

U.S. Department
of Transportation

**United States
Coast Guard**



Load Line Technical Manual

This chapter of the "Load Line Technical Manual" is not affected by the 2005 revisions to the International Convention on Load Lines (ICLL).

American Bureau of Shipping

CHAPTER IV

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Load Line Technical Manual

CHAPTER IV

CONDITIONS OF ASSIGNMENT: Increased Freeboard

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Preface to the electronic version

November 6, 2003

In 1990, the U.S. Coast Guard commissioned the American Bureau of Shipping (ABS) to prepare a report that integrated U.S. load line regulations & policies, ABS and IACS interpretations, IMO circulars, and the International Convention on Load Lines (ICLL) into a single reference document.

This “*Load Line Technical Manual*” is the result of that effort. It sets forth the technical procedures for evaluating, calculating and assigning ICLL load lines, using USCG and ABS policies where the Convention leaves certain requirements “to the satisfaction of the Administration” or is open to interpretation. This manual applies to U.S. vessels seeking an international ICLL assignment or a domestic U.S. load line assignment for unrestricted voyages by sea; it does not cover U.S. load line regulations for other types of domestic voyages (such as coastwise or Great Lakes).

This electronic version of the manual has been divided into five *Adobe .pdf* files:

<i>LL Tech Manual-ToC.pdf</i>	Table of Contents
<i>LL Tech Manual-Ch1.pdf</i>	Chapter I, General Items
<i>LL Tech Manual-Ch2.pdf</i>	Chapter II, Load Line Calculation
<i>LL Tech Manual-Ch3.pdf</i>	Chapter III, Cond of Assignment-Minimum Freebrd
<i>LL Tech Manual-Ch4.pdf</i>	Chapter IV, Cond of Assignment-Increased Freebrd

This Technical Manual was originally prepared in 1990; therefore, it only incorporates material up to that time. Since then, there has been further evolution of load line policies, additional IACS interpretations, new IMO Circulars, etc. The ICLL itself has been amended by the 1988 Protocol (which entered into force on February 3, 2000) as well as subsequent amendments that were adopted in 2003 (and will enter into force on 1 January 2005). There are no immediate plans to incorporate these into this manual.

Preface to the annotated version

February 3, 2006

On January 1, 2005, numerous new and revised ICLL regulations entered into force, adding new technical requirements or expanding existing requirements to encompass shipboard arrangements not previously addressed. The amendments also incorporate (wholly or partially) more than 35 IACS Unified Interpretations on the Load Line Convention.

In response to these revisions, this annotated version of the *Load Line Technical Manual* has been corrected, but not updated. Annotations have been inserted only where the ICLL revisions have affected the original *LLTM* discussion or policy (*the affected text is boxed*). However, there are many other ICLL revisions that are not indicated in this annotated version. Readers are advised to consult an officially-published copy of the ICLL in conjunction with this annotated version. IMO publications can be ordered via the IMO website at www.imo.org.

Unless stated otherwise in this annotated version, all revisions apply to new U.S. vessels (the keels of which were laid on/after January 1, 2005) seeking an international (ICLL) or unrestricted domestic (US) load line certificate.

Future annotations will be added whenever revised ICLL regulations affect the technical content of this *Manual*.

ABBREVIATIONS and VARIABLES

A	Minimum req'd freeing port area; or	B	Breadth as defined in the ICLL
	Angle in freeing port calculation for deck sheathing	B	Angle used in freeing port calc for non-flush openings
Aa	Actual area of freeing port	B₁	Half breadth of superstructure at start of extension; <i>or</i>
Ae	Effective area of freeing port		Breadth of superstructure at the midpoint of the recess
AB	American Bureau of Shipping	B₄	Half breadth of superstructure at midpoint of the length of the second recess
A_h	Actual height of freeing port opening	B-60	A Type 'B' freeboard that is reduced by 60% of the difference between a Type 'A' and a Type 'B' tabular freeboard
ABP	Bow planform area used in the bow height trim resistivity calculation	B-100	A Type 'B' freeboard that is reduced by 100% of the difference between a Type 'A' and a Type 'B' tabular freeboard
ABS	American Bureau of Shipping		
AP	After Perpendicular	B_b	Average breadth of the vessel in way of the well formed by a deck bin.
b	Breadth of superstructure at the middle of its length; <i>or</i>	Bhd	Bulkhead
b	Average breadth of deck obstruction; or	Bs	Breadth of the vessel at the mid-length of the superstructure
	Breadth of a local well in the freeboard deck	C	Camber
b₁	Breadth of extension at superstructure end bulkhead; <i>or</i>	C1	Subdivision load line mark
	Breadth of recess at midpoint of its length	Cb	Block coefficient
b₁	Average breadth of deck obstruction No. 1	Circ	Circular
b₂	Average breadth of deck obstruction No. 2	CL	Center line
b_b	Average breadth of deck bin	cm	Centimeter(s)
b₄	Half breadth of second recess at the midpoint of its length		

