictions for scientific diving in Austria. Regulations are the same as for sports divers. A scientific diver must be CMAS 2-Star or higher.

Diving is forbidden at some local archaeological sites and in private lakes. Every diver must obtain permission from the local residents or the 'Bundesdenkmalamt' for archaeological sites.

Canada: Canadian Standards Association, CSA Standard 2275.2 'Occupational Safety Code for Diving Operations'.

Note: These standards are being gradually adopted province by province. The Canadian Association for Underwater Science is pursuing the same policy as the American Academy of Underwater Sciences and is seeking complete exclusion for scientific diving, on the grounds

that the standards are only appropriate to commercial and industrial types of diving.

Chile: Diario Oficial de la República de Chile, May 1984, no. 31.876, Título IV et. seq. 'Del Deporte Submarino'.

'Reglamento de Buceo para Buzos Profesionales', Reglamento 7-54/4, Armada de Chile, Dirección General del Territorio Marítimo y de Marina Mercante, 1982.

Note: The regulations recommend the use of the US Navy decompression tables and include depth limits on different types of equipment, medical standards, etc. Frequent reference is made to the need to consult or refer to the Maritime Authorities.

The Federal Republic of Germany: Richtlinien für den Einsatz von Forschungstauchen, Hauptverband der gewerblichen Berufsgenossenschaften, 53 Bonn 1, Langwartweg, 103 (ZH 1/540). This document describes regulations for scientific diving and lists the following official documents: Working diving operations, VBG 39; Light diving apparatus, ZH 1/237; Construction of buoyancy equipment for divers, ZH 1/541; and Saturation diving from underwater habitats, ZH 1/516. Also listed are accident prevention regulations: Compressors, VBG 4; Pressure vessels, VBG 17; Floating apparatus, VBG 40a; Gases, VBG 61; and Oxygen, VBG 62.

Note: The Federal Republic of Germany diving regulations are very strict, with a strong requirement for on-site recompression facilities, government approved training qualifications, etc. There is a strong requirement for surface tended life-lines. There is strict segregation between amateur and working diving groups. There have been several research habitats developed in the Federal Republic of Germany using government research funds, and a great deal of experience has been obtained in the operation of these systems. There are three separate sets of laws applying to sports diving, professional industrial diving and scientific diving.

France: Ministère du Travail, Mesures particulières de protection applicables aux scaphandriers, 1977.

Centre Nationale de la Recherche Scientifique, Inspection Générale de l'Hygiène et de la Sécurité: Instruction Technique sur la Sécurité lors des Plongées Subaquatiques, 1978.

Note: French legislation applies to employed divers. Regulations apply to three classes of divers: qualified to dive to 30 m, 50 m and greater than 50 m. Maximum permitted depth on compressed air is 60 m. The regulations specify a detailed set of decompression tables based on repeat dives and a range of surface intervals. French marine research stations have individual codes of practice and regulations to control the standards of diving within the general standards laid down by law, and by the CNRS. There is a strong move (1985) to increase co-operation and communalize standards between laboratories.

Ireland: Irish Diving at Work Act, 1984 which refers to the Irish Factories Act, revised 1982. This regulates diving on a factory site which for the purposes of industrial diving is all-inclusive. Scientific diving is specifically excluded by the Irish Department of Labour from these regulations.

Note: Health and safety legislation which may bring scientific diving under government regulation in much the same way as in the UK is currently being written but will probably be indefinitely postponed because of the cost to industry of implementation of health and safety legislation which will, by its nature, be more all-encompassing.

Amateur and professional scientific divers commonly work together; joint projects involving sports divers in scientific projects controlled by full-time diving scientists have been organized.

both by individual universities and the Science Officer of the Irish Underwater Council. Local government funds have been used to partially defray costs of at least one major scientific project studying pollution in Dublin Bay (Clarke et al., 1986). The Irish Underwater Council considers that selected divers having suitable sports diver qualifications are covered under the general insurance policy carried for club divers while involved in organized and approved scientific diving projects.

