第 125/2015 號行政長官公告

中華人民共和國於一九九九年十二月十三日以照會通知聯合國秘書長，經修訂的《1974年國際海上人命安全公約》（下稱“公約”）自一九九九年十二月二十日起適用於澳門特別行政區；

國際海事組織海上安全委員會於二零零六年十二月八日透過第MSC.216（82）號決議通過了經修正的公約的修正案，該修正案於下列日期適用於澳門特別行政區：

——附件1所載的修正案，自二零零八年七月一日起；

——附件2所載的修正案，自二零零九年一月一日起；及

——附件3所載的修正案，自二零一零年七月一日起；

基於此，行政長官根據第3/1999號法律《法規的公佈與格式》第六條第一款的規定，命令公佈包含上指修正案的第MSC.216（82）號決議的中文及英文文本。

二零一五年十一月十七日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 125/2015

Considerando que a República Popular da China, por nota datada de 13 de Dezembro de 1999, notificou o Secretário-Geral das Nações Unidas sobre a aplicação da Convenção Internacional para a Salvaguarda da Vida Humana no Mar de 1974, adiante designada por Convenção, tal como emendada, na Região Administrativa Especial de Macau a partir de 20 de Dezembro de 1999;

Considerando igualmente que, em 8 de Dezembro de 2006, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.216(82), adoptou emendas à Convenção, tal como emendada, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau como se segue:

— as emendas constantes do anexo 1, desde 1 de Julho de 2008;

— as emendas constantes do anexo 2, desde 1 de Janeiro de 2009; e

— as emendas constantes do anexo 3, desde 1 de Julho de 2010.

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 (Publicação e formulário dos diplomas), a resolução MSC.216(82), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 17 de Novembro de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.216（82）號決議

