SMALL BOAT SAFETY

Draft 4 - 24 July 06

ISO TC 188/SC N

Date: 2006-06-12

ISO/WD 188000

ISO TC 188/SC /WG

Secretariat: SIS

Quick release system for trapeze harness

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Document type: International Standard
Document subtype:
Document stage: (20) Preparatory
Document language: E

NASport/jor ((M/1.F)) 2006-09-12

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Foreword

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Introduction

Thousands of people actively participate is small boat sailing with little evidence of accident, injury or death. Statistically sailing is one of the more safe leisure activities. There are however a very few documented accounts of injury and death owing to a participant being entrapped underwater as a result of not being able to detach themselves from the boat and in some cases not been able to release themselves from a sailing boat trapeze.

This standard has been developed jointly by recreational craft user groups and industry in an endeavour to further reduce the possibility of entrapment underwater as a result of the inability of a user to release themselves from a sailing boat trapeze.

The field of application of this standard is intentionally restricted and only covers the functioning of the safety release system of small sailing boat trapeze arrangements. When developing this standard the Working Group emphasized that the safety of a boat and her entire management shall be the sole responsibility of the skipper who shall ensure that the boat and crew are adequate to face the conditions that may arise in the course of user. The establishment of this standard in no way limits or reduces the absolute responsibility of the skipper for the crew, the boat ~~yacht~~ and the management thereof.

Quick release system for trapeze harness

1 Scope

This standard specifies requirements and test methods for quick release systems as a component of the sailing boat trapeze systems.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

(To be completed later)

3 Terms and definitions

For the purposes of this standard the following terms and definitions apply:

3.1
sailing boat trapeze system
system of sailing boat equipment and/or devices attached to a boat and user which may be used to support the main body mass of that user enabling ~~the to~~ an increase in the righting moment (through their body mass) on the boat

3.2
main attachment point
point to which the trapeze system tensile load is applied and which connects and disconnects the user to and from the boat when the system is in normal use

3.3
release attachment point
point to which the trapeze system tensile load is applied and which releases the user from the boat when the release system is activated.

NOTE In any particular trapeze system the release attachment point may be the same as or may be additional to the main attachment point.

3.4
quick release system
system, mechanism device etc. which brings about the intentional immediate release and separation of the release attachment point under critical emergency load conditions

3.5
user main attachment fitting
fitting or device possessing the user main attachment point and which, in normal use, after disconnection, remains with the user

3.6
boat main attachment fitting
fitting or device possessing the boat main attachment point and which, in normal use, after disconnection, remains with the boat

3.7
exclusively compatible main attachment fittings
situation where the user and boat main attachment fittings are exclusive to each other i.e. they may only be used together

3.8
non-exclusively compatible main attachment fittings
situation where the user and boat attachment fittings are not exclusive to each other i.e. the user main attachment fitting may be used with the boat main attachment fittings of a common design similar in shape and application to the standard boat main attachment fitting

3.9
standard boat main attachment fitting
ring to be used as the boat main attachment fitting in cases of non-exclusively compatible attachment fittings.

NOTE See also Figure 1.

Figure 1

3.10
harness
textile assembly worn by the user to which is attached that part of the main attachment fitting which remains with the user after disconnection

3.11
manufacturer's specified operational weight range
range specified by the manufacturer giving the minimum and maximum operational weight (the weight of the user ready to sail, equipped with trapeze harness, footwear, wetsuit, flotation, etc.)

3.12
operation time
time taken by the user, after being alerted to the need to release, to fully actuate the release system

3.13
release time
time taken after the release system is actuated until the full functioning of the release system and the release occurs

4 Requirements

4.1 Design

The quick release system design shall have the objective of releasing the user from the boat within a minimum specified time.

At the point of release some parts of the system will remain with the boat and other parts with the user e.g. ring and hook. After release it shall be possible for the system to be reconnected to enable re-use.

The distributor of a boat fitted with a trapeze hiking system must provide either main attachment fittings that are exclusively compatible or, if only supplying the part that will remain with the boat, must provide a boat main attachment fitting of the standard type as detailed in Annex A of this standard.

All parts of a release systems shall be compatible and be sold as such.