Cor	Correction	h	Actual height of trunk
D	Molded displacement; Molded depth	h_1	Least height of superstructure
Dr	Depth of a local well in the freeboard deck	h_b	Bulwark height in way of freeing port opening
d_1	85% of the least molded depth	h_c	Actual trunk hatch coaming height
Df	Depth for freeboard	h_i	Height of inboard end
dk	Deck	h_L	Least height of superstructure
E	Effective length of superstructure	h_o	Height of lower edge of freeing port opening above the deck
f	Tabular freeboard	h_{rc}	Required trunk hatch coaming height
f	Freeing port area adjustment factor	h_s	Standard height of superstructure
f_b	Freeing port area factor for bins	IACS	International Association of Classification Societies
F	Minimum required freeing port area	ICLL	International Convention on Load Lines
F_1	Freeing port area non-continuous deck obstruction	IMO	International Maritime Organization
F_2	Freeing port area - continuous deck obstruction	in	Inch
fbd	Freeboard	ISO	International Standards Organization
FFA	Free Flow Area	ITB	Integrated Tug Barge
FP	Forward perpendicular	l	Length of deck sheathed area which extends from side to side; <i>or</i>
ft	Feet		Length of a local well in the fbd dk
FW	Fresh Water load line mark	l	Length of a well
GM	Metacentric Height		
gt	Gross tons		

P	Length of well for freeing port area determination	OCMI	Officer in Charge Marine Inspection
l_1	Length of superstructure set-in from the side of the vessel; <i>or</i> Length of recess	oz	Ounce
		R	Coefficient used in the depth correction
l_1	Average length of deck obstruction No. 1	Reg	Regulation
		Rev	Revision
l_2	Equivalent length of superstructure in way of recess	s	Sheer credit for excess height of a poop or forecastle
l_2	Average length of deck obstruction No. 2	S	Mean length of superstructure; <i>or</i> Summer load line mark
l_4	Equivalent length of second recess		
l_c	Length of camber in the molded half breadth of the vessel	SLF	IMO Subcommittee on Stability and Load Lines and on Fishing Vessels safety
L	Length as defined in the ICLL	sp.gr	Specific gravity
L'	The mean enclosed length of the poop or forecastle up to a maximum of 0.5L	Ss	Sheer strake thickness
		Stab	Stability
LCF	Longitudinal center of floatation	Stbd	Starboard
		Std	Standard
LL	Load line	sw	Saltwater
LLAC	Load Line Advisory Circular	T	Mean thickness of the exposed deck sheathing clear of deck openings; <i>or</i> Tons per centimeter (inch) immersion in salt water at the molded summer load waterline; <i>or</i>
LLC	Load Line Convention		
m	Meter(s)		
mm	Millimeter(s)		
MSC	Marine Safety Center		
NVIC	Navigation Vessel Inspection Circular		Tropical load line mark
		TF	Tropical Fresh load line mark

US	United States
USA	United States of America
USCG	United States Coast Guard
V	Volume of the molded displacement of the vessel
W	Winter load line mark
WNA	Winter North Atlantic load line mark
WP	Waterplane
x	Distance lower edge of freeing port opening is above top of the deck sheathing
y	Difference between the actual and standard height of superstructure at the end of sheer
Z	Least difference between the actual and standard height of superstructure for sheer credit on a full superstructure vessel

REFERENCE SYSTEM

Footnotes are used throughout this manual to designate sources of information, and for notes to clarify or elaborate on the text given. The footnotes are placed on the bottom of the same page where the footnote reference mark appears.

Reference Sources

The eleven (11) common reference sources are indicated on the "Reference Material" page. For simplification, the bracketed number [] that precedes each reference source listed is used in the footnotes throughout this manual in lieu of the complete title of the reference. The titles of other source material not listed on the "Reference Material" page are given in their entirety.

In certain instances the reference source given in the footnote may be followed by the word "{basis}", which means that the reference source was used as the basis of the text, however the wording has been changed or expanded for clarification.

Footnote Reference Mark Location

The footnote reference mark is placed in the subject heading if the entire subject is taken from the reference source, and in the paragraph heading if the entire paragraph is taken from the source referenced. Reference marks placed at the end of a sentence generally mean that only that particular sentence is from the source referenced.

Regulation Reference

The term "Regulation" or simply "Reg." used throughout this manual refers to the *International Convention on Load Lines, 1966* unless otherwise specified.

