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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Small craft — Steering gear — Wire rope and pulley systems

Navires de plaisance — Appareils à gouverner — Systèmes à drosses et réas

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8847 was prepared by Technical Committee ISO/TC 188, *Small craft.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Small craft — Steering gear — Wire rope and pulley systems

1 Scope and field of application

This International Standard specifies the minimum level of requirements for construction, operation and installation of wire rope and pulley steering systems on sailing craft, with or without an auxiliary engine.

This International Standard sets requirements for the design and construction of all components of a steering system from the wheel to, and including, the steering arm. It applies only to wire rope and pulley steering systems, whether for pedestal or bulkhead types.

The design and specifications for the rudder shaft and rudder blade are within the province of the naval architect and are assumed to be appropriate to the size and speed of the boat.

2 Reference

ISO 8844, *Small craft — Steel wire ropes and strands — Specifications.* [1)]

3 Conditions of use

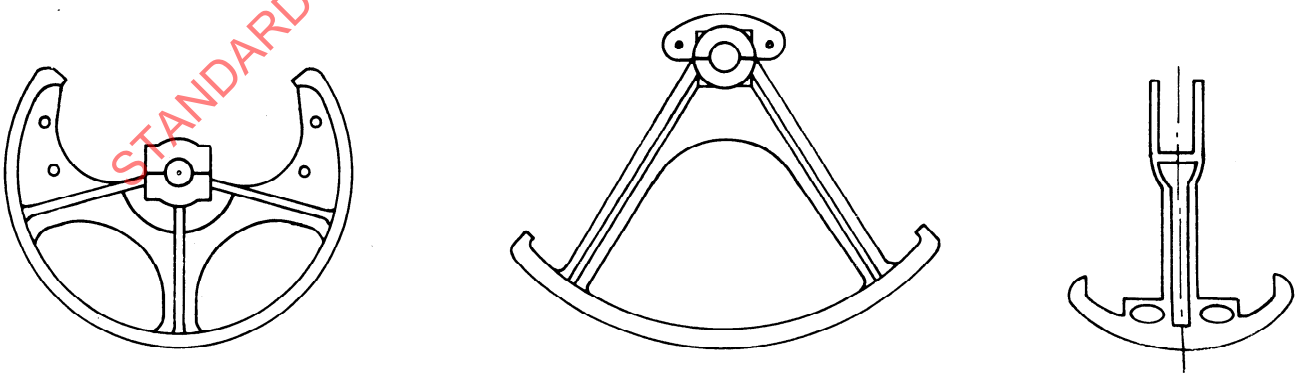
To ensure the proper operation of a steering system, all components shall be fastened securely to the structure of the boat, reinforced where necessary especially at the bulkhead mounting pedestal and at pulleys.

The steering arm connection to the rudder shaft shall also be capable of transmitting the steering torque to the rudder.

4 Definitions

4.1 wire rope pulley steering system: System in which rotation of the steering wheel positions the rudder blade by means of a sprocket, a chain, wire ropes, pulleys and a steering arm fastened to the rudder shaft.

4.2 steering arm: Component fixed to the rudder shaft with at least one groove for the wire rope concentric to the shaft centre. The steering arm may be a wheel quadrant [see figure 1a)], a quadrant [see figure 1b)] or a tiller quadrant [see figure 1c)].



a) Wheel quadrant b) Quadrant c) Tiller quadrant

Figure 1 — Steering arm types

1) At present at the stage of draft.

4.3 wire rope load : Force applied to the wire rope providing the necessary torque to move the rudder through the rudder shaft and steering arm while the boat is sailing.

5 Constructional requirements

5.1 Steering arm

The radius of the steering arm and the wire rope diameter shall be chosen such that the wire rope load is less than 0,25 × wire rope breaking load. The steering arm radius shall be concentric with the shaft centre.

The radius at the end of the groove where the wire rope is led out shall be at least 5 × diameter of wire rope used.

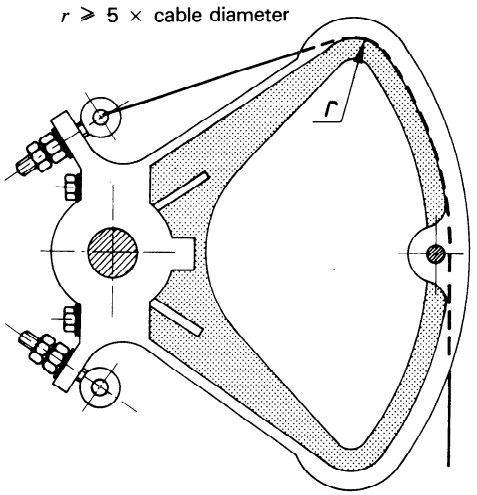


Figure 2 — Radius, *r*

5.2 Wire rope

Wire rope shall be of flexible construction (e.g. 7 × 19 construction wire), in stainless steel or protected against corrosion.

Wire rope characteristics shall meet the specifications given in ISO 8844.

The tension shall be adjustable by means of an appropriate tensioner (e.g. a rigging screw) to minimize lost motion.

The wire ropes shall be aligned with the grooves when leaving the steering arm.

