
International Standard



6812

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Roll on/Roll off ship-to-shore connection — Interface between terminals and ships with straight stern/bow ramps

Connexion pour relier la terre aux navires rouliers — Interface entre terminaux et navires munis de rampes droites arrière/d'étrave

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Descriptors : shipbuilding, ships, harbour stations, harbour facilities, junctions, dimensions, design, specifications.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

International Standard ISO 6812 was developed by Technical Committee ISO/TC 8, *Shipbuilding and marine structures*, and was circulated to the member bodies in May 1982.

It has been approved by the member bodies of the following countries:

Australia	Germany, F.R.	Netherlands
Austria	India	Norway
Belgium	Ireland	Poland
Brazil	Italy	Romania
China	Japan	Sweden
Cuba	Korea, Dem. P. Rep. of	United Kingdom
Czechoslovakia	Korea, Rep. of	
France	Mexico	

No member body expressed disapproval of the document.

Roll on/Roll off ship-to-shore connection — Interface between terminals and ships with straight stern/bow ramps

0 Introduction

The aim of this International Standard is to harmonize the interface between the terminal and ship, and to lay down certain major dimensions and principles of design concerning the Roll on/Roll off ship-to-shore connection.

Not all existing ships will be able to comply with the requirements of certain clauses in this International Standard. Port Authorities are advised, for an interim period, to take account of the need to accommodate ships that do not comply entirely with the requirements of this International Standard.

To make full use of this International Standard, a Port Authority needs to make a thorough investigation as to the class of ramp required to suit the types of ship expected. If only one fixed shore ramp is to be installed, and no clear indication emerges of the class of ramp to be chosen, a class A fixed shore ramp may offer the best solution.

The class A ramp could then be equipped with removable blocks or other means of making it possible to accommodate ships equipped with a ramp that will not reach down to the level of a class A ramp.

Although this International Standard does not take into account Ro/Ro terminals used in specialized ferry services, Port Authorities are advised to consider this International Standard when building such terminals, to avoid expensive alterations later, if the terminal is then opened to other ships.

NOTE — Users of this International Standard should note that while observing the requirements of the standard, they should at the same time ensure compliance with such statutory requirements, rules and regulations as may be applicable.

1 Scope and field of application

This International Standard specifies requirements and makes recommendations for the Ro/Ro ship-to-terminal interface for ships with a stern and/or bow ramp, the centreline of which is parallel to the centreline of the ship.

It does not apply to Ro/Ro terminals used for specialized ferry services, such as train ferries, and ships that have no ramp of their own.

2 Definitions

For the purpose of this International Standard, the following definitions apply.

2.1 General

2.1.1 Ro/Ro transport : A mode of marine transport in which the cargo may be loaded into and unloaded from the ship by essentially horizontal movements, every cargo unit being moved on its own wheels or by a temporary mobile system.

2.1.2 flap : An extension, normally hinged to the free end of a ramp, to give transition between running surfaces (see figure 1).

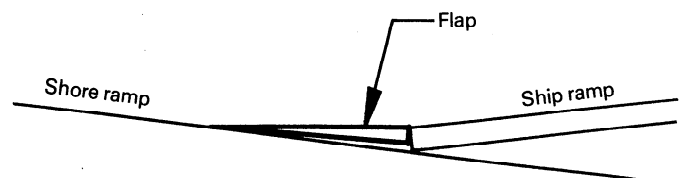


Figure 1 — Flap

2.2 Shore

2.2.1 Ro/Ro terminal : Port facilities designed to accept Ro/Ro ships under defined conditions of water level and ship loading, so as to permit cargo handling by a rolling movement. Terminals may include one or more Ro/Ro berths at which Ro/Ro ships can be moored; such berths include fixed and/or adjustable shore ramps.

2.2.2 interface limit line : The line that defines the safe minimum distance between the seaward end of the ship ramp landing area and the outer face of the shore ramp (see figure 2).