REFERENCE MATERIAL

- [1] International Convention on Load Lines, 1966
- [2] Code of Federal Regulations, Title 46, 1984
- [3] Marine Safety Manual
- [4] IMO Correspondence
- [5] IACS Unified Interpretations of the International Convention on Load Lines, 1966
- [6] U.S.C.G. Navigation and Vessel Inspection Circulars
- [7] A.B.S. Circular Letters of Instruction
- [8] U.S.C.G. Correspondence
- [9] A.B.S. Correspondence
- [10] Ship Design and Construction
- [11] U.S.C.G. Load Line Advisory Circulars

GENERAL GUIDELINES

GENERAL REQUIREMENTS

Definition

The term "Conditions of Assignment of Freeboard" is applied collectively to the requirements stipulated in Regulations 10-26 of the Convention; information supplied to the master, superstructure end bulkheads, doors, cargo and access hatchways, machinery space openings, miscellaneous openings in the freeboard and superstructure decks, ventilators, airpipes, cargo ports, scuppers, inlets and overboard discharges, side scuttles, freeing ports, protection of the crew, and special conditions for Type 'A' vessels.

An increased freeboard¹ is one which is greater than the minimum Type 'A' or Type 'B' freeboard for each respective type of vessel, calculated using the vessels geometric particulars in accordance with the Convention.

Freeboards may be required to be increased due to such considerations such as strength, stability, deficient hatch covers, location of shell doors or side scuttles, operational considerations or other reasons.

Relaxation²

*All of the conditions of assignment requirements stipulated in the preceding chapter are applicable to every vessel to which is assigned a minimum freeboard. Relaxations from these requirements *may* be granted to a vessel assigned a greater than minimum freeboard *provided* the safety conditions of the vessel are determined to be satisfactory.*

Non-Steel Construction

Vessels made of:

- 1) wood or composite construction;
- 2) other materials acceptable to the Commandant; or

¹ An assigned freeboard is not considered to be an "increased freeboard" if the only penalty imposed is due to a deficient bow height, per Reg. 40(1).

² [2] 42.13-10(e)

- 3) vessels with constructional features that render the application of the conditions of assignment requirements of the Convention unreasonable,

may be assigned freeboards as determined necessary by the Commandant, after consideration of the information supplied in the assigning authority report; details of which will be addressed later in this section. Special consideration does not necessarily mean a waiver; it refers to an equivalency or an evaluation of the requirements to determine their application to a particular item.

GENERAL PHILOSOPHY

Overview for Assessing Possible Deficiencies

All the conditions of assignment requirements addressed in the previous chapter are applicable to vessels assigned a minimum freeboard, based on their geometric particulars, in accordance with the Convention. If the assigned freeboard is increased, a *relaxation* of the conditions of assignment is allowed where deemed justified by the assigning authority, or where applicable by the Commandant. Generally, the larger the increase in freeboard the greater the allowable relaxation.

In theory it is preferable to evaluate possible deficiencies on a "case by case" basis, where all contributing factors can be weighed to determine a fair and equitable assessment for the configuration in question. In practice however, since this approach is subjective, it may lead to inconsistency. Similar configurations may be treated differently by different assigning authorities, or by personnel within the same assigning authority over a period of time. It is important that, where possible, a basic standardized guideline is followed to increase the probability of consistent application.

The standardized guidelines are to be used for assessing possible deficiencies and should not be used for design purposes.

A designer should strive for compliance with the Conditions of Assignment requirements specified in the Convention *even* if the assigned freeboard will be increased from the geometric minimum.

In addition to an increase in assigned freeboard, the location of a particular item in question, i.e. on which deck it is located and the height of the deck relative to the standard height of superstructure,³ will also influence whether a possible deficiency may be accepted. Generally, relaxations *may* be granted if superstructures of excess height are involved, in a step by step fashion, deck height by deck height. The ratio of gradation between the locations already determined by the Convention are recommended as a guideline.⁴

³ Standard height of superstructure is addressed in Chapter II of this manual.

⁴ IACS, 10th Meeting of WP/SSLL, 4 Nov 1974, [general opinion]

When comparing a vessel's actual conditions of assignment to those associated with the assignment of a minimum freeboard, if a possible deficiency exists, the guidelines stipulated in this chapter are to be used by the assigning authority to evaluate whether a possible deficiency may be accepted. If further special consideration is warranted, a report is to be furnished by the assigning authority to the Commandant for his decision. Details of the report contents are addressed in the next section of this chapter.

Criteria Summary

The various criteria for assessing possible conditions of assignment deficiencies are summarized into the following table. The matrix referenced in the table is indicated later in this chapter in the "Coaming and Sill Heights" section.

