The International Marine Contractors Association

Limitations in the Use of SCUBA Offshore

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The International Marine Contractors Association (IMCA) is the international trade association representing offshore, marine and underwater engineering companies.

IMCA promotes improvements in quality, health, safety, environmental and technical standards through the publication of information notes, codes of practice and by other appropriate means.

Members are self-regulating through the adoption of IMCA guidelines as appropriate. They commit to act as responsible members by following relevant guidelines and being willing to be audited against compliance with them by their clients.

There are two core committees that relate to all members:

- Safety, Environment & Legislation
- Training, Certification & Personnel Competence

The Association is organised through four distinct divisions, each covering a specific area of members' interests: Diving, Marine, Offshore Survey, Remote Systems & ROV.

There are also four regional sections which facilitate work on issues affecting members in their local geographic area – Americas Deepwater, Asia-Pacific, Europe & Africa and Middle East & India.

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This guidance document was prepared for IMCA under the direction of its Diving Division Management Committee, enhancing and extending guidance formerly available via guidance note AODC 065, which is now withdrawn.

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1 BACKGROUND

SCUBA – self-contained underwater breathing apparatus – was first developed in the 1940s and has since become widely used for recreational and amateur diving.

This type of equipment had been used in the past in place of the commercial diver's normal surface demand equipment. However, after a number of accidents and fatalities, the limitations of SCUBA in comparison to surface supplied equipment became clear. Thereafter the use of SCUBA for commercial diving work became restricted.

In July 1994 AODC issued guidance note AODC 065 entitled *SCUBA* (Ref. 1), which stated:

> *"SCUBA (self-contained underwater breathing apparatus) has inherent limitations and it is strongly recommended that it should NOT be used for offshore diving operations in support of: oil/gas projects; marine construction; civil engineering or salvage."*

This was subsequently reinforced in April 1998 when the *IMCA International Code of Practice for Offshore Diving* (IMCA D 014 - Ref 2) was published. Section 7.1.1 of that document stated:

> *"Self-contained underwater breathing apparatus (SCUBA) has inherent limitations and difficulties, such as limited breathing gas supplies. It should not be used if surface supplied equipment can be used and thus there are unlikely to be any circumstances where the use of SCUBA will provide a suitable technique for diving under the scope of this Code."*

It should also be noted that SCUBA is specifically banned for offshore diving under some national regulations.

2 SCOPE

This guidance re-iterates the IMCA (and earlier AODC) guidance that SCUBA is an inappropriate technique for use in offshore diving operations and provides additional clarification on the limitations of the use of SCUBA.

IMCA members are sometimes asked by potential clients to use SCUBA because it is seen as a simpler way of doing things compared to conventional surface supplied diving. This note seeks to provide clarification on such issues.

3 SHORTCOMINGS IN THE USE OF SCUBA

There are a number of limitations in the use of SCUBA, which are set out below.

3.1 Limited Breathing Gas

By definition, there is a limited amount of compressed gas available from the cylinder(s) carried by a diver using SCUBA. The problems this can cause in commercial diving are:

- The time a diver can spend under water is limited by the amount of gas that the diver can carry with him. This is a particular problem if the diver is working hard and breathing heavily. For efficiency, a commercial diver needs to maximise time in the water. With surface supplied equipment the time in the water is not limited by breathing gas availability.
- In many commercial diving locations there are obstructions under water. If a diver becomes entangled or fouled then the limited amount of breathing gas available using SCUBA can present a serious safety problem – which is not the case with surface supplied equipment. In the event of the diver being trapped, a surface supplied diver has virtually unlimited gas supplies to sustain life either until assistance arrives or the situation is resolved. A SCUBA diver has a very limited breathing gas supply available in such circumstances. The SCUBA diver, in such situations is also likely to become distressed, leading to an increased breathing rate and faster consumption of the limited breathing gas supply.
- A surface supplied diver has a separate reserve of breathing gas carried in a cylinder on his back. If his main gas supply from the surface is lost for any reason then he has sufficient reserves to return safely to the surface or another place of safety. Although some SCUBA systems do have a reserve facility these have a record of failure in an emergency. They can also be easily activated and depleted without the diver's knowledge. The reserve supply of gas carried by a SCUBA diver is normally extremely limited.

3.2 Lack of Communications with the Surface

Divers using surface supplied equipment have an umbilical that carries various services between the surface and the diver. This includes voice communication between the diver and the diving supervisor and sometimes video pictures from a diver carried camera. The SCUBA diver is often not supplied with any sort of communications to the surface.

The advantages of having voice communications are:

- The diving supervisor will talk to the diver as the work is being carried out. He can provide guidance and instruction (even more if video is used) which substantially improves efficiency of the work;
- The diving supervisor is able to monitor the diver's breathing pattern and will be alerted if the diver is in distress;
- The diver can tell the diving supervisor if he feels unwell or has a problem

Sometimes SCUBA divers use what is known as 'personal through-water communications' that do not use a hard wire system to the surface. Such non-hard-wired systems may not be reliable and often do not provide clear communications. In general such systems are operated by direct diver action thus requiring the diver to be conscious. Such systems do not enable the diving supervisor to monitor the diver's breathing patterns.

3.3 Safety of Breathing Equipment

A SCUBA diver can wear a number of types of breathing equipment. One type is known as a "half mask and regulator" with the mask only covering the eyes and nose. Use of this equipment requires the diver to hold the regulator for breathing gas between his teeth. There have been many accidents with this type of equipment due to the regulator becoming dislodged from the diver's mouth or the half mask coming off the diver's face and the diver inhaling sea water. Such accidents can be fatal.

In contrast surface supplied divers always wear full face masks or helmets with the regulator forming an integral part of the mask or helmet. This allows the diver to breathe normally through either nose or mouth. The chances of the diver inhaling sea water while unconscious or due to an accident are thus virtually eliminated.

3.4 Decompression

A SCUBA diver normally has to carry his own depth gauge and watch. This is an extra task for him to think about while diving as he has to control his own decompression. Some SCUBA divers wear decompression 'computers' but these are programmed for recreational users and may not be reliable for the heavier types of work normally carried out by commercial divers.

In contrast a diver using surface supplied equipment has his depth constantly monitored by the diving supervisor on the surface. The supervisor can thus control the amount of time that the diver spends at depth and ensure that proper decompression procedures are followed.

3.5 Mobility/Emergency Recovery

It is sometimes said that SCUBA divers are much more mobile under water than divers using surface supplied equipment.

While this may be true of a free-swimming SCUBA diver, with no life line or other attachment to the surface, the risks of free swimming (such as the diver going missing) are not acceptable in offshore commercial diving. As an example a free-swimming SCUBA diver could be seriously affected by sea currents. If the SCUBA diver is connected to the surface by a life line then he is no more mobile than a diver wearing normal commercial surface supplied equipment.

For surface supplied diving the length of the umbilical in relation to the worksite is known and enables rapid location and recovery of the diver in an emergency situation.

4 REFERENCES

1 AODC 065 – *SCUBA*, July 1994. This publication has now been withdrawn.

2 IMCA D 014 – *IMCA International Code of Practice for Offshore Diving*, April 1998

3 IMCA D 015 – *Mobile / Portable Surface Supplied Systems*, May 1998