（2006 年 12 月 8 日通過）

《經修正的 1974 年國際海上人命安全公約》的修正案

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第 28（b）條，

進一步憶及《1974 年國際海上人命安全公約》（SOLAS）（以下簡稱“公約”）關於附則除第 I 章規定以外的適用修正程序的第 VIII（b）條，

在其第八十二屆會議上，**審議了**根據公約第 VIII（b）（i）條建議和散發的《公約》修正案，

1. 根據公約第 VIII（b）（iv）條，**通過**《公約》的修正案，其正文列於本決議之附件 1、2 和 3；

2. 按照《公約》第 VIII（b）（vi）（2）（bb）條，**決定**：

（a） 載於附件 1 的所述修正案將於 2008 年 1 月 1 日視為已被接受；

（b） 載於附件 2 的所述修正案將於 2008 年 7 月 1 日視為已被接受；以及

（c） 載於附件 3 的所述修正案將於 2010 年 1 月 1 日視為已被接受，

除非在此日期之前，超過三分之一的《公約》締約政府或其合計商船隊總噸位不少於世界商船隊總噸位 50%的締約政府通知反對該修正案；

3. **請**締約政府注意，根據《公約》第 VIII（b）（vii）（2）條，在按照上述第 2 段被接受後：

（a） 載於附件 1 的修正案將於 2008 年 7 月 1 日生效；

（b） 載於附件 2 的修正案將於 2009 年 1 月 1 日生效；及

（c） 載於附件 3 的修正案將於 2010 年 7 月 1 日生效，

4. **要求**秘書長遵照《公約》第 VIII（b）（v）條，將本決議和附件所載修正案文本的核證無誤副本送發《公約》的所有締約政府；

5. **進一步要求**秘書長將本決議及其附件的副本送發非《公約》締約政府的本組織會員。

附件 1

《經修正的 1974 年國際海上人命安全公約》的修正案

第 II-1 章

構造－結構、分艙及穩性、機電設備

A-1 部分

船舶結構

第 3-2 條 油船和散貨船海水壓載艙的防腐

1 用以下文字取代第 3-2 條的現有文字和標題：

“所有類型船舶專用海水壓載艙及散貨船雙舷側處所的保護塗層

1 本條第 2 和第 4 款須適用於不小於 500 總噸的下列船舶：

.1 2008 年 7 月 1 日及之後簽訂造船合同；或

.2 如無造船合同，2009 年 1 月 1 日及之後安放龍骨或處於類似建造階段；或

.3 交船日期為 2012 年 7 月 1 日或之後的船舶。

2 船上配置的所有專用海水壓載艙和 150 米及以上長度散貨船的雙舷側處所，須在建造時按照《所有類型船舶專用海水壓載艙及散貨船雙舷側處所的保護塗層性能標準》塗裝塗層。該標準由海上安全委員會以第 MSC.215（82）號決議通過，並可由本組織修正，但這樣的修正案要按照本公約第 VIII 條關於附則除第 I 章外的適用修正程序的規定通過、滿足生效條件和發生效力。

3 1998 年 7 月 1 日及之後建造的油船和散貨船上配置的第 2 款不適用的所有專用海水壓載艙，須符合第 MSC.47（66）號決議通過的第 II-1/3-2 條的要求。

4 保護塗層系統的保養須列入全船保養機制。在船舶的壽命中，保護塗層系統的效能須由主管機關或經主管機關認可的組織根據本組織制定的指南加以驗證。”

第 II-2 章

構造－防火、探火及滅火

第 1 條 適用範圍

2 在第 2.2.3 款中，刪去第二次出現的“和”字。

3 在第 2.2.4 款中，“。”改為“；和”。

4 在第 2.2 款中，在現有第.4 項之後加上下列新的第.5 項：

“5 第 5.3.1.3.2 和 5.3.4 條對客船不遲於 2008 年 7 月 1 日之後的第一次檢驗日期。”

第 3 條 定義

5 在現有第 52 款之後加上下列新的第 53 款：

“53 *客房陽臺*是單獨一個客房的住客專用的開敞甲板處所，並有該客房的直接入口。”

第 4 條 着火可能性

6 在第 5.2.3 款的末尾加上下列文字：

“但對第 9.2.4.2.5 條所規定的限度之外的窗戶和舷窗，可接受“A-0”級標準。”

7 在第 4.4 款中，在“站”和“須”之間，加上“或如適用於 2008 年 7 月 1 日及之後建造的客船的客房陽臺。”

第 5 條 火勢增大的潛勢

8 在第 3.1.2.1 款中，刪去最後一句。

9 加入下列新的第 3.1.3 款：

“3.1.3 *客船上的局部艙壁和甲板*

3.1.3.1 為實用或藝術處理而分隔處所所使用的局部艙壁或甲板須為不可燃材料。

3.1.3.2 用於屏隔或分隔相鄰客房陽臺的襯板，天花板和半隔艙壁或甲板須為不可燃材料。2008 年 7 月 1 日之前建造的客船上的客房陽臺須在 2008 年 7 月 1 日之後的第一次檢驗之前符合本款的要求。”

10 在第 3.2.1.1 款第一句中，在“處所”和“其”之間加入“及客房陽臺”，並在該款末尾加上下列新的一句：

“但是，第 3.2.3 款的規定毋須適用於客房陽臺。”

11 在現有第 3.2.4.1 款中，加上下列新的第.3 項：

“3 暴露的客房陽臺表面，天然硬木甲板系統除外。”

12 在現有第 3.3 款之後，加上下列新的第 3.4 款：

“3.4 客船客房陽臺上的家具和陳設

客船上客房陽臺的家具和陳設須符合第 3.40.1、3.40.2、3.40.3、3.40.6 和 3.40.7 條，除非陽臺在符合第 7.10 和 10.6.1.3

條的固定式壓力噴水和固定式探火和失火報警系統的保護之下。2008 年 7 月 1 日之前建造的客船須在 2008 年 7 月 1 日之後的第一次檢驗之前符合本款的要求。”