CRITERIA SUMMARY

<u>Item</u>	<u>Assessment Criteria</u>
Doors.....	Matrix
Machinery Space Openings.....	Matrix
Cargo Ports.....	Assigned freeboard -directly
Tonnage Openings.....	Matrix
Cargo Hatchways.....	Matrix
Access Hatchways.....	Matrix
Ventilators.....	Matrix
Airpipes.....	Matrix-for those without automatic closures
Overboard Piping.....	Assigned freeboard -directly
Side Scuttles.....	Assigned freeboard -directly & ventilator comparison
Freeing Ports.....	Assigned freeboard & excess height "f" values
Crew Protection.....	Case by case & assigned fbd.
Special Conds. (Type 'A', 'B' reduced).....	Each category is assessed separately.

**CARGO PORTS,
OVERBOARD
PIPING, & SIDE
SCUTTLES**

Concept

There is a *direct correlation* between the waterline corresponding to the assigned freeboard, and the requirements associated with cargo ports and side scuttles located in the shell below the freeboard deck, and to the requirements associated with overboard piping. A small increase in the assigned freeboard *may* allow a particular "border

line" arrangement which would otherwise be unacceptable. The requirements associated with these items are assessed as a function of the waterplane location corresponding to the actual assigned increased freeboard. No additional relaxation is granted simply because the assigned freeboard is "increased" from the minimum.

Cargo Ports

The lower edge of a cargo port may not be located below a line drawn parallel to the freeboard deck at side, which has as its lowest point the upper edge of the uppermost load line. Therefore, an increase in the assigned freeboard may allow a particular cargo port arrangement to be located in an area which would otherwise be unacceptable.

For cargo ports or other similar openings located in the side shell below the freeboard deck, an increase in the assigned freeboard has no bearing on any requirement other than the allowable location of the lowest edge of the opening. The strength and tightness requirements associated with the cargo port remain unaffected since the opening is still located below the freeboard deck, regardless of the amount that the assigned freeboard may have been increased from the minimum. If when assigning the freeboard, a lower deck below the level of the cargo port is designated as the freeboard deck, the strength and tightness requirements *may* be influenced by the magnitude of the increase in assigned freeboard.

Overboard Piping

The requirements associated with scuppers, inlets and overboard discharges are *directly* predicated on the location of the inboard end, fitted valves, and shell outlet to the location of the assigned summer and tropical freeboard marks. Increasing these assigned freeboards *may* diminish the requirements applicable to a particular configuration, such as number or type of required valves, or minimum required piping thickness.

Side Scuttles

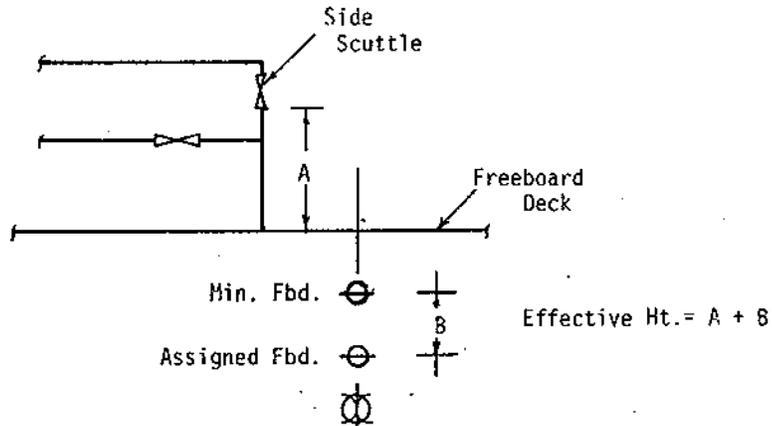
A side scuttle located *below the freeboard deck* is not to have its lower sill below a line, drawn parallel to the freeboard deck at side, which is 2.5% of the breadth of the vessel above the highest seasonal load waterline. Therefore, increasing the assigned freeboard *may* allow a side scuttle to be located in an otherwise unacceptable location.

The requirements associated with side scuttles located *above the freeboard deck* in the sides of superstructures or deck houses, are predicated on the effective height that the side scuttle is above the freeboard deck, i.e. in which tier⁶ the side scuttle is located. When evaluating the applicable requirements for each side scuttle, the amount the assigned freeboard is increased from the minimum geo-

⁶ A tier is considered to be one standard height of superstructure in height.