The Shellfish Act prohibits divers taking shellfish for any purpose including scientific without a special licence from the Department of Fisheries.

Italy: No laws at present restrict the practice of scuba diving. However, insurance is a serious problem for people working while diving, and cover can be provided through the Centro Italiano di Ricerche e Scienze Subacquee. New legislation is under discussion. Amateur and professional co-operation is encouraged.

The Netherlands: The Netherlands does not yet have generally applicable laws or regulations on diving activities of scientific and sports divers.

General: Legal provisions covering professional diving activities have, however, been in preparation for a considerable time. These provisions will supplement the general laws on working conditions, which inter alia contains rules on safety and health. The first draft for legislation on diving also takes into account the European Economic Community (EEC) guidelines in this field (Mines Safety and Health Commission). It may be assumed (late-1986) that it will be some considerable time yet before this legislation on diving will come into force. Information on this (future) legislation may be obtained from: Directoraat Generaal van de Arbeid, Postbus 69, 2270 MA Voorburg, The Netherlands (Tel. 070 694001).

Zeeland regulations: In 1980 the Province of Zeeland drew up regulations prohibiting diving as a sport in Zeeland waters without a permit issued by the provincial authorities. Persons who can prove that they dive in Zeeland for scientific or other professional purposes do not need this permit. Information on the Zeeland diving regulations can be obtained from: Provinciale Griffie Zeeland, Postbus 42, 4330 LA Middelburg, The Netherlands (Tel. 01180 31011).

Finding objects under water that have an archaeological value: In principle, the Dutch Monuments Act also applies to the territory underwater. This act provides that finds with a scientific or historical value have to be reported to the competent authorities (usually the local mayor or the town office). Further, the act prohibits digging for objects with a scientific or historical value without a permit. Information on searching for, or finding, historical or archaeological objects underwater can be obtained from: (1) Rijkscommissie Oudheidkundig Bodemonderzoek, Kleine Haag 2, 3811 CD Amersfoort, The Netherlands (Tel. 033 12648); (2) Drs Thijs Maarleveld, Ministerie van W.V.C., Postbus 5406, 2280 HK Rijswijk, The Netherlands (Tel. 070 949393).

Voluntary Code of Practice: The Nederlandse Onderwatersport Bond (N.O.B., Dutch Underwater Sport Association), a member of CMAS, has drawn up safety regulations that are binding on its members. The N.O.B. has addresses of members who can give information on archaeological, biological and other scientific aspects of diving in the Netherlands. The address of the office of the N.O.B. is: Nassaustraet 12, 3583 XG Utrecht, The Netherlands (Tel. 030 517014).

New Zealand: Department of Labour, Safety in Construction, No. 15, Code of Practice for Underwater Diving. This is a guidance document, not a regulation. Shown here rather than in

(2.4) because it is promulgated by a government agency. Actual legislation and regulations concerning diving are scattered through the Construction Act; Construction Regulations; Fisheries Regulations; Merchant Shipping Act, wreck and salvage of ships and aircraft; Mining Act; Petroleum Act; Antiquities and Historic Places Acts. The Underwater Association Code of Practice for Scientific Diving, 2nd edition, (Flemming; Miles, 1979) has been widely used in New Zealand.

Norway: A draft on revised regulations on inshore commercial diving was circulated in Norway (1987). In their present form the regulations require underwater communications for all commercial diving and a chamber on location whenever dives are conducted to a depth below 24 m. As a reason for the new regulations, the national labor commission lists safety as well as ensuring that commercial divers as a trade group will not be deprived of jobs as a result of sports divers accepting assignments for lower fees than their professional counterparts.

The authorities will legalize sports divers on commercial assignments by requiring that the divers hold a 'class 1' commercial diver's licence issued by the Norwegian State's school of commercial diving to perform as commercial divers.