第 6 條 發煙潛勢和毒性

13 現有第 2 款重新編為第 2.1 款。

14 在新編的第 2.1 款之後加上下列新的第 2.2 款：

“2.2 在 2008 年 7 月 1 日或之後建造的客船上，客房陽臺除天然硬木甲板系統之外的暴露表面上所用的油漆、清漆、及其他表層塗飾須不能產生過量的煙氣和有毒產物。這要按照《耐火試驗規則》加以確定。”

15 現有第 3 款重新編為第 3.1 款。

16 在新編第 3.1 款之後，加上下列新的第 3.2 款：

“3.2 在 2008 年 7 月 1 日或之後建造的客船上，客房陽臺的甲板底層敷料不得在溫度升高時產生煙氣、毒性或爆炸性危險。這要按照《耐火試驗規則》加以確定。”

第 7 條 探火與報警

17 在現有第 9.4 款之後加上下列新的第 10 款：

“10 客船上客房陽臺的保護

在第 5.3.4 條所適用船舶的客房陽臺上，如其家具與陳設不是第 3.40.1、3.40.2、3.40.3、3.40.6 及 3.40.7 條所界定者，須安裝符合《消防安全系統規則》要求的固定式探火和失火報警系統。”

第 9 條 控火

18 在現有第 2.2.5.2 款之後加上下列新的第 2.2.6 款：

“2.2.6 *客房陽臺的佈置*

在 2008 年 7 月 1 日或之後建造的客船上，分隔相鄰陽臺的非承重局部艙壁須能夠由船員從每一側打開以便滅火。”

第 10 條 消防

19 第 6.1 款的標題由下列文字取代：

“6.1 *客船上的灑水和噴水系統*”

20 在現有第 6.1.2 款之後加上下列新的第 6.1.3 款：

“6.1.3 在第 5.3.4 條所適用船舶的客房陽臺上，如其家具與陳設不是第 3.40.1、3.40.2、3.40.3、3.40.6 及 3.40.7 條所界定者，須安裝符合《消防安全系統規則》要求的固定式壓力噴水滅火系統。”

第 III 章

救生設備與佈置

第 6 條 通訊

21 第 4.3 款由下列文字取代：

“4.3 通用應急警報系統須在所有起居處所和船員一般工作處所均可聽到。在客船上，該系統須在所有開敞甲板上均可聽到。”

第 11 條 救生艇筏集合及登乘佈置

22 在第 7 款的第 1 句中，“不利的”一詞由“所有”一詞取代，並在“10”和“20”之後加入單位“°”。

第 14 條 救助艇的存放

23 在第.1 項的末尾加上“，及如為充氣式，隨時保持充足氣狀態”。

第 19 條 應急訓練及演習

24 第 3.3.4 款由下列文字取代：

“3.3.4 如救生艇被佈置為自由降落降放，則至少每三個月一次在棄船演習時，船員須登上該救生艇，各自正確繫固在其座位上並開始降放程序直至但不包括實際釋放救生艇（即：不得鬆開釋放鉤）時為止。之後，該救生艇或者僅帶所需操作船員自由降落降放，或者用第二降放手段帶着或不帶操作船員降至水中。之後，在兩種情況下均須由操作船員在水中操縱。在不超過六個月的間隔裏，該艇須或者僅載有操作船員自由降落降放，或者按照本組織制定的指南進行模擬降放。”

第 20 條 隨時可操作狀態、保養及檢查

25 第 4.1 和 4.2 款由下列文字取代：

“降放用吊艇索須定期檢查，要特別注意穿過滑輪的部分，並在因受損而必要時或間隔不超過五年時更換，以較早者為準。”

26 在第 6.2 款第三句中，用“可配備適當的供水”取代“其運轉應按製造商的手冊規定的時間進行”。

27 第 8 款的標題由下列文字取代：

“8 氣脹式救生筏、氣脹式救生衣、海上撤離系統的檢修及充氣式救助艇的保養和維修”

