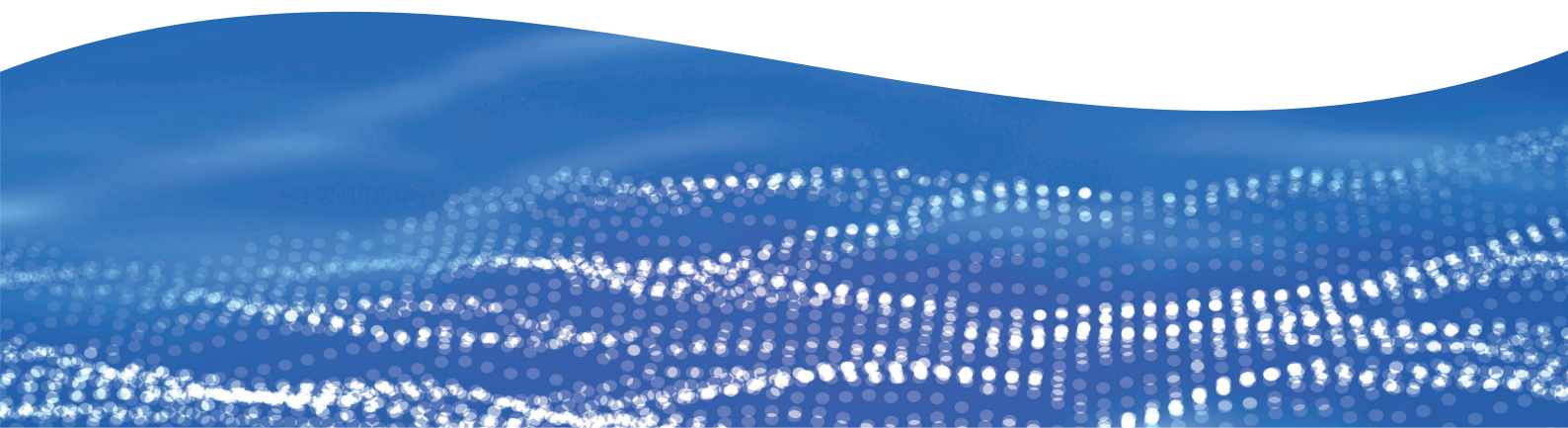




Guidance on Diver Attachment to Structures by Means of a Weak Link

**IMCA D 058 Rev.1
July 2021**





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Document designation: this document is categorised as a Recommended Practice.

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IMCA D 058 Rev.1 – Version History

Date	Reason	Revision
July 2021	Minor updates after periodic review	Rev.1
October 2016	Update of AODC 058 during IMCA review	IMCA D 058
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1 Introduction

The offshore diving industry recognises that it is sometimes necessary for divers to secure themselves and/or their umbilical to structures in order to be able to carry out certain tasks. Unplanned movements of the dive platform from which diving is being carried out (for example, during a DP vessel station-keeping incident) have the potential to cause significant injuries to divers who have secured themselves or their umbilical to underwater structures but not incorporated a reliable weak-link device into their rigging arrangements.

In order to reduce the possibility of injury it is essential to ensure that when divers secure themselves to underwater structures they always have access to, and always use, a safe and reliable weak link device which has been appropriately evaluated and will break or release at a predetermined load.

In the early 1990s trials were carried out on behalf of the Association of Offshore Diving Contractors (IMCA's predecessor) by the National Hyperbaric Centre and Comex UK to identify a suitable device(s). When the trials were completed, a report was prepared. The conclusions of the report are still considered valid, and so they continue to be reflected in this guidance document.

Apart from the specific 'touch and close' type fastening materials quoted in this guidance, the other proprietary brand names used are purely for convenience in identifying the type of equipment referred to.

2 Aims

The main aims of this document are to provide information and guidance to divers, diving supervisors, diving contractors and others on:

- 1) the design requirements of diver weak-link devices;
- 2) the types of diver weak link devices currently considered suitable for commercial diving operations; and
- 3) the importance of using diver weak-link devices when it is necessary for divers to secure themselves to underwater structures during operations conducted from moveable diving platforms.

3 Application

This guidance is intended to apply internationally, but it is recognised that some countries will have legislation that requires different standards or practices to be followed. Where local or national laws are more stringent than the advice contained herein, they will always take precedence over this guidance.

