INTERNATIONAL STANDARD

ISO 13767

First edition
2012-07-01

Ships and marine technology — Ship's mooring and towing fittings — Shipside roller fairleads

Navires et technologie maritime — Corps-morts et ferrures de remorquage de navires — Chaumards à rouleaux à quai

Reference number
ISO 13767:2012(E)

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Published in Switzerland

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Foreword

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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.

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ISO 13767 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

Introduction

The shipside roller fairlead is a type of ship's mooring fitting installed on board to lead the mooring rope from the ship's inboard to outboard.

Ships and marine technology — Ship's mooring and towing fittings — Shipside roller fairleads

1 Scope

This International Standard specifies the design, size and technical requirements for shipside roller fairleads installed to lead the mooring rope of a ship.

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 13755, *Ships and marine technology — Ship's mooring and towing fittings — Steel rollers*

IMO Circular MSC/Circ.1175, *Guidance on shipboard towing and mooring equipment*

3 Terms and definitions

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

3.1
safe working load
SWL
maximum load in kN on the rope that should normally be applied in service conditions

4 Classification

4.1 Type

Depending on the construction, roller fairleads shall be classified as the following two types:

— 2-roller type;

— 3-roller type.

4.2 Nominal sizes

The nominal sizes, D_n, of roller fairleads are denoted by reference to the outside diameter of the roller, in millimetres, from a basic series of preferred numbers.

The nominal sizes are: 150, 200, 250, 300, 350, 400, 450 and 500.

5 Dimensions

Roller fairleads have dimensions and particulars in accordance with Tables 1 and 2, and Figures 1 and 2.

6 Materials

The following material shall be used for manufacturing the roller fairleads:

— Seat: weldable steel plates having a yield point of not less than 235 N/mm^2.

7 Manufacturing and inspection

7.1 All surfaces of the roller fairleads, including welding, shall be free from any visible flaws or imperfections.

7.2 All surfaces in contact with the ropes shall be free from surface roughness or irregularities likely to cause damage to the ropes by abrasion.

7.3 The roller fairleads shall be coated externally with an anti-corrosion protective finish.

8 Marking

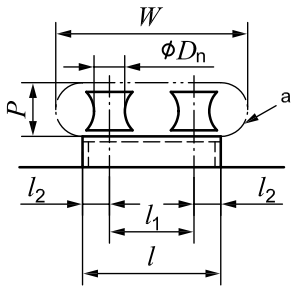
8.1 The safe working load (SWL) intended for the use of the roller fairleads shall be noted in the towing and mooring plan available on board for the guidance of the shipmaster as specified in MSC/Circ.1175.

8.2 The actual SWL on board shall be determined by considering the under deck reinforcement, and it shall be marked on the towing and mooring plan. The actual SWL shall not be over the SWL indicated in this International Standard.

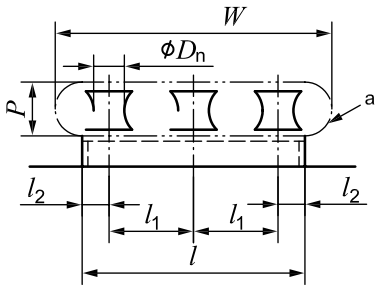
8.3 The shipside roller fairleads shall be clearly marked with its SWL by weld bead or equivalent. The SWL shall be expressed in tonnes (letter 't') and be placed so that it is not obscured during operation of the fitting.

EXAMPLE SWL XXX t

Dimensions in millimetres



a) 2-roller type



b) 3-roller type

a Opening on shell/bulwark.

Figure 1 — Layout of roller fairleads

Table 1 — Dimensions and SWL of roller fairleads

Dimensions in millimetres

Nominal size	2-roller type		3-roller type		l_1	l_2	P[c]	SWL[b]			
								$\theta = 90°$[a]		$\theta = 20°$	
D_n	l	W[c]	l	W				(kN)	(t)	(kN)	(t)
150	570	770	870	1 070	300	135	200	260	26	186	19
200	740	990	1 140	1 390	400	170	250	437	45	314	32
250	910	1 210	1 410	1 710	500	205	300	574	58	412	42
300	1 070	1 420	1 670	2 020	600	235	350	710	72	510	52
350	1 230	1 610	1 930	2 310	700	265	380	1 025	104	736	75
400	1 400	1 780	2 200	2 580	800	300	380	1 230	125	883	90
450	1 560	1 940	2 460	2 840	900	330	380	1 571	160	1 128	115
500	1 720	2 100	2 720	3 100	1 000	360	380	1 913	195	1 373	140

a θ is the relative angle of ropes on the roller fairlead (refer to Annex A).

