
**Ships and marine technology — Ship's
bridge layout and associated
equipment — Requirements and
guidelines**

*Navires et technologie maritime — Aménagement de la passerelle d'un
navire et disposition de ses équipements annexes — Exigences et
directives*

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8468 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 5, *Ships' bridge layout*.

This third edition cancels and replaces the second edition (ISO 8468:1990) and ISO 14612:2004, which have been technically revised.

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Introduction

It has become common practice for operators (officers and crew) to move between shipping companies and flag states and serve on a wide range of ships. Pilots too have to handle an increasing variety of ships and equipment. This International Standard therefore, contains requirements and guidelines which aim to ensure safe navigation by standardizing the bridge environment to provide watchkeepers with a consistent pattern of equipment layout regardless of the ship type or the navigational systems fitted on the bridge.

The requirements in this International Standard take into account human factors, ergonomic principles and advances in technology.

Functional requirements are outlined in general terms in order to prescribe the basic functionality, providing the operator at each defined workstation with

- the best possible overview of internally presented data,
- easy and ergonomic operation of equipment,
- adequate environmental conditions on the bridge.

All information made available to the operator from equipment, alarm systems and communication equipment has to be suited for the purpose, and presented in accordance with ergonomic principles. Too much information is stressing and may cause confusion.

Information and control facilities have to meet the needs of the operator and provide the level of performance appropriate to particular workstations and procedures.

Safety aspects related to the crew, cargo, ship and the environment need to be addressed in detail.

Guidelines and figures give examples, ideal and/or alternative solutions, when such are well defined. Guiding references and comments are added where applicable.

It should be noted that no specific layout presents the sole solution for a proper bridge fulfilling the requirements laid down in this International Standard. This International Standard is parametric, and different types of ships and operations have different optimum designs, even though basic safety requirements are equal.

This International Standard is related to the IMO Resolution on ergonomic criteria for bridge equipment and the general requirements in SOLAS Chapter V. Based on SOLAS Chapter IX (ISM-Code), dealing with casualties attributed to the human element, this International Standard should reduce such casualties.

Ships and marine technology — Ship's bridge layout and associated equipment — Requirements and guidelines

1 Scope

This International Standard specifies the functional requirements for bridge configuration, bridge arrangement, bridge workstations and bridge environment. Guidelines have been drawn up for the methods and solutions to meet the functional requirements.

The requirements in this International Standard apply to all bridge functions.

The purpose of this International Standard is to assist the operator(s) and pilot by providing a workplace that is conducive to safe and effective operation. It also aims to specify bridge requirements, which will secure safe and efficient operation of the ship berth-to-berth regardless of the watchkeeping arrangement in place at a particular time. This International Standard should be used in support of the aims in SOLAS Chapter V Regulation 15.

Requirements and guidance on the human element aspects of the bridge system (e.g. training, procedures) are not given. However, for safe and effective watchkeeping, these aspects will need to be addressed.

The main use of this International Standard will be for designing ships' bridges. This International Standard will also be useful to

- [specifiers and procurers of ships and bridge equipment](https://standards.iteh.ai/catalog/standards/sist/2ecd4942-66ef-4eb1-acbe-b1f51b16508d/iso-8468-2007),
- operators, and
- owners for ensuring that changes made to the bridge through the life of a ship continue to conform to these requirements.

This International Standard is applicable to seagoing ships. Where there are physical limitations in applying this International Standard, i.e. to small ships or to ships of unusual design, the general functional requirements still apply.

Annex A of this International Standard applies to high speed craft.

This International Standard does not supersede performance standards for bridge equipment.

Users of this International Standard should note that while attempting to implement its requirements, they should ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual ship concerned.

Designers should consider future changes in the purpose of the ship, and availability of new equipments, in their bridge designs.

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.

ISO 2412, *Shipbuilding — Colours of indicator lights*

ISO 3434, *Shipbuilding and marine structures — Heated glass panes for ships' rectangular windows*

ISO 3904, *Shipbuilding and marine structures — Clear-view screens*

IEC 60447, *Basic and safety principles for man-machine interface, marking and identification — Actuating principles*

IMO MSC.97(73) 2000, *International Code of Safety for High-Speed Craft, 2000 (2000 HSC Code)*

IMO Resolution A.343(IX), *Recommendation on methods of measuring noise levels at listening posts*

IMO Resolution A.468(XII), *Code on Noise Levels on Board Ships*

IMO Resolution A.694(17), *General requirements for shipborne radio equipment forming part of the GMDSS and for electronic navigational aids*

International Convention for the Safety of Life at Sea (SOLAS)

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3 Terms, definitions and abbreviations

3.1 Terms and definitions

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For the purposes of this document, the following terms and definitions apply.