It is still not clear whether diving instructors and scientific divers may be exempted from the new regulations. Scientific divers are, of course, no threat to the commercial labour force, but Norwegian authorities are reluctant to grant any exemptions at all. Commercial divers have stated that if they have to comply with strict regulations they will not see any other group getting preferential treatment. It is evident that this attitude is motivated primarily by the desire to form and perpetuate a monopoly. There seems to be little public interest in the scientific divers' situation. The Norwegian Sports Diving Association (Norges Dykkeforbund) is trying to protect the rights and interests of scientific divers and sports diving instructors. Semi-professionals may not be strongly affected since the regulations will be hard to enforce on the extremely long and remote Norwegian coastline.

Sweden: To date there are no legislative requirements aimed specifically at scientific divers. There are different local safety codes being used throughout the country but they vary in important respects. This has created insurance problems for institutions.

There is an authority appointed by the government for legislation of diving certification. The authority is organized within the Swedish Navy and shall, on request, certify divers who meet the demands of identified levels of diving education in Sweden. The three levels are related to:

- (1) The Contracting industry,
- (2) The Salvage industry,
- and (3) Scientific diving.

Scientific diving training did not start until 1986. The training course is six weeks long. Certification of scientists who are currently diving in the course of their work is part of an early transitional period in the training schedule. It is proposed that diving training will be adopted and incorporated into the Swedish universities' notes system. A national safety code for scientific diving is under revision and should be presented in its new form in 1989 or 1990. A preliminary code is available from the University of Gothenburg.

Presentation of diver certification from any national or international body, especially the CMAS Scientific Diver Brevet, should give a visiting diver access to scientific diving in Sweden.

South Africa: Department of Labour, Factories Machinery and Building Work Act, 1941, Diving Work: Diver-Scientists, Chapter VII of the Regulations, Code of Practice for Research Diving. South Africa Bureau of Standards.

Note: South African regulations were negotiated fully with the cooperation of the scientific diving community. The scientific divers are represented by Barologia, the Association of Diving Scientists. The regulations make it difficult for amateur and employed groups to work together in the same team, but two self-contained teams may co-operate.

The United Kingdom: The Merchant Shipping (Diving Operations) Regulations, 1975. S.I. No. 116 (applicable on British ships outside territorial waters and foreign ships within British waters).

Health and Safety at Work (Diving Operations) Regulations, 1981. S.I. 399 (applicable to all divers anywhere in inland waters or at sea, on oil rigs, etc. within territorial waters or on the UK continental shelf, provided that the divers are self-employed or working as paid employees. (Amateurs are excluded.)

The Merchant Shipping (Diving Operations) (Amendment) Regulations, 1976. S.I. 2062. (This excludes scientists and archaeologists from the Merchant Shipping (Diving Operations) Regulations, 1975.

Note: The Health and Safety Regulations are the most important, and these lay down standards of training, certification, the appointment of dive supervisors, medical standards and procedures for the conduct of dives. Only doctors approved by the Employment Medical Advisory Service are entitled to give medical certificates to working divers. Exemptions are in force to permit groups of divers to be made up of both employed and amateur divers conducting scientific research, and an amateur diver of suitable experience is permitted to supervise a dive conducted by an employed diver. The minimum training standard for a working scientific diver is BSAC Advanced Diver or CMAS 3-Star. That is to say, sports diving standards are accepted and recognized as sufficient for a working scientific diver using scuba.

The United States of America: Occupational Safety and Health Administration (OSHA), Department of Labor, Part 1910 of 29 CFR, Subpart T, Commercial Diving Operations. (See Federal Register, July 1977, Vol. 42, No. 141, pp. 37650-37676, Final Standard.) The text of exemption covering scientific diving is contained in the Federal Register Vol. 47, No. 228, Friday, November 26, 1982, Rules and Regulations, pp. 53357-53365. There is a later amendment of January, 1983. Those requiring more information should contact the Secretary of the AAUS, 947 Newhall Street, Costa Mesa, California 92627, USA.