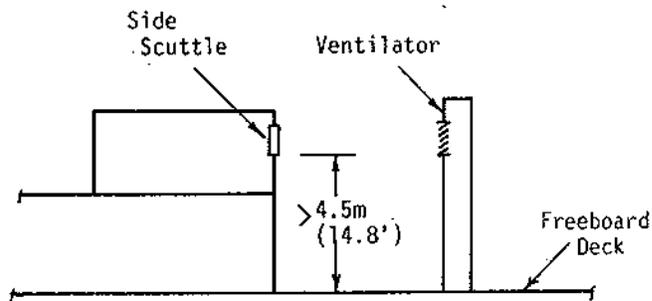
metric freeboard *may* be added to the actual height that the side scuttle is above the freeboard deck, to determine it's effective height.

Figure 103.
Increased
Freeboard-Side
Scuttles, Tier
Location



As an alternative to using the previously addressed guidelines, a side scuttle may be equated to a ventilator opening when determining if a deadlight cover is required.⁶ Ventilators located in position 1 which have coamings which extend more than 4.5 m (14.8 ft) above the deck, and in position 2 extend more than 2.3 m (7.5 ft) above the deck, need not be fitted with a closing arrangement *unless* specifically required by the assigning authority. If the lower sill of a side scuttle complies with the same height criteria, including an effective addition to the actual height for the increase in freeboard, the deadlight cover requirement *may* be relaxed, unless specifically required by the assigning authority.

Figure 104.
Increased
Freeboard-Side
Scuttles, Ventilator
Equivalency



After determining the effective height of a side scuttle, there are a few possible alternatives for evaluating compliance:

⁶ Practice since at least 1980.

Deadlight Requirement

- 1) tier location; or
- 2) equating to a ventilator, location of lower sill relative to the deck - position 1 requirements; or
- 3) equating to a ventilator, location of lower sill relative to the deck - position 2 requirements;

Glass Requirements

- 1) tier location only.

**MINIMUM
COAMING & SILL
HEIGHTS**
Concept

There are five major factors which may influence the required minimum coaming and sill heights of openings on the weatherdecks:

- 1) height above the waterline;
- 2) athwartships location;
- 3) longitudinal location;
- 4) area of the open deck around or adjacent to the opening; and
- 5) type and volume of space opening leads to.

There is some measure of accountability for each of these factors within the requirements of the Convention. The accountability is direct for some of these factors, for others it is indirect or more subtle.

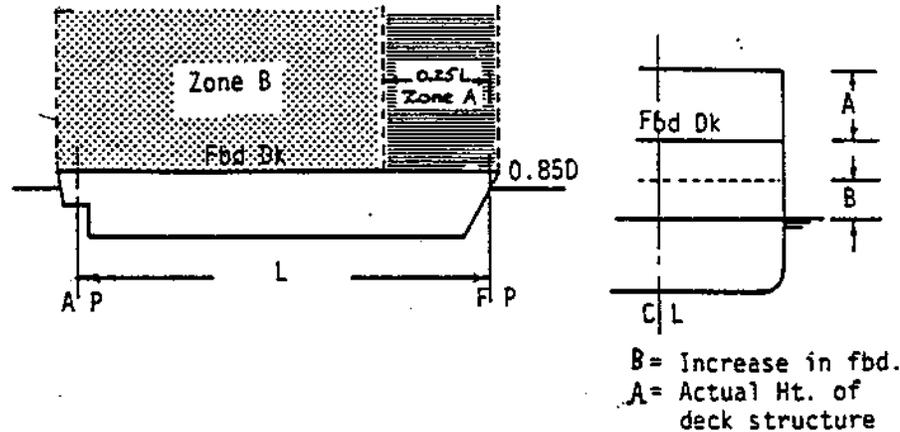
Guidelines for Coaming & Sill Heights

The primary basis of the conditions of assignment of the Convention is to establish a minimum effective height above the waterline. This philosophy is supported by the determination of the minimum geometric freeboard, stipulated coaming and sill height requirements, etc. For simplification, the guidelines to follow for assessing possible deficiencies are based primarily on factor 1) of those addressed above; the height above the waterline.

There are two possible contributing factors which may be added to the actual height above the deck of a sill or coaming to establish its *effective height*:

- 1) the increase in assigned freeboard over the minimum geometric freeboard; and

- 2) for items located on decks above the freeboard deck, the excess height of the deck above the standard height of a superstructure.⁷



The following tables specify the minimum coaming and sill height requirements, in both english and metric units, that are applicable when either a minimum or increased freeboard is assigned. The values indicated simply reflect a linear interpolation and extrapolation of the requirements stipulated in the Load Line Convention.

Guidance for Using the Tables

To use the tables, find the applicable value, as determined below, in the left column, and then move horizontally across the row to the applicable column for the item in question.