4.2 Assembly/installation

The quick release system assembly/installation procedure must be detailed in a user manual and must be sufficiently detailed and precise to avoid errors in assembly/installation.

The manual must define the difference between exclusively compatible main attachment fittings and non-exclusively compatible main attachment fittings and specify which is applicable.

4.3 Operation

4.3.1 General

The quick release system shall be easily accessible and operable in all conditions that might occur whilst in normal use.

After all the tests described in Clause 5 have been carried out, the quick release system must still be capable of correct operation.

The quick release system shall be easily identifiable, be primarily red in colour and, when necessary, include text and/or a picturegram illustrating method of release e.g. "Pull" and/or and arrow.

4.3.2 Inadvertent release or disconnection

The quick release system shall not present risks of inadvertent release in a normal sailing situation.

4.3.3 Risk incurred on operation

Operation of the quick release system must not present any significant risk to the user.

4.3.4 Functional environment

The quick release system shall be able to operate in a moist, salt and sandy environment.

4.3.5 Resistance to breakage

The quick release system shall ~~s~~not break under a load of [2.5] times the maximum operational weight specified in the manufacturers specified operational weight range.

4.3.6 Functional capacity after a one-off exceptional overload

The functioning of the equipment shall not be compromised after a one-off overloading of [2.5] times the maximum operational weight specified by the manufacturer.

5 Test methods

5.1 General

The test results shall be recorded.

5.2 Sampling

Tests are to be conducted on a quick release system selected at random from among 5 samples provided by the manufacturer or distributor.

5.3 Test configuration

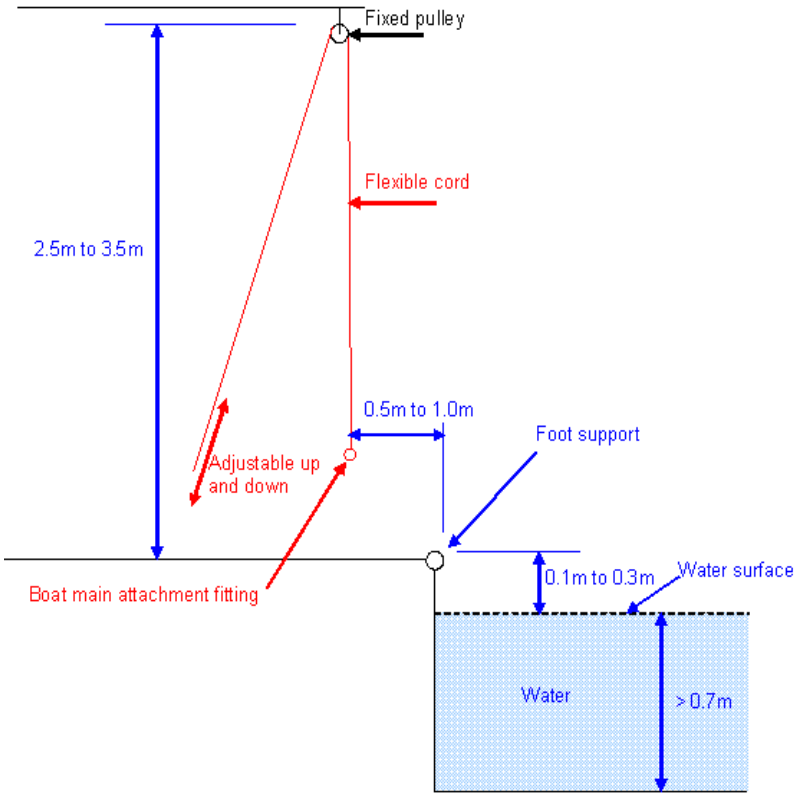
The tests shall be conducted in the configuration corresponding to the situations in which the elements of the quick release system will be operated, i.e. hook to ring, not hook to hook.

The equipment shall be assembled/installed according to the information supplied by the manufacturer.

If the user main attachment fitting to be tested is of the exclusively compatible type, for the tests, the exclusively compatible boat main attachment fitting shall be used otherwise the standard boat main attachment fitting shall be used.

Suspend, by a flexible cord (wire rope, rope or similar), the boat main attachment fitting in the position as given in Figure 1.