3.1.1

abnormal operating condition

condition created when internal technical system failures require operation of back-up systems on the bridge, or when they occur under an irregular operating condition, or when the operator becomes unfit to perform his duties and has not yet been replaced by another qualified officer

3.1.2

additional bridge functions

functions performed on the bridge, but not related to a primary bridge function

EXAMPLE Extended communication functions, monitoring and control of ballasting and cargo operations, monitoring and control of machinery, monitoring and control of domestic systems, ship management.

3.1.3

alarm

audible and visual signal alerting a condition requiring immediate attention or user action

3.1.4

alarm transfer system

system which transfers an alarm from the bridge to the master and the back-up operator or any place(s) assigned by the system in the case of any operator deficiency

3.1.5

alert

announcement of an abnormal situation or condition requiring attention

NOTE Alerts may consist of alarms, warnings and cautions.

3.1.6**back-up operator**

qualified officer who has been designated by the ship's master to be on call if assistance is needed on the navigation bridge

3.1.7**bridge**

area from which the navigation and control of the ship is exercised, including the wheelhouse and bridge wings

3.1.8**bridge arrangement**

location and interrelation of workstations and equipment on the bridge

3.1.9**bridge configuration**

shape of the bridge comprising the outer bulkheads and windows of the bridge area

3.1.10**bridge navigational watch alarm system****BNWAS**

alarm system comprising watch monitoring and alarm transfer

3.1.11**bridge integrator**

organization that takes overall responsibility for the design of the bridge

3.1.12**bridge system**

total system for the performance of bridge functions, comprising bridge personnel, technical systems, man-machine interface and procedures

3.1.13**bridge wing**

part of the bridge, on both sides of the ship's wheelhouse, which, in general, extends to the ship's side

3.1.14**catwalk**

extension to a deck outside the wheelhouse wide enough to allow the safe passage of a person

3.1.15**caution**

visual alert of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary, consideration of the situation, or of the given information

3.1.16**collision avoidance function**

detection and plotting of ships and other moving and stationary objects; determination and execution of course and speed deviations to avoid collision

3.1.17**commanding vision**

view without obstructions which would interfere with the operator's ability to perform his immediate task

3.1.18**communications workstation**

workstation for operation and control of equipment for distress, safety and routine communications

3.1.19

conning position

place in the wheelhouse with commanding vision and which is used by operators when monitoring and directing the ship's movements

NOTE The conning position is frequently at the workstation for navigation and manoeuvring.

3.1.20

display

means by which a device presents visual information to the operator, including conventional instrumentation

3.1.21

docking

manoeuvring of the ship alongside a berth, another ship or other structure and controlling the mooring operations

3.1.22

docking workstation

workstation from which the ship can be manoeuvred during docking, lock passage and other manoeuvres requiring a view of the ship's side

3.1.23

electronic navigational chart

ENC

database, standardized as to content, structure and format for use with the ECDIS on the authority of government authorized hydrographic offices

NOTE The ENC contains all the chart information for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g. sailing directions) considered necessary for safe navigation.

3.1.24

electronic chart display and information system

ECDIS

navigation information system which with adequate back-up arrangements can be accepted as complying with the up-to-date chart required by regulations V/19 and V/27 of the 2000-12-05 Amendments to SOLAS by displaying selected information from a system electronic navigational chart (SENC) with positional information from navigation sensors to assist the mariner in voyage planning and route monitoring, and if required additional navigation-related information

3.1.25

ergonomics

study and design of working environments and their components, work practices, and work procedures for the benefit of the worker's productivity, health, comfort and safety

3.1.26

essential information

information which is necessary for the monitoring and control of primary bridge functions

3.1.27

field of vision

angular size of a scene that can be observed from a position on the ship's bridge

3.1.28

failure mode and effects analysis

FMEA

method used for the identification of potential error types in order to define their effects on the examined object or system, and to clarify the error types with regard to criticality or persistency

3.1.29

guideline

non-mandatory information leading to a compliant solution for the related requirement

3.1.30**helmsman**

person who steers the ship under way

3.1.31**irregular condition****irregular operating condition**

condition causing an excessive operator workload

3.1.32**lookout**

activity carried out at all times by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision