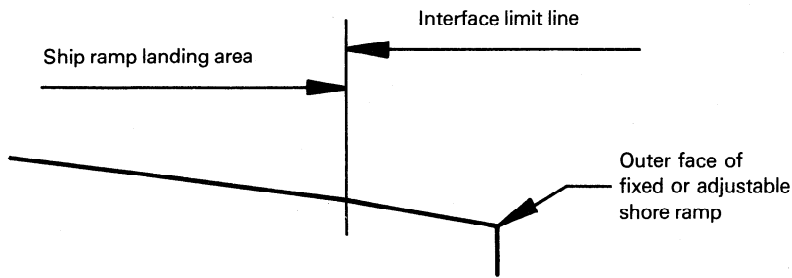
2.2.3 fixed shore ramp : The fixed incline between the normal quay surface and the outer face of the quay wall on which the shore end of a ship ramp can rest (see figure 3).

2.2.4 adjustable shore ramp : The vertically adjustable roadway, usually hinged at the inshore end and supported in-

dependently of the ship near the outer end, that provides an intermediate connection between the shore and the ship and on which the shore end of a ship ramp can rest (see figure 4).

2.2.5 normal water level variation : The variation of the water level within which operations are possible.

NOTE — Normal variation of the water level has to be considered by the port authority for each installation. Water levels between which operations are possible should be considered with regard to what is practical and economic in each case. Excessive peak variations of the water level can be disregarded where they do not normally have any practical influence on the traffic.



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Figure 2 — Interface limit line
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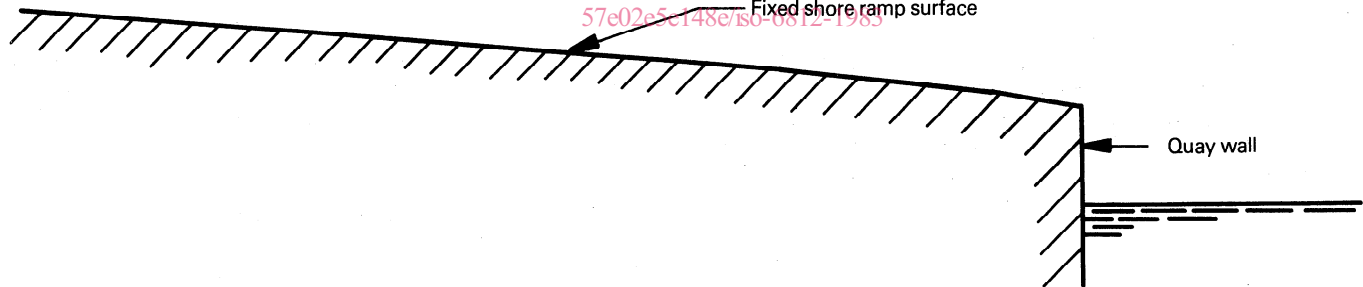


Figure 3 — Fixed shore ramp

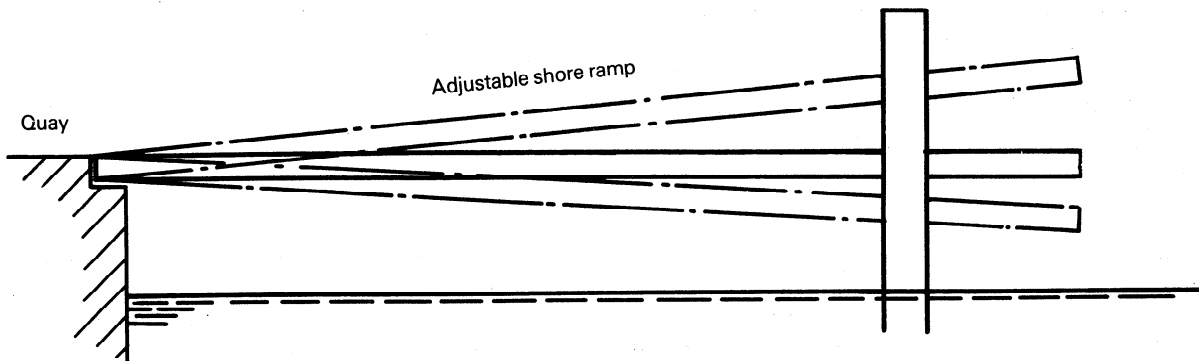


Figure 4 — Adjustable shore ramp

2.2.6 high normal water level : The high water level at which operations can be carried out.