4 Design Requirements of a Weak Link Device

In order to meet the required standard of safety a weak link device must be capable of:

- a) supporting a fully equipped working diver and/or their umbilical against current or other forces in water;
- b) breaking/releasing reliably on application of an appropriate load, considered to be in the region of 70 kg;
- c) withstanding environmental conditions, such as mud, water, grease etc.

Any weak link should be used in conjunction with a device capable of manual release under tension by the diver, such as an over-centre snap shackle which also allows the attachment to swivel (see Figure 1).



Figure 1 – An over-centre snap shackle

5 Devices Tested

5.1 Unsuitable Options

The suitability was investigated of various devices to act as weak links such as cordage, welding rods, Gibbs clips, carabiner clips, cable ties (Ty-wraps) and ascenders or 'Jumar' clips, none of which was able to consistently meet all of the design requirements.

5.2 Touch and Close Type Fastenings¹

Initial trials with a 'touch and close' type fastening indicated that this material produced consistent results on application of various loads and in various conditions, i.e. wet, dry and lubricated with a mixture of oil and water. The two most well-known proprietary brands of hook and loop material are 'Cosmolon' and 'Velcro', the former being the brand used in the trials.

Quantitative tests were conducted using 24 mm wide 'Cosmolon' of varying lengths. Results indicated that the load required to effect release of the device is governed by the length of the contact closure area of material used, at the given width of 24 mm. The desired breaking load of 70 kg was therefore achieved using a contact closure length of 70 mm i.e. an area of 16.8 cm².

A device designed to the above specification (see sketch at Appendix 1) was tested in a variety of different conditions, i.e. wet, dry and oily water. Consistent results were achieved in all cases.

The device will break or release at a predetermined load and will permit release by means of the mating surfaces being pulled apart by the diver himself in an emergency or during their emergency recovery. It is important, however, that the device is used correctly in order to maintain its integrity and effectiveness for as long as possible, i.e.:

1 Also known as a 'hook and loop' fastenings

- a) it should be attached to a clip capable of manual release under tension (such as an over-centre snap shackle) and this assembly incorporated into the diver's preferred rigging arrangement;
- b) once incorporated, the diver should use the over-centre snap shackle and not the weak link device to release their rigging arrangement under normal circumstances. There should be no need to separate the mating surfaces of the weak link, thus preserving the integrity and effectiveness of the touch and close fastening material;

On-site testing has demonstrated that if it is used incorrectly and is continually opened and closed underwater, the mating surfaces will deteriorate due to clogging of the latter by marine growth, thus rendering it ineffective.

A device constructed of Cosmolon/Velcro in accordance with this guidance note is regarded as a safe and reliable weak link device which will break or release at a predetermined load and will permit release by means of the mating surfaces being pulled apart by the diver himself in an emergency or during their emergency recovery.

6 Conclusions

6.1 Touch and Close Type Fastening

A device constructed of 'hook and loop' material (such as that made by 'Cosmolon or Velcro'), of width 24 mm, with a contact closure surface of length 70 mm (i.e. an area of 16.8 cm²) as demonstrated in Appendix 1, will provide a safe, reliable, and cost-effective method of holding a diver or their umbilical to structures and ensuring their release in an emergency when used in accordance with the guidance.

On-site testing has demonstrated that if the device is used incorrectly and is continually opened and closed underwater, deterioration of the mating surfaces will occur due to clogging of the latter by marine growth, thus rendering it ineffective.

The diver should incorporate the chosen system into their own preferred rigging arrangement in conjunction with a device capable of manual release under tension such as an over-centre snap shackle, which also allows the attachment to swivel.