If the end of the wire rope terminates in an eye, it shall be fitted with a thimble. The eye shall be spliced, fitted with ferrules or secured by means of at least two suitable wire clamps. Ends without eye shall be secured against untwisting by means of ferrules or at least two suitable wire clamps.

5.3 Pulleys

The sheave diameter shall be at least 16 × diameter of wire rope used.

If pulleys are of swivel type, means shall be provided to secure them in the correct position.

Pulleys shall be fitted to guide the wire rope into and out of the sheave, and prevent it jamming against the pulley frame. Easy access for maintenance shall be ensured.

The strength of each individual component shall be superior to the strength of the wire.

5.4 Steering-wheel

The whole system shall withstand without loss of steering the loads resulting from the tests described in 5.4.1 and 5.4.2.

5.4.1 Axial load test

Apply a 670 N single push-pull load (see *F* in figure 3) for 10 cycles of 5 s each at any single location on the outer wheel rim or the centre of the handgrip of an external spoke in a direction parallel to the centreline of the wheel shaft.

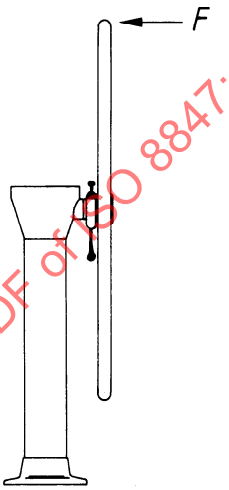


Figure 3 — Application of axial load

5.4.2 Tangential load test

With the rudder shaft locked and not against a stop, apply a single 445 N load in each direction for 10 cycles of 5 s each to the external rim or the centre of the handgrip of an external spoke of the steering-wheel.

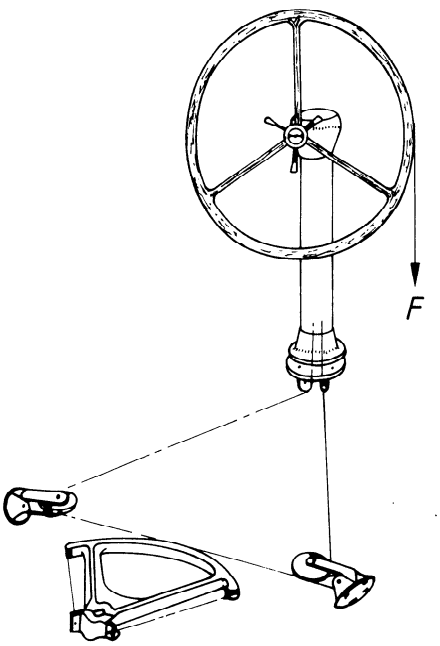


Figure 4 — Application of tangential load

6 General installation requirements

6.1 Tangential force

The complete steering system shall give the helmsman adequate power to drive the boat at its maximum speed with less than 200 N tangential effort applied to the outer wheel rim or the centre of the handgrip of an external spoke steering-wheel.

6.2 Chain length

The length of the chain shall not limit the rotation of the steering arm as determined by the groove length.

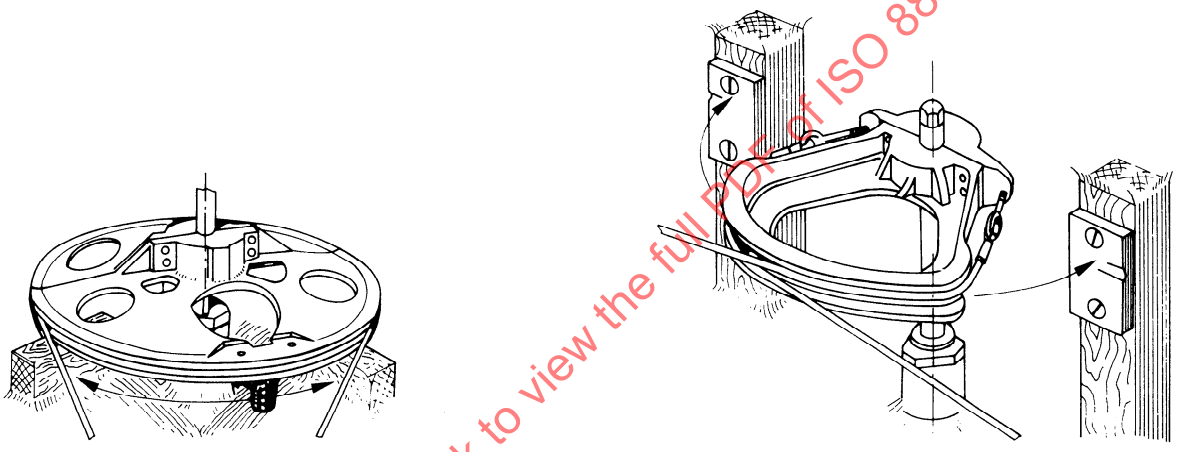
6.3 Steering arm rotation

One or two stops shall be suitably fixed to the structure of the boat to limit over-rotation of the steering arm (see figure 5).

To limit dynamic overloading due to shocks, these stops shall be placed as far as possible off-centre from the rudder shaft.

6.4 Instrument accuracy and reliability

Materials used in the various components of the steering system shall not affect accuracy and reliability of compasses or navigational instruments, whatever the steering angle may be.



a) One-stop-limited

b) Two-stop-limited

Figure 5 — Steering arm rotation

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