There are three different possibilities for determining the value to be used in the left column of the tables:

- 1) Increased freeboard assigned and sill or coaming in question is located on the freeboard deck;

effective height = increase in freeboard.

- 2) Increased freeboard assigned and sill or coaming in question is located atop a deck structure;

effective height = increase in freeboard + actual height of deck structure.

- 3) Minimum freeboard assigned and item in question is located atop a deck structure;

effective height = actual height of deck structure.

⁷ Standard height of a superstructure is defined in Regulation 33, and in Chapter II of this manual.

Zones - The vessel is subdivided into two regions or zones:

Zone A- From the bow to a point 0.25L abaft the F.P., and from the freeboard deck upwards without limit.

Zone B- From the stern to a point 0.25L abaft the F.P., and from the freeboard deck upwards without limit.

Standard Height - The applicable standard height is a function of the length of the vessel.⁸ An interpolation between the two standard height columns indicated may be necessary.

⁸ Standard height of a superstructure is defined in Regulation 33, and in Chapter II of this manual.

MINIMUM REQ'D SILL & COAMING HEIGHTS
for Increased Freeboards & Excess Deck Structure Heights

ENGLISH UNITS - INCHES

Increase in Fbd + Height of Deck Structure above Fbd Deck (Ft)	Hatch Coamings (Reg. 15,16)				Door Sills (Reg. 12) (no direct access below)				Door Sills & Misc. Openings (Reg. 17,18) (direct access below)				Ventilators (Reg. 19)				Airpipes (Reg. 20) (No automatic closure)		
	Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		
	5.9'		7.5'		5.9'		7.5'		5.9'		7.5'		5.9'		7.5'		5.9' 7.5'		
	Zone		Zone		Zone		Zone		Zone		Zone		Zone		Zone				
EFFECTIVE HT (Feet)	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B			
0.5	23.5	23.0	23.5	23.1	15.0	13.7	15.0	14.0	23.5	22.8	23.5	22.9	35.5	35.0	35.5	35.1	28.9	29.2	
1.0		22.5		22.7		12.4		13.0		22.1		22.4		34.6		34.8	27.9	28.3	
1.5		22.0		22.3		11.2		12.0		21.3		21.8		34.1		34.4	26.8	27.5	
2.0		21.5		21.9		9.9		11.0		20.6		21.2		33.6		34.0	25.8	26.7	
2.5		21.0		21.5		8.6		10.0		19.9		20.7		33.2		33.7	24.7	25.8	
3.0		20.5		21.1		7.4		9.0		19.2		20.1		32.7		33.3	23.6	25.0	
3.5		20.0		20.7		6.1		8.0		18.4		19.5		32.2		32.9	22.6	24.2	
4.0		19.5		20.3				7.0		17.7		19.0		31.8		32.6	21.5	23.3	
4.5		19.0		19.9				6.0		17.0		18.4		31.3		32.2	20.5	22.5	
5.0		18.5		19.5						16.3		17.8		30.8		31.8	19.4	21.7	
5.5		18.0		19.1						15.6		17.3		30.4		31.5	18.4	20.8	
5.9	23.5	17.5		18.8	15.0					23.5	15.0	16.8	35.5	30.0		31.2	17.5	20.2	
6.5	22.9	15.7		18.3	13.5					22.6	13.5	16.1	34.9	26.9		30.7	15.7	19.2	
7.0	22.4	14.2		17.9	12.2					21.9	12.2	15.6	34.5	24.4		30.4	14.2	18.3	
7.5	21.9	12.8	23.5	17.5	10.9		15.0			21.2	10.9	23.5	15.0	34.0	21.9	35.5	30.0	12.8	17.5
8.0	21.4	11.3	23.1	16.3	9.7		14.0			20.5	9.7	22.9	14.0	33.5	19.3	35.1	28.0	11.3	16.8
8.5	20.9	9.8	22.7	15.2	8.4		13.0			19.8	8.4	22.4	13.0	33.1	16.8	34.8	26.0	9.8	15.2
9.0	20.3	8.3	22.3	14.0	7.1		12.0			19.0	7.1	21.8	12.0	32.6	14.3	34.4	24.0	8.3	14.0
9.5	19.8	6.8	21.9	12.8			11.0			18.3		21.2	11.0	32.1	11.7	34.0	22.0	6.8	12.8
10.0	19.3		21.5	11.7			10.0			17.6		20.7	10.0	31.7	9.2	33.7	20.0		11.7
10.5	18.8		21.1	10.5			9.0			16.9		20.1	9.0	31.2	6.6	33.3	18.0		10.5
11.0	18.3		20.7	9.3			8.0			16.2		19.5	8.0	30.7		32.9	16.0		9.3
11.5	17.8		20.3	8.2			7.0			15.5		19.0	7.0	30.3		32.6	14.0		8.2
12.0	16.9		19.9	7.0			6.0			14.5		18.4	6.0	29.0		32.2	12.0		7.0
12.5	15.4		19.5							13.2		17.8		26.4		31.8	10.0		
13.0	13.9		19.1							11.9		17.3		23.9		31.5	8.0		
13.5	12.4		18.7							10.7		16.7		21.4		31.1	6.0		
14.0	11.0		18.3							9.4		16.1		18.8		30.7			
14.5	9.5		17.9							8.1		15.6		16.3		30.4			
15.0	8.0		17.5							6.9		15.0		13.7		30.0			
15.5	6.5		16.3									14.0		11.2		28.0			
16.0			14.0									13.0		8.6		26.0			
16.5			12.8									12.0		6.1		24.0			
17.0			11.7									11.0				22.0			
17.5			10.5									10.0				20.0			
18.0			9.3									9.0				18.0			