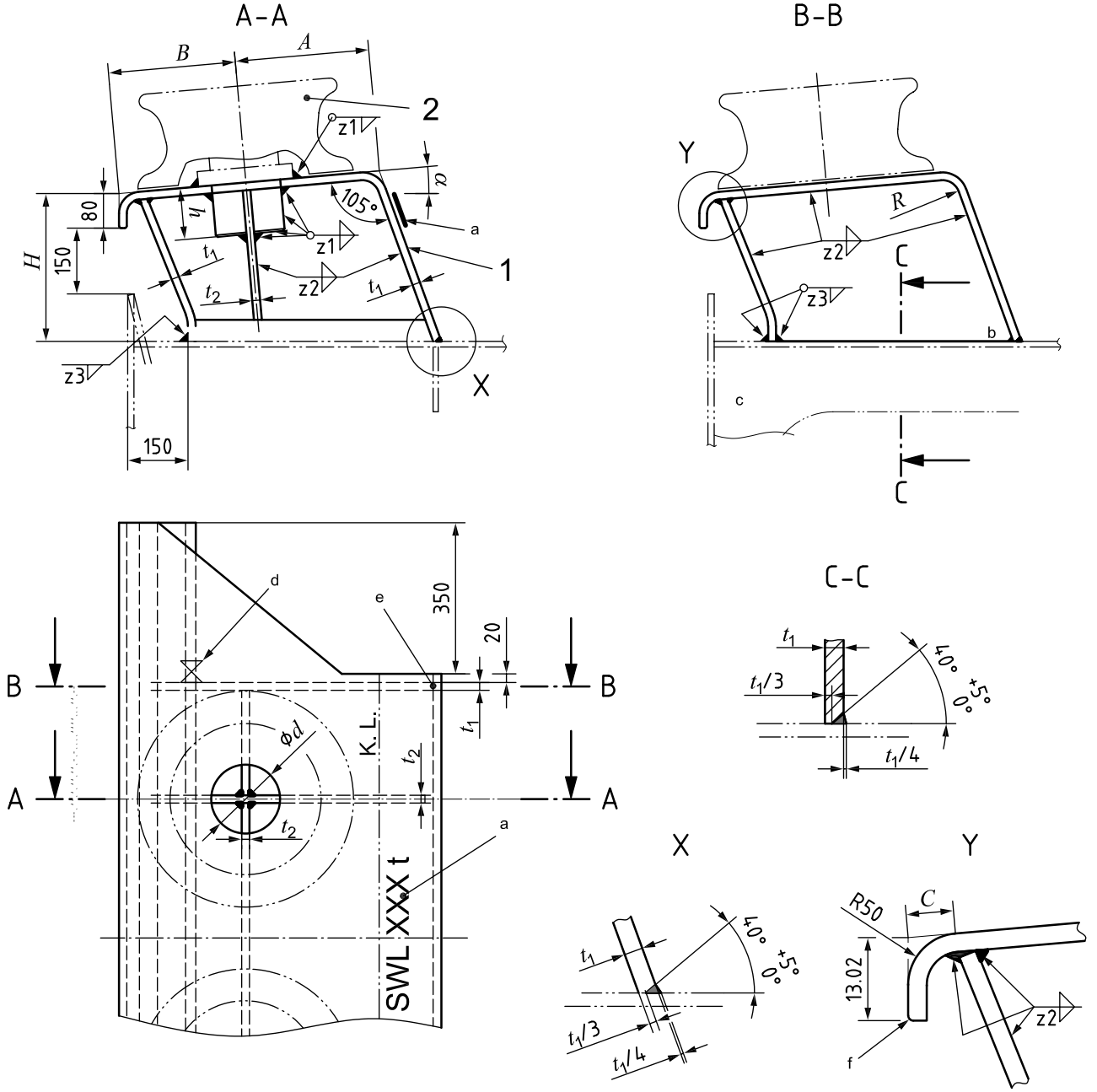
b The SWL is the maximum applicable rope tension based on 90° ($\theta = 90°$) and 160° ($\theta = 20°$) deflection of rope direction by the roller fairlead.