NOTE — See the note in 2.2.5.

2.2.7 low normal water level : The low water level at which operations can be carried out.

NOTE — See the note in 2.2.5.

2.3 Ships

2.3.1 Ro/Ro ships : Ships provided with access openings that permit cargo units to be loaded and unloaded by a rolling movement, every cargo unit being moved on its own wheels or by a temporary mobile system.

2.3.2 ship ramp : The adjustable structure fitted to the ship that when lowered to and resting on the shore approach forms the connecting roadway between the ship and the shore ramp or the quay.

2.3.3 threshold height : The height of the vehicle deck above the water at the ship end of the ramp at the stern or bow door opening (see figure 5).

3 Variation of water level

3.1 Water level variation up to 1,5 m

Where the normal water level variation at a berth does not exceed 1,5 m, a fixed shore ramp as detailed in clause 4 is suitable for use in conjunction with the ramp of a ship as detailed in clause 5.

3.2 Water level variation in excess of 1,5 m

Terminals with a normal water level variation greater than 1,5 m shall provide shore facilities, such as an adjustable shore ramp, pontoon or the like, with a range of movement that reduces the net water level variation with respect to the shore ramp to not greater than 1,5 m.

Special requirements of some existing ships may increase the amount of movement required in the adjustable shore ramps (see 4.2.1).

4 Shore ramps

4.1 General

4.1.1 Interface and ramp landing area

The interface limit line with the ship ramp shall be not less than 1 m shorewards of the shore ramp face line (see figures 7, 8 and 11). There shall be no permanent obstacles within the ship ramp landing area or seawards of the interface limit line (see also figure 10).

It is possible that ships with long ramps may be berthed, under certain circumstances, such that the outer end of the ship ramp lands further up the ramp than the area indicated in figures 7 and 8 by "ship ramp landing area".

4.1.2 Outer face

The shore ramp shall be so constructed that a ship may lie in close proximity to its outer face. There shall be no obstacles seawards of a vertical plane through this face line.

4.1.3 Roadway width

The roadway should have a minimum clear width of 9 m if the ramp is to be used for two-lane operations and for diverse cargo handling operations, for example handling 20 ft (series 1C) containers by fork lift trucks. For single-lane operations using road vehicles or trailers, a minimum clear width of 5 m is recommended.

4.1.4 Clear height

The clear height should be a minimum of 8 m above the ramp surface, allowing for the effect of changes of gradient.

NOTE — This clear height may have to be modified if provision is made for double-deck shore ramp facilities.

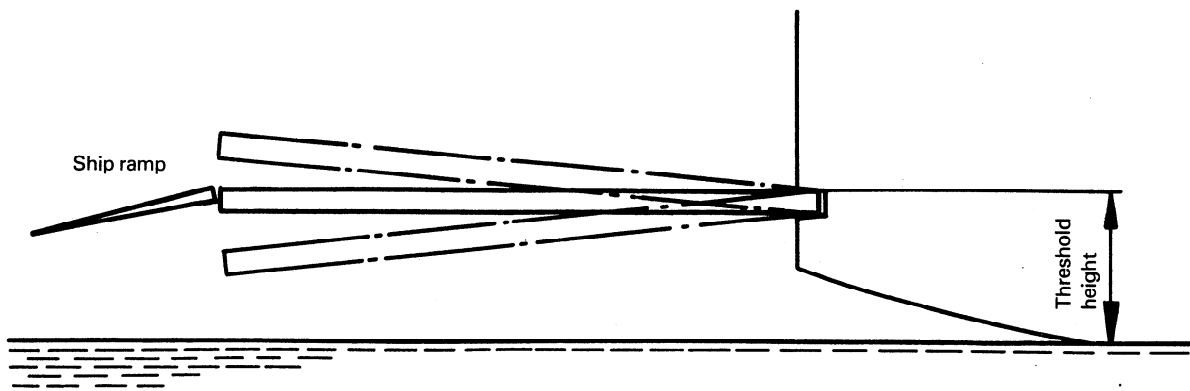


Figure 5 — Threshold height

4.1.5 Design loadings

The shore ramps shall be designed for loads that comply with the local road regulations, as well as the road regulations of countries from/to which traffic is expected, and at the same time take the tare weight imposed by the ship ramp. Additionally, the design shall allow for loads that represent the weight of cargo and cargo handling equipment expected to be operated over the ramps.