Note: The American Academy of Underwater Sciences has obtained exclusion for scientific divers from the OSHA Regulations. Most major universities and marine institutes have very thorough and practical codes of diving training operated at the institutional level. Divers visiting American institutes from abroad will usually have to satisfy training, legal and medical standards, established by the institution where they are going to work. To operate under the exemption, OSHA requires that 'Scientific diving be under the direction and control of a Diving Program utilizing a Diving Safety Manual and a Diving Control Board meeting certain specified criteria'.

2.3. Discussion

Scientific diving has an extremely good safety record, and there is no evidence that accidents or fatalities were frequent before legislation was introduced in any country or that accidents have increased or decreased after legislation was introduced. (See Flemming [1981] for analysis of diving accidents in Europe, and Schenk and McAniff [1975] and Sharkey and McAniff [1982] for accidents in the USA). It follows that legislation should serve the purpose of

guaranteeing the status quo, rather than effecting major changes in practice. Where legislation exceeds this level of restriction, the monetary cost of scientific diving increases, work is delayed and safety may even decrease as divers perceive that the regulations are generally irrelevant and unenforceable. For a comparative discussion of national legislation see Flemming (1985).

2.4. Examples of codes of practice

In several countries there are important documents providing guidance on diving practice at a level of recommendation, rather than mandatory legislation. These documents are usually designed in a very positive way, providing interpretation of legal matters and advice on diving in sea and freshwater conditions found in that country.

The United Kingdom: Underwater Association for Scientific Research (ed.) *The Code of Practice for Scientific Diving*. Natural Environment Research Council, publisher. 3rd ed., 1979 (Fourth edition in preparation).

Canada: Canadian Association for Underwater Science, *Standard of Practice for Scientific Diving*. Draft, February 1984.

Italy: CNR (1980) *Normative di Sicurezza per l'Immersione Scientifica*. (DeStrobel and Colantoni). SAACLANTCEN Code of Practice for Scientific Diving. 1984.

South Africa: *South African Code of Practice for Scientific Diving*, published by Barologia, Department of Oceanography, University of Cape Town, Rondebosch 7700 (adapted from 2nd ed. of the Underwater Association Code of Practice, by permission).

The United States of America: American Academy of Underwater Sciences (AAUS). *Standards for Scientific Diving Certification and Operation of Scientific Diving programs* 1984.

Woods Hole Oceanographic Institution. *Diving Safety Manual*. 1983.

Miller, J.W. (ed.). *NOAA Diving Manual*. US Government Printing Office. 1979.

California State Universities and Colleges. *Minimal Standards for Scuba Diving Certification and Operation of Scuba Diving Programs*. 1981.

University of Rhode Island. *Narragansett Bay Campus Research Diver's Manual*. 1985.

Note: These documents are just a few of those prepared by major universities and research institutes. Many sections of these institutional documents are deliberately phrased to be as similar as possible, and to comply with the minimum standards of practice for scientific diving as set out by the AAUS.

2.5. Insurance

Divers carrying out scientific work underwater should be insured.

2.5.1. Introduction

Insurance legislation differs widely from country to country, and between government organizations and private organizations. In some cases employed divers may be covered automatically by virtue of their employment.

Institutes, university departments or groups of divers who are, or wish to be insured commercially, should arrange consultations between their insurers, the administrators and the scientists responsible for diving activities to ensure that adequate insurance cover is provided.

The following points are relevant to such consultations:

1. Size and training standard of the diving team.
2. Medical examination standard.
3. Code of practice or regulations followed.
4. Operating areas and depths.
5. Apparatus and techniques involved.
6. Equipment maintenance standards.
7. Liaison with marine insurers if research vessels are involved.
8. Compliance with statutory regulations where necessary.