Intermediate values are to be determined by linear interpolation.

MINIMUM REQ'D SILL & COAMING HEIGHTS
for Increased Freeboards & Excess Deck Structure Heights

METRIC UNITS - MILLIMETERS

Increase in Fbd + Height of Deck Structure above Fbd Deck (m)	Hatch Coamings (Reg. 15,16)				Door Sills (Reg. 12) (no direct access below)				Door Sills & Misc. Openings (Reg. 17,18) (direct access below)				Ventilators (Reg. 19)				Airpipes (Reg. 20) (No automatic closure)	
	Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht		Std Ht	Std Ht		
	1.8m		2.3m		1.8m		2.3m		1.8m		2.3m		1.8m		2.3m		1.8m	2.3m
	Zone		Zone		Zone		Zone		Zone		Zone		Zone					
EFFECTIVE HT (Meters)	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B		
0.1	600	592	600	593	380	359	380	383	600	588	600	590	900	892	900	894	743	747
0.2		583		587		338		347		576		581		884		888	726	733
0.3		575		580		317		330		563		571		877		882	708	720
0.4		567		574		296		314		551		562		869		876	691	706
0.5		558		567		274		298		539		552		861		870	674	693
0.6		550		561		253		281		527		543		853		863	657	679
0.7		542		554		232		264		514		533		846		857	639	666
0.8		533		548		211		248		502		523		838		851	622	652
0.9		525		541		190		231		490		514		830		845	605	639
1.0		517		535		169		215		478		504		822		839	588	625
1.2		500		522				182		453		485		807		827	553	598
1.4		483		509				149		429		466		791		815	519	571
1.6		467		496						404		447		776		803	484	544
1.8	600	450		483	380				600	380		428	900	780		790	450	517
2.0	583	400		470	338				576	338		409	884	676		778	400	490
2.2	567	350		457	296				551	296		390	869	591		766	350	463
2.3	558	325	600	450	274		380		539	274	600	380	861	549	900	760	325	450
2.6	533	250	580	391	253		330		502	253	571	330	838	422	882	661	250	391
2.8	517	200	567	352	169		297		478	169	552	297	822	338	870	595	200	352
3.0	483	150	554	313			264		453		533	264	807	253	857	529	150	313
3.2	483		541	274			231		429		514	231	791	169	845	463		274
3.4	467		528	235			198		404		495	198	776		833	397		235
3.6	450		515	196			165		380		476	165	760		821	330		196
3.8	400		502	157							456				809	264		157
4.0	350		489								437				797	198		
4.6	200		450								380				760			
5.0			372								314				628			
5.4			293								249				496			
6.0			176								149				297			

Intermediate values are to be determined by linear interpolation.

Examples Using Tables**Example 1**

A ventilator with a 26" coaming height is located on a poop deck 8'-0" above the freeboard deck, on a bulk carrier with a length of 700', assigned a minimum summer freeboard of 10'-0".

Q) Is the ventilator coaming height acceptable?

A) The standard superstructure height for a 700' vessel is 7.5'. From the english units table, for a ventilator located in Zone B, standard height = 7.5', atop a deck located 8'-0" above the freeboard deck, the minimum effective height = 8.0' and the minimum required coaming height is 28". Therefore the coaming height of the ventilator is unacceptable.

Q) If the assigned summer freeboard were increased by 1'-0" to 11'-0", will the ventilator coaming height then be acceptable?

A) Increase in freeboard + height of deck above the freeboard deck = 1'-0" + 8'-0" = effective height = 9'-0". From the same table, the minimum required coaming height for the ventilator is 24". Therefore, a coaming height of 26" would be acceptable.