NOTE — Wheel and axle loadings imparted by some types of cargo handling equipment are exceptionally high.

4.1.6 Pedestrian access

Pedestrians should embark/disembark by a means other than ship ramp/shore ramp. If this is not possible, due to the situation of the berth, pedestrian access shall be segregated from vehicular traffic by adequate safety barriers or other means in accordance with national regulations.

4.1.7 Ramp roadway surfaces

The ramp roadway surface shall be designed and constructed to ensure adequate adhesion for traction in all operational conditions.

4.1.8 Mooring

To prevent separation of the ship ramp from the shore ramp due to sudden external forces, conveniently placed mooring points shall be provided.

4.1.9 Changes of gradient in transition between running surfaces

Changes of gradient in the transition between running surfaces, and the combined slopes over short humps, etc. shall be given due consideration in relation to ground clearance, wheelbase and projection of vehicles and handling equipment.

The gradients specified in this International Standard for shore and ship ramps give recommendations for angles in the transition between the ramps in accordance with figures 6 a), b) and c); they are the maxima that can be recommended to ensure a smooth cargo flow.

4.2 Fixed shore ramp

4.2.1 Classes of ramp

To accommodate ships with low and high threshold heights when the normal water level variation is 1,5 m, two classes of fixed shore ramp, A and B, are required.

When the normal water level variation is less than 1,5 m, it becomes possible to accommodate the required heights by ramps having heights other than those for classes A and B, thus permitting some flexibility to Port Authorities when constructing fixed shore ramps.

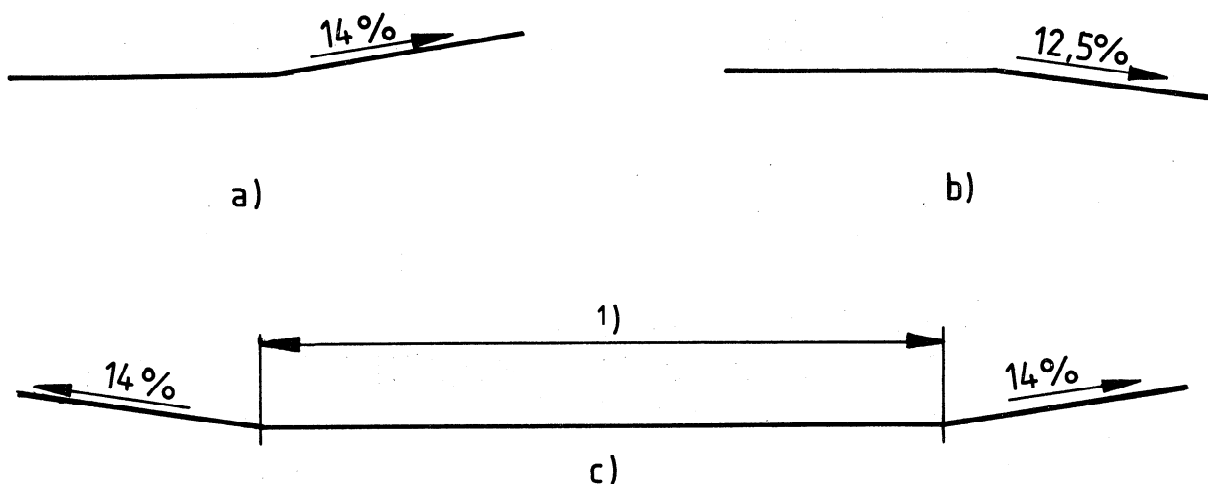
Depending on the water level variations and the range of ships expected to use the port, it may be possible for a Port Authority to use only one fixed ramp of a height intermediate to classes A and B (see also clause 0).