It is the institute's responsibility to take all reasonable precautions against accidents during diving activities. This demands standards of medical fitness and training, adherence to an approved code of practice and the provision and maintenance of suitable equipment.

In all institutes diving is a voluntary activity and in some institutes divers are required to sign a disclaimer to that effect. This serves first to draw the individual's attention to the demanding nature of the duty undertaken and second to indicate that the diver knowingly waives some rights. The individual can only press a claim against the institute by proving negligence on its part. The diver is entitled to refuse to dive under any circumstances in which there is reason to believe that there is evidence of negligence, for example the provision of defective equipment.

Since the individual has little chance of a successful claim against the institute in the event of an accident occurring if all reasonable precautions have been taken, the diver is strongly advised to take out personal accident insurance. This and all other policies such as life insurance and mortgage protection policies should have specific endorsements for diving risks in connection with employment, whether paid or unpaid, added to the policy document. Under certain circumstances it may be possible for the employing institution to reimburse divers for the excess premium required to obtain or maintain the usual life insurance policies on a personal basis.

Scientific diving associations such as AAUS, CAUS, UASR, CIRSS, etc. provide advice on insurance for divers.

2.5.2. Classes of risk

Several different classes of risk and liability should be considered, not necessarily in order of importance:

1. Liability of the employer for claims against the employer by an injured diver or his/her dependent(s).
2. The liability of the employer for claims against the diver by employees or the general public arising from diving accidents.
3. The liability of any diver for claims against the diver by other divers or members of the public arising from diving accidents.
4. Personal accident insurance for individual divers compensating them or their dependents for accident or loss of life caused by diving while employed.
5. Personal accident and third party liabilities arising from boat-handling, which is not usually included in a diving insurance arrangement.

2.5.3. Standard group insurance policies

Sports diving organizations and national diving federations often provide third party public liability insurance for their members as part of the membership rights, the cost being part of the subscription fee. Personal accident insurance can usually be obtained through agents who are familiar with diving risks. In both cases, these policies become invalid if the diver undertakes

paid or professional work for profit.

For this reason, some scientific diving associations have negotiated group insurance to cover scientific work only. Examples are the CIRSS in Italy and the UASR in the UK. In both cases, a member of the association receives insurance cover while employed in scientific diving activities. For addresses of scientific diving associations, see Appendix 8.

2.6. Equivalent job titles

Detailed descriptions of responsibilities or personnel will be given in Section 3, but a broad equivalence of titles is important for legal purposes and insurance evaluation and is thus relevant here. The titles of people responsible at different levels vary from country to country but the overall structure is consistent. The titles and structure listed below will only apply in larger institutes or departments; in smaller establishments some of the roles can be combined. The job titles illustrated below have been chosen from the line-management structures in several countries and are shown as examples (Table 2.1).

In general terms Level 1 is the ultimate legal and employing authority in the organization. Level 2 is the senior individual, individuals, or committee responsible for overseeing diving training and safety. Level 3 is the responsible administrative officer charged with carrying out the policies and directives of the Diving Control Board. Level 4 is the professional technical expert responsible for all technical, administrative and personnel aspects of diving training and safety. Level 5 is the person responsible for diving safety and conduct at any particular dive site. Level 6 describes the diver who is in charge underwater when a buddy pair dive together. Level 7 describes the diver at work. Level 8 is a diver whose training has been approved, but is not yet complete.

2.7. Qualification records and authorization to dive

Certification of the diver's training courses, medical examinations and diving records should be in an officially recognized diver's record card or logbook. In a few countries these logbooks must contain records of every dive with specified details required by law. In most countries, a sports diver style of logbook is sufficient.

With regard to training records the following items should be recorded and signed or approved with the appropriate stamps and dates:

1. Senior officer's approval to undertake diving course.
2. Signature on a voluntary declaration form.
3. Medical examination and X-rays passed prior to first dive.
4. Theoretical written examination passed.
5. Pool examination passed, or shallow water tests.
6. Open-water basic training with scuba completed.
7. Open-water practice period as a Trainee diver completed.
8. Authorization to dive.