3.1.33**manoeuvring**

operation of steering systems and propulsion machinery as required to move the ship in predetermined directions or into predetermined positions or tracks

3.1.34**manual steering workstation**

workstation from which the ship can be steered by a helmsman

3.1.35**master**

ship's captain and the person in overall charge of the ship

3.1.36**monitoring**

act of periodically checking equipment and environment in order to detect any changes

3.1.37**monitoring and secondary navigation workstation**

workstation for an assisting operator (secondary navigation) and monitoring

3.1.38**navigation**

process of position-finding as well as planning, controlling and recording the movement of a ship from one place to another

3.1.39**navigation workstations**

any plurality of the navigation and manoeuvring workstation and monitoring and secondary navigation workstation

3.1.40**operating compartment**

bridge

3.1.41**operator**

qualified officer navigating, operating bridge equipment and manoeuvring the ship

3.1.42**navigation and manoeuvring workstation**

workstation with commanding vision used by operators when carrying out navigation, traffic surveillance and manoeuvring functions

3.1.43

normal condition

normal operating condition

condition whereby all shipboard systems and equipment related to primary bridge functions operate within design limits and external conditions (i.e. weather and traffic), or when the malfunction of position-fixing systems does not cause excessive operator workloads

3.1.44

percentile

percentage of population

3.1.45

primary bridge function

function related to the determination, execution and maintenance of safe course, speed or position of the ship in relation to the waters, traffic or weather conditions

EXAMPLE Voyage planning functions, navigation functions, collision avoidance functions, manoeuvring functions, docking functions, monitoring of internal safety systems, external and internal communication related to safety in bridge operation and distress situations.

3.1.46

radar plotting

whole process of target detection, tracking, calculation of parameters and display of information

3.1.47

route monitoring

periodic surveillance of the ship's position, course and speed in relation to a pre-planned route and the surrounding waters

3.1.48

safety workstation

workstation at which monitoring displays and operating elements serving safety are concentrated

3.1.49

screen

device used for presenting visual information based on one or several displays

3.1.50

seagoing ship

ship designed, equipped and certified to go to sea

NOTE Another definition of this term, adapted from COLREGs¹⁾, is "any vessel including non-displacement craft, designed, equipped and certified for use as a means of transportation on the high seas and all waters connected thereto".

3.1.51

ship management

administrative and miscellaneous activity such as maintaining spares and other stores, payrolls and other activities not related to the manoeuvring of the ship

3.1.52

superstructure

decked structure, not including funnels, which is on or above the freeboard deck

3.1.53

system electronic navigational chart

SENC

database resulting from the transformation of the ENC by the ECDIS for appropriate use, updates to the ENC by appropriate means and other data added by the mariner

NOTE It is the database that is actually accessed by the ECDIS for the display generation and other navigational functions, and is the equivalent to an up-to-date paper chart. The SENC may also contain information from other sources.

1) Convention on the International Regulations for Preventing Collisions at Sea (COLREGs).

3.1.54**track monitoring**

observing the position of own ship in relation to a planned route or existing track

3.1.55**tracking**

process of observing the sequential changes in the position of a target, to establish its motion

3.1.56**traffic surveillance**

observation of ship traffic within an area for the purpose of planning the movement of own ship in that area

3.1.57**visibility**

fields and/or distance of vision to observe objects

3.1.58**voyage planning**

pre-determination, from berth to berth, of courses, turns and speeds in relation to the waters to be navigated

3.1.59**voyage planning workstation**

workstation at which the ship's voyage is planned

3.1.60**warning**

visual alert of a condition which is not immediately hazardous, but may become so, if no action is taken

3.1.61**wheelhouse**

enclosed area of the bridge

3.1.62**workstation**

combination of all job-related items, including a console, if provided, with all devices, equipment and furniture, to fulfil certain tasks

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3.2 Abbreviations

AIS	automatic identification system
ARPA	automatic radar plotting aid
BNWAS	bridge navigational watch alarm system
ENC	electronic navigational chart
ECDIS	electronic chart display and information system
FMEA	failure mode and effects analysis
GMDSS	global maritime distress and safety system
IMO	International Maritime Organization, a specialized agency of the United Nations devoted exclusively to maritime matters
SENC	system electronic navigational chart
SOLAS	safety of life at sea
UHF	ultra high frequency
VHF	very high frequency