The ranges of height above water level for the two ramps have been chosen so that they overlap each other by 0,25 m in the area of low normal water level for class A ramps and high normal water level for class B ramps. When the total water level variation is less than 0,25 m, it will be sufficient to provide one type of ramp designed to meet both class A and B ramp requirements.

4.2.2 Class A

Class A comprises fixed shore ramps for ships whose outer end of the ship ramp can reach levels of 0,25 to 1,75 m above the water line in all loaded conditions.

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1) Length depending on the mobile equipment in use.

Figure 6 — Angles of transition between running surfaces

Class A fixed shore ramps shall have a height, at the interface limit line with the ship ramp, of not more than 1,75 m above the low normal water level and not less than 0,25 m above the high normal water level (see figure 7).

4.2.3 Class B

Class B comprises fixed shore ramps for ships whose outer end of the ship ramp can reach levels of 1,5 to 3,0 m above the water line in all loaded conditions.

Class B fixed shore ramps shall have a height, at the interface limit line with the ship ramp, of not more than 3,0 m above the low normal water level and not less than 1,5 m above the high normal water level (see figure 8).

4.2.4 Clear width

The clear width of a fixed shore ramp shall be 32 m or equal to the beam of the largest ship which is expected to call at the terminal.

4.2.5 Gradient and profile

The gradient of a fixed shore ramp shorewards of the ship ramp normal landing area shall be limited in normal circumstances to 10 % for the section of the ramp over which cargo is moved. For the longitudinal profile of a fixed shore ramp, see figures 7 and 8.

4.2.6 Inner side

The inner side of the fixed shore ramp shall be aligned with the side fender line.

4.3 Adjustable shore ramp

4.3.1 Height above water

It shall be possible to maintain the outer end of the adjustable shore ramp, at the interface limit line, at a height of 1,75 m above low normal water level and 1,5 m above high normal water level (see figure 9).

4.3.2 Outer end

The outer end of an adjustable shore ramp should be wide enough to accommodate the ramp of the largest ship which is expected to call at the terminal.

The adjustable shore ramp should be so constructed that the outer end imposes no restriction on the beam of the ship; it may be provided with a splayed end.

The outer end of the interface with the ship ramp shall have its side surfaces flush and unobstructed, to permit a maximum eccentricity between the centrelines of the ship and adjustable shore ramp respectively (see figure 10).

Fendering provided to protect the adjustable shore ramp shall not impose any restriction on the beam of the ship.

4.3.3 Profile

The longitudinal profile of the adjustable shore ramp shall be as shown in figure 11.

4.3.4 Length

The length of the adjustable shore ramp shall be such that the maximum operational gradient in normal circumstances does not exceed 10 %.