Figure 1



Assemble a harness, the user main attachment fitting and the quick release system to be tested and suspend the assembly by the user main attachment fitting from the boat main attachment fitting.

5.4 Overload test

Apply a load of [2,5] times the maximum weight specified in the manufacturer's specified operational weight range to the lowest item of the assembly.

Activate the quick release system.

For the test to be passed the release time shall have been less than [1]s. Additionally there shall have been no breakage or distortion of any part of the quick release system.

5.5 Operation inline - 100° test

Choose a human test user with a weight within the manufacturer's specified operational weight range.

Don the test user in an assembly of a harness, user main attachment fitting and the quick release system to be tested. Additionally full finger fitting neoprene gloves of not less than 2 mm neoprene thickness and full blackout blindfold.

Apply additional weight to the trapeze harness so that the total weight, including the weight of the test user and trapeze harness itself, is equal to or not less than the maximum weight specified in the Manufacturer's specified operational weight range.

Suspend the test user via the user main attachment fitting to the boat main attachment fitting. The test user's feet shall be in contact with the foot support (see Figure 1) with their body straight and suspended over the water.

The test user's rotational attitude to the suspension shall be inline i.e. the user shall be inline with and facing the suspension cord.

The test user's length attitude to the suspension shall be 100° i.e. the angle between the upper part of the test users body and the suspension cord shall be 100°. See Figure 2.

Figure 2

The test user's hands shall be placed on top of their head.

Check

— that the release system is easily accessible

— the ergonomics and kinematics of the release system operation are compatible with the physiological movements of the user's upper limbs

— the system does not present risks of inadvertent or accidental release

— the system does not be compromised any other operational situation

— the system does not present any significant risk to the user

At a single unprompted or anticipated sound signal, the test user shall attempt to activate the quick release system.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.6 Operation inline - 45° test

Repeat the test according to 5.5 but with the user's length attitude to the suspension at 45° i.e. the angle between the upper part of the test user's body and the suspension cord shall be 45°.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.7 Operation 15° right - 100° test

Repeat the test according to 5.5 but with the test user's rotational attitude to the suspension rotated 15° to the right i.e. the user shall be facing 15° to the right of the suspension cord.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.8 Operation 15° left - 100° test

Repeat the test according to 5.5 but with the test user's rotational attitude to the suspension rotated 15° to the left i.e. the user shall be facing 15° to the left of the suspension cord.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.9 No load test

Repeat the test according to 5.5 with the test user standing below the suspension cord pulley with no tension applied to the system.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.10 Debris test

Bury and compact the complete assembled trapeze system in a mixture of [50 %] saltwater, [25 %] fine sand, and [25 %] mud and silt by volume for not less than 60 seconds. Remove the complete assembled trapeze system and without cleaning, repeat the test according to 5.5.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.11 Longevity test

Immerse the complete assembled trapeze system in a bath of saltwater, salt to [10 %] by volume, for not less than 10 days. Remove the complete assembled trapeze system and without cleaning or drying, repeat the test according to 5.5.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.12 Corrosion test

Without cleaning after the test according to 5.10, leave the complete assembled trapeze system in a moist salt laden environment untouched for not less than 90 day and without cleaning or drying, repeat the test according to 5.5.

For the test to be passed the operation time shall have been less than [3]s and the release time less than [1]s.

5.13 Final test

Repeat the test according to 5.4 and then the test according to 5.5.

6 Marking

The quick release system and/or harness if sold with the quick release system shall display:

— The requirements of section 4.3.1

— The Manufacturer's specified operational weight range

— If the attachment fitting is of an exclusively compatible type that this should only be used in conjunction with a compatible boat attachment fitting.

7 Information supplied by the manufacturer

7.1 Maintenance and replacement

The user manual shall state the maintenance and material replacement periods of the quick release system under normal use and maintenance conditions.

7.2 Repairs

The quick release system operation shall not be compromised by repairs. Repair procedures shall be included in the information supplied by the manufacturer in a user manual which must be sufficiently detailed and precise.

The repair procedures must not allow "reasonably foreseeable" errors which could compromise functioning in accordance with the standard.