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BS 6349-1-1:2025



BSI Standards Publication

Maritime works

Part 1-1: General – Code of practice for planning and design
for the asset lifecycle

bsi.

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 October 2025. It was prepared by Technical Committee CB/502, *Maritime works*. A list of organizations represented on this committee can be obtained on request to the committee manager.

BSI Committee CB/502 takes collective responsibility for the preparation of this British Standard. The Committee wishes to acknowledge the personal contribution of Mr David Heavens to this British Standard, and to the work of CB/502, until his untimely death in 2023.

Supersession

This British Standard supersedes [BS 6349-1-1:2013](#), which is withdrawn.

Relationship with other publications

[BS 6349](#) is published in the following parts:

- Part 1-2: *General – Code of practice for assessment of actions*;
- Part 1-3: *General – Code of practice for geotechnical design*;
- Part 1-4: *General – Code of practice for materials*;
- Part 2: *Code of practice for the design of quay walls, jetties and dolphins*;
- Part 3: *Code of practice for the design of shipyards and sea locks*;
- Part 4: *Code of practice for design of fendering and mooring systems*;
- Part 5: *Code of practice for dredging and land reclamation*;
- Part 6: *Design of inshore moorings and floating structures¹⁾*;
- Part 7: *Guide to the design and construction of breakwaters*;
- Part 8: *Code of practice for the design of Ro-Ro ramps, linkspans and walkways*.

Information about this document

This is a full revision of the document, and introduces the following principal changes.

- a) General updating of reference documents to reflect latest practice.
- b) Enhanced applicability of content generally with reference to the whole asset lifecycle and coastal flood and erosion control management infrastructure. The title is revised from “planning and design for operations” to “planning and design for the asset lifecycle”.
- c) New Section 2 with changes to [Clause 4](#) revising environmental considerations within the broader remit of the UN sustainable development goals with additional guidance on:
 - 1) assessment and management of environmental impacts including the sustainable management and efficient use of natural resources;
 - 2) reduction of carbon emissions through the asset lifecycle; and
 - 3) climate change adaptation and infrastructure resilience.

¹⁾ [BS 6349-6](#) was withdrawn in 2013 and a new, updated version is in preparation.

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requirements for different types of asset and lifecycle stages, and also with respect to developments in survey technology and digitization.

- e) **Clause 6:** additional guidance on:
 - 1) climate change projections; and
 - 2) wave measurements.
- f) **Clause 8:** revision of long-term sea level trends.
- g) **Clause 10:** guidance on waves.
- h) Addition of a new Section 4 comprising **Clause 13** to **Clause 22** on wave and water levels for design of general applicability currently included in **BS 6349-1-2** and planned for removal from that Part in a future revision.
- i) Section 5 comprising **Clause 23** to **Clause 34** now expanded in scope to include functional, operational and safety considerations.
- j) **Clause 23:** extended guidance on definition of performance and other end-user requirements and development of a design basis including operational and stakeholder input. Recommendations included on planning for execution and the use of a building information model (BIM).
- k) **Clause 24:** general update of health safety considerations, including recommendations with respect to:
 - 1) safety in design;
 - 2) HAZID and risk assessment generally;
 - 3) terminals for hazardous products and cargos; and
 - 4) floating LNG terminals with long-term moorings.
- l) **Clause 27:** expanded from definition of design working life to include recommendations of wider applicability addressing the periods used for project appraisal and design. Amongst other things, this recognizes adaptive management approaches in planning for climate resilience.
- m) **Clause 28** and **Annex H:** updated to reflect trends in vessel sizes based upon commercially available vessel databases as of early 2022.
- n) Rearrangement of content regarding mooring studies design resulting in deletion of some content from Part 1-1 with the intention of including in future revisions of Part 1-2 and Part 4. This includes deletion from Part 1-1 of parts of **Clause 30** and parts of **Annex E** detailing mooring studies.
- o) **Clause 32:** edited and expanded in scope to address wider aspects of reliability and performance-based design. Previous parts of content specific to derivation of actions is excluded (since it falls within the scope of **BS 6349-1-2**). This clause now addresses:
 - 1) design principles as per **BS EN 1990**;
 - 2) earthquakes and seismic performance;
 - 3) design operating conditions and actions; and
 - 4) hydraulic response and performance requirements.
- p) **Clause 33:** maintenance has been developed and expanded.
- q) **Clause 34:** a new clause has been added to include recommendations for assessment of decommissioning requirements at the planning and design stage.
- r) **Annex A:** organizations with a role in coastal activities in the UK are updated.

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removal from that Part in a future revision.

- t) **Annex I**: now provides updated informative guidance on typical operationally acceptable motion criteria, rather than methods for assessing acceptable wave conditions for mooring. The future revision of **BS 6349-8** does not duplicate the motion criteria provided in **Annex I**. Former section E.5 has been deleted and is included in a revision of **BS 6349-4**.

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Use of this document

As a code of practice, this part of **BS 6349** takes the form of recommendations and guidance. It is not to be quoted as if it were a specification. Users are expected to ensure that claims of compliance are not misleading.