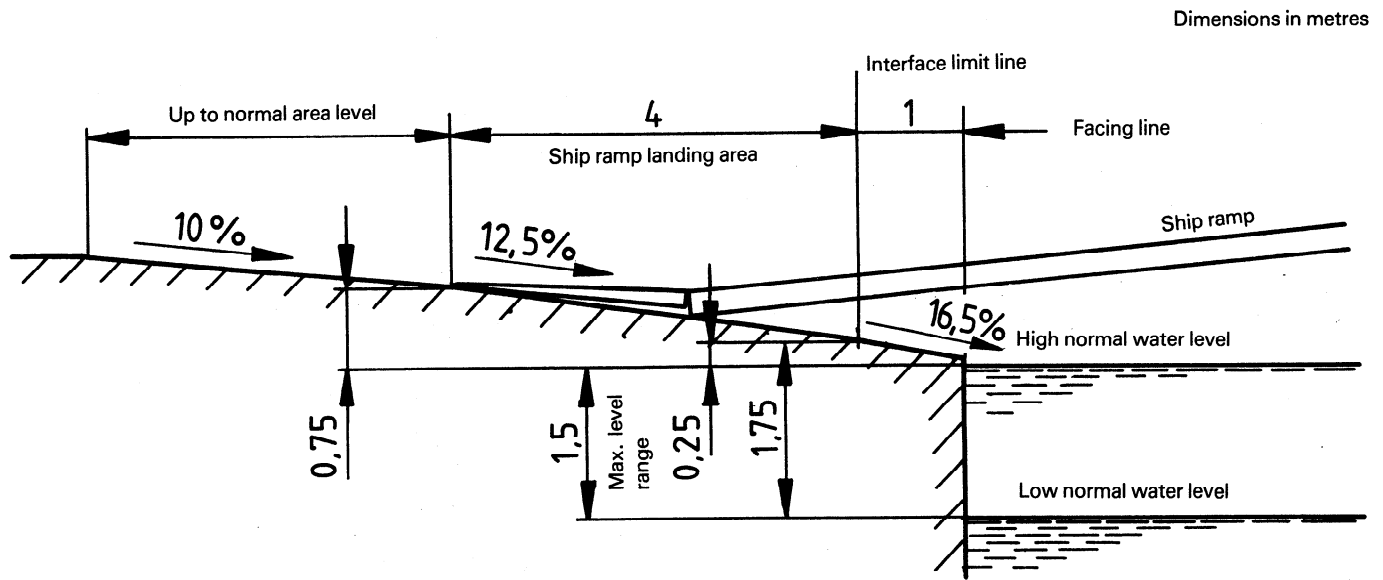


Figure 7 — Fixed shore ramp class A
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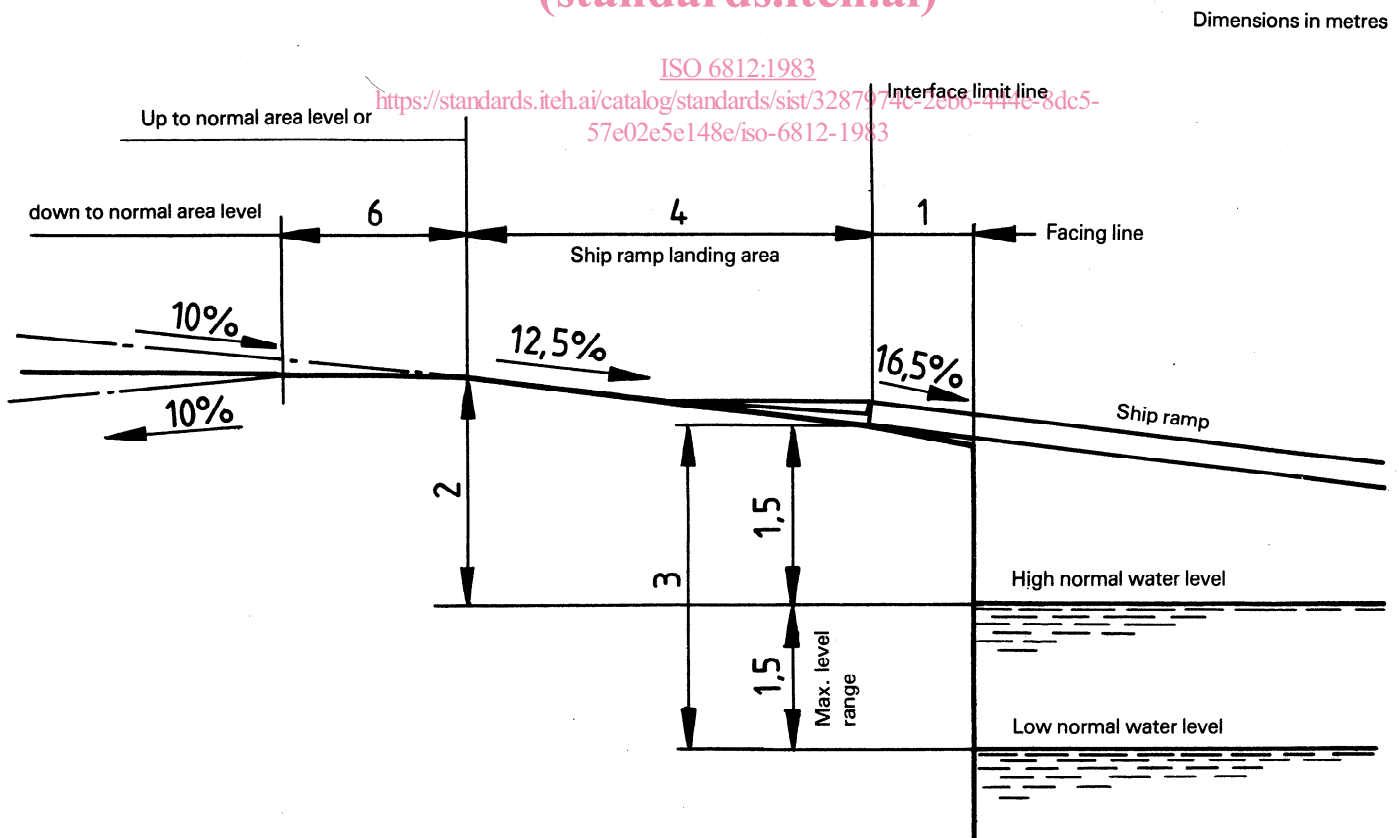