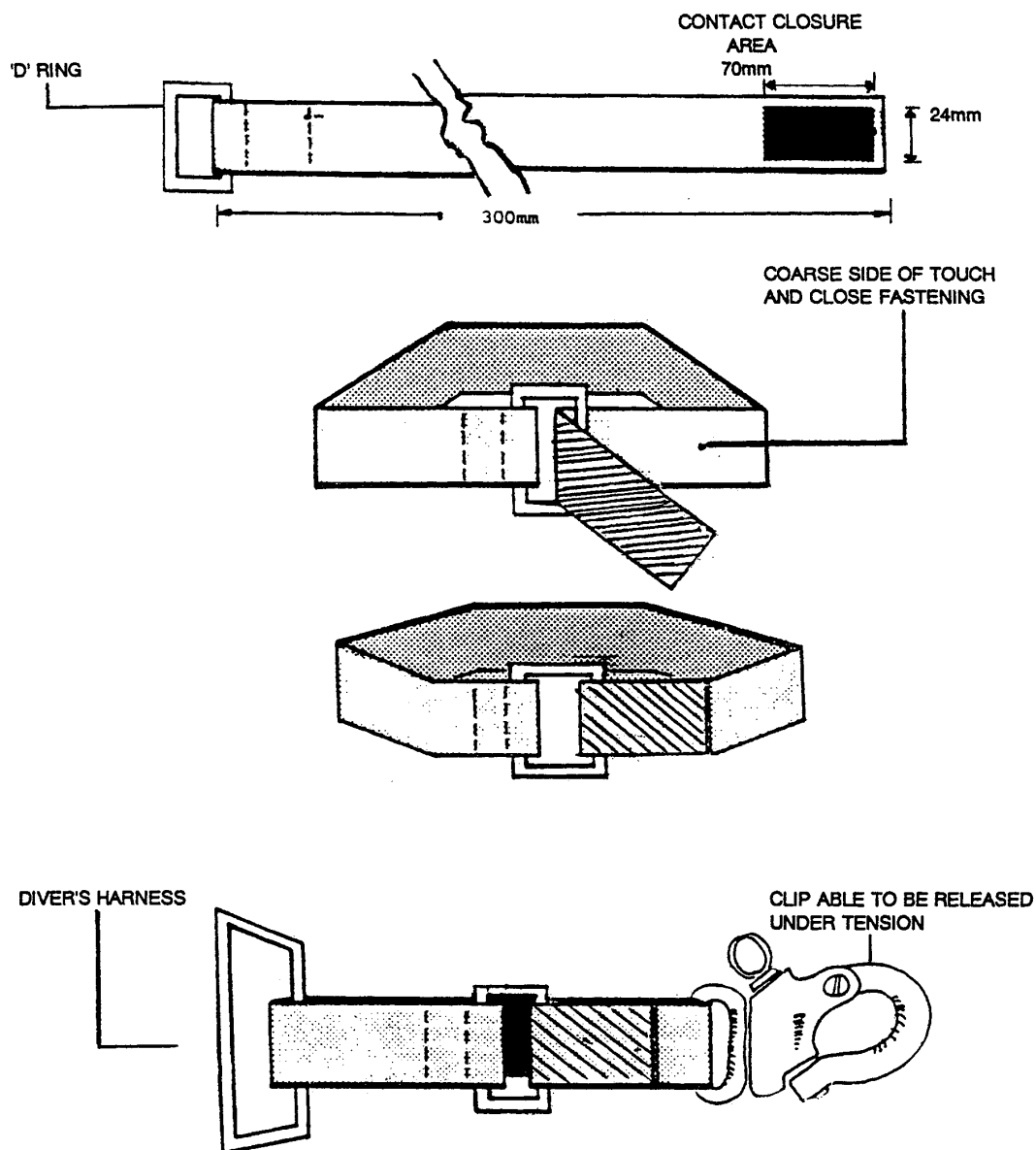
7 Other Methods of Safe Diver Attachment

It is acknowledged that there may be other equally suitable methods of diver attachment which have not been tested. Before use, however, any other method should have been demonstrated to comply with the principles contained in this guidance note.

7.1 Other weak link methods

Other innovative ideas and solutions such as spiral wound wire (key ring types) may be used. It must be ensured that if any of these are to be used they should be rigorously tested to show that the method will release when loads of above 70kg are applied, or can be released quickly in the event of an emergency, or when the standby diver is deployed.

Touch and Close Fastening Weak Link Device



WEAK LINK ASSEMBLY

TO BE INCORPORATED INTO THE DIVERS
PREFERRED RIGGING ARRANGEMENT BY
MEANS OF A CLIP SUITABLE FOR RELEASING
UNDER TENSION **NOT** BY OPENING