Users may substitute any of the recommendations in this British Standard with practices of equivalent or better outcome. Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the *Shorter Oxford English Dictionary* is used (e.g. “organization” rather than “organisation”).

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Section 1: General

Introduction

BS 6349 provides recommendations and guidance for the planning and design of maritime works. It covers a wide variety of asset types and operational needs, aiming to be flexible and applicable across different functions, environments and maritime activities.

The standard is structured around three key principles:

- a) clarity of required outcomes;
- b) thorough understanding of the natural environment; and
- c) focus on utility, safety and sustainability throughout the asset's lifecycle.

To support this, BS 6349 includes numerous references to other British Standards and industry guidelines relevant to specific types of maritime assets and operations.

One key source frequently referenced is the World Association of Waterborne Transport Infrastructure (PIANC). PIANC publishes detailed working group reports on topics such as port planning, design, maintenance, and navigation. These reports contain valuable background information and technical insights.

However, PIANC reports do not follow the formal structure of UK standards and thus BS 6349 typically treats PIANC reports as informative references. An exception is made in certain cases where a PIANC report is considered normative, such as in the design of harbour approach channels.

The revised BS 6349-1-1 now includes content relevant to coastal structures, enhancing its usefulness for coastal flood and erosion risk management (FECRM). This includes references to guidance from CIRIA and other authoritative sources.

For the structural and geotechnical design of maritime works:

- BS 6349-1-1 and BS 6349-1-2, provide recommendations aligned with the structural Eurocodes; and
- BS 6349-1-3, offers guidance specifically for geotechnical design.

These parts work in conjunction with:

- BS EN 1990 – *Eurocode: Basis of structural and geotechnical design*; and
- BS EN 1997 – *Eurocode 7: Geotechnical design*.

The Eurocodes were originally developed with a focus on buildings and civil engineering structures, e.g. bridges, and came fully into use in 2007. The Eurocode suite is structured as follows:

- 1) EN 1990 – *Basis of design*;
- 2) EN 1991 – *Actions (loads) on structures*;
- 3) EN 1992 to EN 1996, and EN 1999 – *Design for specific materials, e.g. concrete, steel, timber, masonry, aluminium*;
- 4) EN 1997 – *Geotechnical design*; and
- 5) EN 1998 – *Design of structures for earthquake resistance*.

The first generation of Eurocodes, introduced in 2007, will be replaced by the second generation (2G) Eurocodes by 2028.

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provided supplementary guidance for applying structural Eurocodes to maritime works, particularly under maritime actions such as waves, currents, mooring, and berthing forces.

However, the use of Eurocodes in maritime design, via [BS 6349](#), has been limited to structures where maritime forces can be reliably quantified and where a relevant Eurocode exists for the construction material, e.g. steel or concrete. For example, a piled jetty (a “bridge-like” structure) can be designed using Eurocodes, supplemented by [BS 6349](#). In contrast, structures like rubble mound breakwaters are typically designed using empirical methods and physical modelling, as there is no Eurocode section that covers the design of armour layers.

The second generation Eurocodes partly address this gap for some types of maritime structures and actions. The revised [EN 1990](#) now includes a category for coastal structures, and a new part of Eurocode 1, [EN 1991-1-8](#), introduces provisions for wave and current actions on structures.

Despite these advancements, the application of the new Eurocode parts will still be limited to hydrodynamic actions that can be directly quantified—such as wave- and current-induced pressures and the resulting forces and moments on structures. Rubble mound structures will remain excluded, as no specific Eurocode design part exists for them.

Future updates to [BS 6349](#) and related standards will align with the second generation Eurocodes, particularly in relation to coastal structures and hydrodynamic actions.

1 Scope

This part of [BS 6349](#) gives recommendations and guidance for general criteria relevant to the planning, design, construction, maintenance and decommissioning of structures and facilities set in the maritime environment. It also gives recommendations and guidance regarding safety, environmental and operational matters that are to be taken into account when planning and designing maritime and coastal works.

It includes a description of the various physical environmental conditions that are to be taken into account for investigation at a coastal site, and provides recommendations and information for methods of survey and data collection.

It is applicable to coastal, nearshore, estuarine and inland marine facilities for safe navigation, berthing, mooring, loading, unloading and servicing of ships, barges and other forms of waterborne transport and the associated infrastructure, equipment and works at the ship-shore interface. It is also applicable to other civil infrastructure works at the waterfront or coastal margin such as dredging, reclamation, shoreline flood and coastal erosion risk management and to recreational infrastructure such as marinas.

NOTE 1 The [BS 6349](#) series is also partly applicable to other applications such as wave effects on lakes and reservoirs.

NOTE 2 The [BS 6349](#) series might be applicable to types of floating LNG installation (such as FSRUs and FSUs) as described in the [BS ISO 20257](#) series which are permanently or semi-permanently moored to a jetty or similar structure at an inshore or protected location.

This part of [BS 6349](#) does not cover:

- a) offshore structures for the petroleum and natural gas industries (which are specified in [BS EN ISO 19900](#) and [BS EN ISO 19901](#)); and
- b) structures and infrastructure for offshore renewables.