The SWLs shown in this table are for reference only. These are based on the loadings as mentioned in Annex A.

The "SWL" may be adjusted depending on the actual loading conditions, and the actual marking shall be agreed between the user and the manufacturer.

c P and W are for reference only. The opening size on the shell or bulwark shall be determined considering overhauling space of the roller.

Dimensions in millimetres



Key

1 seat

2 steel rollers

a SWL marking.

b Deck.

c Under carling.

d Drain hole.

e Water tight.

f Smooth grinding.

H The height of the roller fairlead shall be determined in accordance with the height of the shipside gutter coaming.

a° The inclination of a° is to be determined in accordance with the rope leading inclination.

NOTE The end shape of the fairleads shown in “Detail Y” can be changed as per manufacturer’s standard based on no sharp edges to avoid rope damage.

Figure 2 — Assembly of roller fairleads

Table 2 — Dimensions of roller fairleads

Dimensions in millimetres

Nominal size D_n	A	B	C	R	d[c]		h_1	t_1	t_2	Welding leg length[a]			Calculated weight[b] (kg)	
					Type A and B	Type C				z_1	z_2	z_3	2-roller type	3-roller type
150	145	165	50	20	71,5	81,5	100	10	12	8	5	8	126	171
200	182	200	50	20	93,5	102,5	100	12	14	10	6	10	191	265
250	225	235	50	25	113,5	119,5	100	15	16	11	7,5	12	286	404
300	256	265	50	25	128,5	130,5	125	16	18	12	8	13	367	525
350	296	295	50	30	145,5	152,5	125	21	24	15	10,5	17	569	820
400	333	330	70	30	154,5	164,5	150	23	26	17	11,5	18	719	1 048
450	371	360	70	35	167,5	179,5	150	26	28	20	13	21	912	1 339
500	402	390	70	35	178,5	195,5	150	27	32	23	13,5	22	1 097	1 618

[a] Welding with chamfering is available based on the same welding volume/strength.

[b] The calculated weight is for reference based on the height of seat (H), 380 mm excluding the steel roller on the roller fairlead.

[c] d is to be decided depending on the type of steel roller (Type A and B or Type C), as specified in ISO 13755.

Annex A
(informative)