Example 2

An access door, with a sill height of 300 mm, is located in the aft bulkhead of a forecastle on the freeboard deck of a supply vessel with a length of 55 m. The forecastle end bulkhead is located in the forward 0.25L of the vessel, the minimum freeboard is 600 mm, and the assigned freeboard is 1.0 m.

Q) Is the door sill height acceptable?

A) The standard height of superstructure for a 55 m vessel is 1.8 m. From the metric units table, for a door sill (no direct access below) located in Zone A, standard height = 1.8 m, located on the freeboard deck, with an increase in freeboard of 0.4 m the effective height is = 0.4 m and the minimum required door sill height is 380 mm. Therefore, the door sill height is unacceptable. The door sill height would be acceptable if the door were located in Zone B.

FREEING PORTS**Concept**

If an increased freeboard is assigned, *except* as provided below, the minimum required freeing port area is determined following the same procedures used when a minimum geometric freeboard is assigned.⁹ This is true for wells formed *either* by bulwarks or by bins.

⁹ See the section on "Freeing Ports" in Chapter III of this manual.

The only difference in the procedure is that the amount of freeboard increase may be added to the effective height of the deck on which the well is located *before* determining the appropriate "f" factor from the table located in the "Freeing Port Section" of Chapter III of this manual.

An increase in assigned freeboard has no direct influence on the effective freeing area credit given for actual freeing arrangements that are provided.

CREW PROTECTION

Concept

Generally, an increase in the assigned freeboard has no direct influence on the crew protection requirements stipulated in Reg. 25.¹⁰

If the required height of a bulwark or guard rail would interfere with the normal operation of the vessel, a lesser height may be approved provided both the assigning authority and the Commandant are satisfied that adequate protection is provided. The latter approval necessitates a report, the details of which are specified in the following section of this chapter. This procedure is also applicable if a minimum geometric freeboard is assigned.

¹⁰ See the section on "Crew Protection" in Chapter III of this manual.

REPORT TO THE COMMANDANT¹

GENERAL APPLICATION

Application

When comparing a vessel's actual conditions of assignment to those associated with the assignment of a minimum freeboard, if a possible deficiency exists, the guidelines previously stipulated in this chapter are to be used by the assigning authority to evaluate whether it may be accepted. If the item(s) in question cannot be justified, and further special consideration is warranted, or where the Commandant's approval is specifically required, a report is to be furnished by the assigning authority to the Commandant for a decision.

If a minimum freeboard is assigned, a "Report to the Commandant" may be submitted by the assigning authority to the USCG if the assigning authority deems there is sufficient cause to warrant special consideration.

Procedure

The designer, shipyard or owner is to write to the assigning authority requesting a relaxation from the requirements for the specific items in question. Details, including operational considerations, prior history, or other possible justifications etc., are to be provided to support the request. Additional information, initial testing, or possible future monitoring that the submitter wishes to provide to support the request should also be indicated.

The assigning authority in turn will review the information submitted to determine if special consideration is warranted. If the item(s) cannot be justified using the procedures addressed in the previous section of this manual, and special consideration is warranted, the assigning authority is to prepare a report containing all the necessary details for the review and decision of the Commandant. The assigning authority is to include in the report any additional information to assist the USCG in it's decision, i.e. background data, similar occurrences in the past, assigned freeboard, amount of freeboard increase, any recommendation, etc. The report together, with the request and information provided by the submitter, is to be sent to the USCG Headquarters in Washington, D.C.

¹ [2] 42.13-10(e)(f)

The USCG will advise both the assigning authority and the request submitter of it's decision, or *if* additional information is required before a decision can be made.

REPORT SPECIFICS²

Items to be Included

The report is to be accompanied by a cover letter from the assigning authority, and a copy of the submitter's request and supporting data. Both the cover letter and the submitter's request are to clearly designate the individuals that the USCG is to advise when a decision has been made.

The report should be subdivided into five main sections:

- 1) *Vessel Particulars* - vessel name, identification number, builder, hull number, type of vessel, etc.
- 2) *Consideration Requested* - the specific item(s) to be considered and the applicable regulation(s) or requirement(s).
- 3) *Request Submitter* - the person and organization requesting the special consideration including their correspondence address.
- 4) *Background Vessel Data* - pertinent factual information relative to the vessel including, but not limited to, the assigned freeboard and amount of freeboard increase if applicable.
- 5) *Further Items for Consideration* - any additional information such as IACS interpretations etc. which may assist the USCG in making their decision.

A copy of the report cover letter is to be forwarded to the submitter requesting the special consideration to indicate that the request is pending review by the USCG.

² The information provided in this section for the report is only a suggested format. Alternative formats are also acceptable provided all the necessary information is provided.