Table 2-1. Examples of equivalent job titles

Level	UK	USA	CANADA	NORWAY
1.	Director of Institute, or Chancellor of University	President of the University	Chief Executive	Governing Board, or Rector of the University
2.	Diving Officer	Diving Board of Control	Diving Control Board	Diving Control Board
3.	-----	Diving Officer	Diving Officer	Departmental Diving Officer
4.	Chief Diver	-----	-----	Diving Officer's Appointee
5.	Dive Marshal/ Dive Supervisor	Lead Diver/ Dive Master/ Supervisor	Person in Charge	Lead Diver
6.	Dive Leader	Dive Leader	Dive Leader	Dive Leader
7.	Diver	Diver	Diver	Diver
8.	Trainee	Diver-in-training	Diver-in-training	Trainee

In some countries or institutions diving authorizations are depth limited at intervals and may expire if dives are not completed by regular dates. These systems are effective where it is a simple matter for divers to obtain dives in deep water in order to keep in date, but may result in unnecessary journeys and expense when an institute is located far from deep water. In the latter case a work-up dive schedule is preferable before each major diving project (4.9.1; 4.9.2; Table 4-1).

2.8. Pay

Some institutions or organizations provide a pay bonus or supplement for scientists who dive in the course of their work. This practice does not compromise the general principle that scientific divers are employed primarily as scientists, and that diving is only a voluntary element in their research programmes. In some countries the acceptance of diving pay may change the legal status of the diver.

Supplementary pay schemes are usually based on either:

1. A proportion of the scientist's daily pay added to each day on which diving takes place.
2. A sum proportional to the number of atmospheres x minutes for which the diver is either actually underwater or fully kitted up on the surface before and after a dive.
3. A fixed sum which is intended to compensate the diver for discomfort or outdoor time or

additional personal costs incurred.

2.9. Volunteers

Employed/working scientific divers may frequently dive in company with volunteer assistants or teams in the following circumstances:

1. Where an employed teacher or supervisor dives with students in the course of scientific instruction or research.
2. Where students or amateurs volunteer to join a selected team to conduct research and assist a professional research worker.

In these cases the amateurs/volunteers should be regarded as if they were temporary employees, and their diving should be conducted according to the same code of practice and laws as those applying to the institute/ university/employer. The only exception may be the legal requirement to have attended specific courses of training relevant only to employed divers. This protects the institution from the allegation that it is allowing amateurs to dive in an unsafe manner while using their labour and goodwill.

3. Where a professional researcher or scientist supervises members of a club or voluntary group who have offered to do environmental studies in the region where they normally dive and ask for scientific advice.
4. Where amateur divers discover an archaeological site and are supervised by a visiting professional.

In these cases diving will almost certainly be conducted to the normal standards of sports diving and be covered by sports diving insurance. Neither the visiting professional, nor their employing institution takes responsibility for the diving training standards, conduct of dives, choice of dive-sites or times of dives. The visiting professional scientist should make sure that their own diving practices are compatible with those of the amateurs, and that their insurance is not invalidated by diving without professional companions.

It cannot be stressed too strongly that the above examples are only examples from a range of possibilities, and that the law has never been tested in this area. Co-operation between amateur and professional scientific divers has proved beneficial to aquatic science over the last two decades and is very widely practised. It is hoped that this co-operation will continue. Volunteer amateur divers working for an institution, whether paid or not, should sign a declaration form outlining the terms agreed on, and making it clear what standard of diving and code of practice is being applied.

Diving conducted in the mode of paragraphs (3) and (4) above should not be regarded formally as scientific dives, or logged as scientific dives, except for the professional scientists involved. This helps to preserve the statistical records of scientific diving, to avoid over-counting the numbers of supposed scientific dives and to identify the true categorization of any accidents or incidents that may occur.