Figure 8 — Fixed shore ramp class B

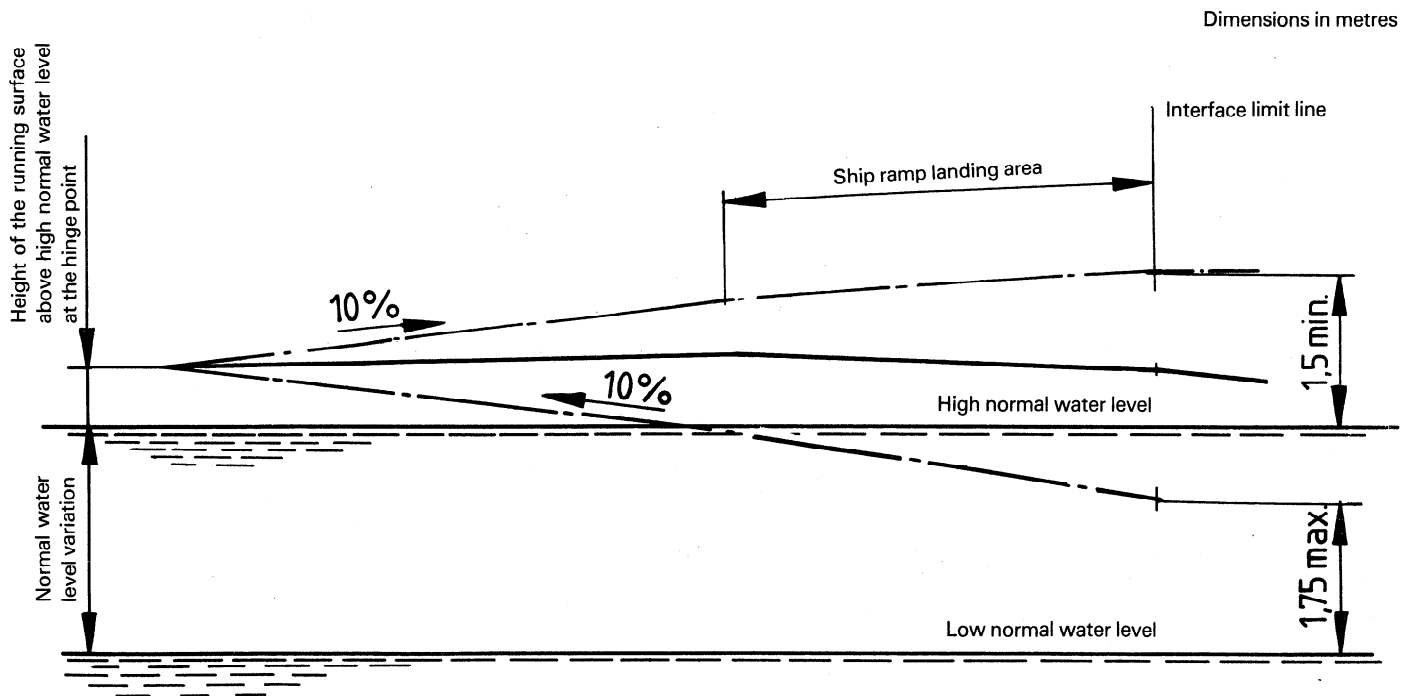


Figure 9 — Adjustable shore ramp — Height above water
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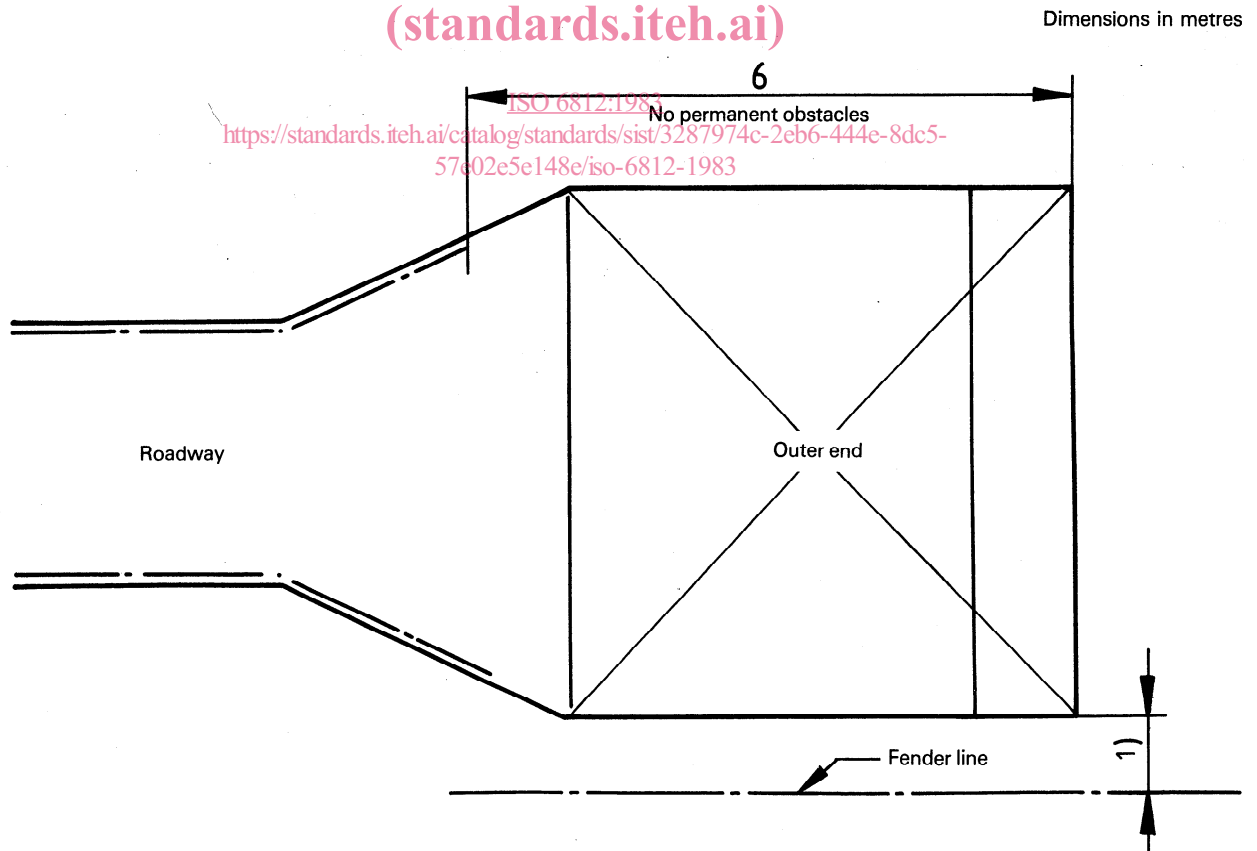


Figure 10 — Adjustable shore ramp — Outer end

1) The distance between the fenderline and the adjustable shore ramp should be chosen with regard to the ships which are expected to call at the terminal.