Basis for strength assessment of shipside roller fairleads

A.1 General

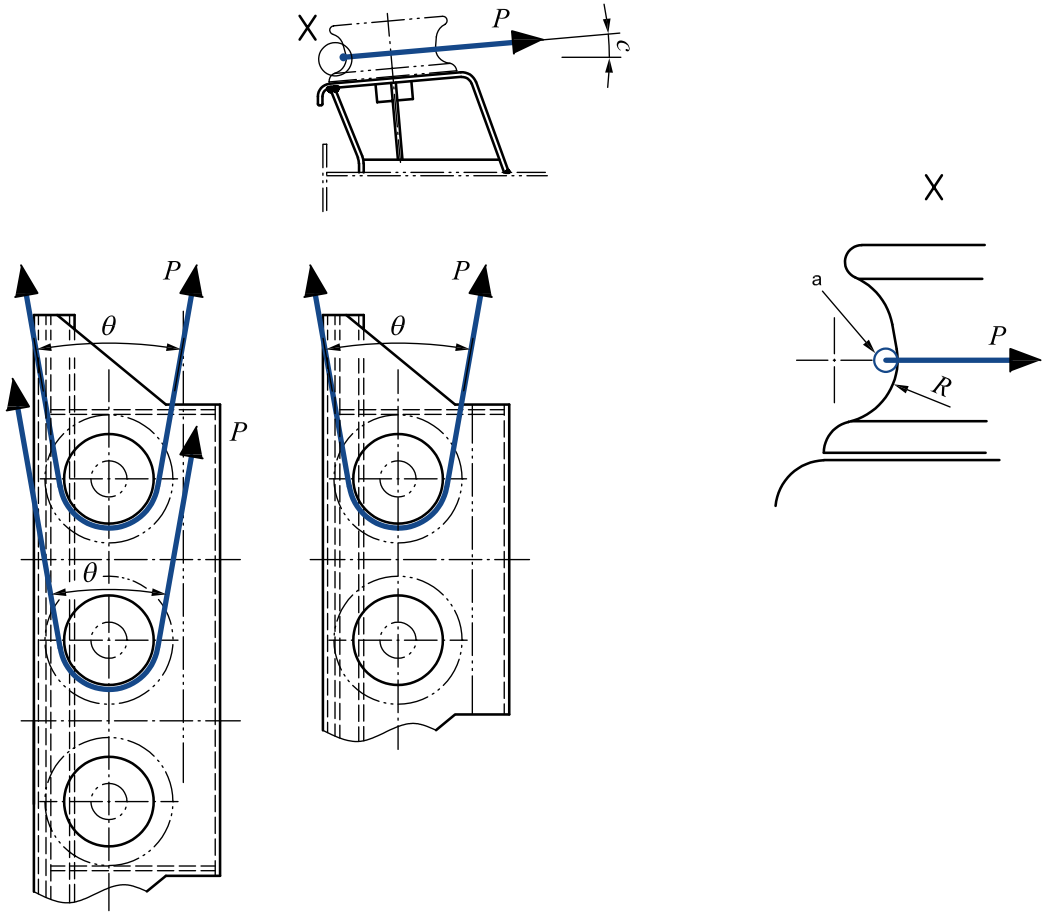
The strength of the roller fairleads was evaluated by finite element model analysis and determined based on the following design criteria.

A.2 Loading

The roller fairleads are to be designed to withstand the horizontal and vertical load cases.

The horizontal and vertical loadings were considered individually, but both loadings were not considered simultaneously.

A.2.1 Case 1 — Horizontal loading



Key

P mooring force and towing force at the conical part of the throat of the roller

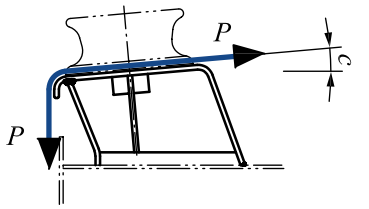
a Conical part of throat.

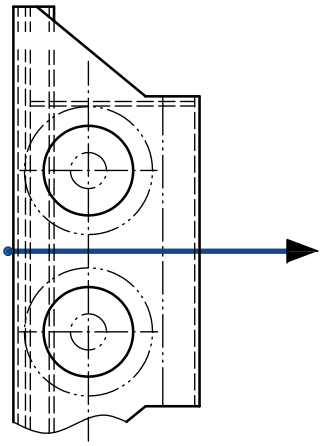
NOTE 1 The loads were considered with rope deflected 160° ($\theta = 20°$) through the roller fairlead as shown in this figure.

NOTE 2 The loads can be increased in accordance with the deflecting angle of the rope smaller than 160°.

Figure A.1 — Horizontal loading on roller fairleads

A.2.2 Case 2 — Vertical loading





Key

P mooring force and towing force at the conical part of the throat of the roller

NOTE The loads were considered with rope deflected as shown in this figure through the roller fairleads.

Vertical down side: Outboard down 90°.

"c" degree is to be decided to lead the mooring line to the mooring drum.

Vertical up side: This case was not considered.

Figure A.2 — Vertical loading on roller fairleads

A.2.3 A single load was considered for the 2-roller type and simultaneous loadings were considered for the 3-roller type roller fairleads.

A.3 Load and stress criterion

Under the SWL, the following stress criterion was adopted:

— The combined stress is limited to 85 % of the yield stress of the material.

A.4 Wear-down allowances and corrosion additions

The wear-down margin and corrosion margin were already included in the safety factor.

Bibliography

[1] IACS UR A2, *Shipboard fittings and supporting hull structures associated with towing and mooring on conventional vessels*

[2] OCIMF, *Mooring Equipment Guidelines (MEG3)*

ICS 47.020.50

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