28 第 11.1.3 款的第二句由下列文字取代：

“所加負荷須為救生艇或救助艇無乘員時的質量，但在不超過五年的間隔裏，須用相等於救生艇或救助艇及其全部定員和設備重量 1.1 倍的驗證負荷進行試驗。”

29 第 11.2 款的引言由下列文字取代：

“11.2 救生艇或救助艇的帶負荷釋放裝置，包括自由降落救生艇的釋放系統須：”

30 在第 11.2.3 款的第一句中，將“救生艇”改為“艇”。

31 本條中加上下列新的第 11.3 款：

“11.3 吊艇架降放的救生筏自動釋放鉤須：

.1 按照第 36 條所要求的船上保養說明進行保養；

.2 在進行第 I/7 和 I/8 條所要求的年度檢驗時，由經過適當培訓並熟悉該系統的人員進行徹底檢查和操作測試；及

.3 每次自動釋放鉤大修後，用該救生筏及其全部定員和設備總質量 1.1 倍的負荷進行運作試驗。此大修及試驗須至少每五年進行一次。”

第 21 條 救生艇筏及救助艇

32 第 1.2 款的引言由下列文字取代：

“.1.2 從事短途國際航行的客船須帶有：”

33 刪除第 1.3 款，其餘各款相應地重新編號。

34 在第 1.4 款中，在末尾加上“在全體人員集合並穿妥救生衣之後”。

35 第 2.3 款由下列文字取代：

“2.3 以救生艇作為救助艇亦可接受，但該艇及其降放和回收佈置亦須符合對救助艇的要求。”

36 在第 3.2 款中，刪去“並符合第 II-1/6.5 條規定得特殊分艙標準”。

第 26 條 對滾裝船的補充要求

37 在第 3.1 款中，用“符合《規則》第 5.1.4 節”取代“經主管機關參照本組織核准的建議案予以認可的”。

38 在第 3.2 款中，用“符合《規則》第 6.1.7 節”取代“設備”一詞之後的所有文字。

第 31 條 救生艇筏及救助艇

39 第 1.1 款第.2 項由下列文字取代：

“.2 此外，一個或多個符合《規則》第 4.2 或 4.3 節要求的氣脹式或剛性救生筏，其質量小於 185 千克，存放於在單一開敞甲板層上易於舷到舷轉移之處，其總計容量可容納船上人員的總和。如所述一個或多個救生筏的質量不小於 185 千克，且並非存放於在單一開敞甲板層上易於舷到舷轉移之處，則每一邊的總計容量須足以容納船上人員的總和。”

40 第 1.3 款第.2 項由下列文字取代：

“.2 除非第 1.3.1 款要求的救生筏質量小於 185 千克，並存放於在單一開敞甲板層上易於艏到艏轉移之處，否則須加配救生筏，以使每一艏的總計容量能夠容納船上人員總和的 150%；”

41 第 1.3 款第.4 項由下列文字取代：

“.4 在任何一個救生艇筏滅失或無法使用的情況下，每一艏仍須有足夠的救生艇筏可供使用，這包括任何質量小於 185 千克、並存放於在單一開敞甲板層上易於艏到艏轉移之處的救生艇筏，以容納船上人員的總和。”

42 第 2 款的第二句由下列文字取代：

“以救生艇作為救助艇亦可接受，但該艇及其降放和回收佈置亦須符合對救助艇的要求。”

第 32 條 個人救生設備

43 在第 3.2 款的第一句中，在“服”和“符合”兩詞之間加入“尺寸適宜的”。

44 在第 3.3 款中，在“存放”和“另外”兩詞之間加入“包括按照第 31.1.4 條所載位於邊遠位置的救生艇筏”及在“服”和“須”之間加入“尺寸適宜的”。

第 35 條 訓練手冊和船上訓練輔具

45 在現有第 4 款之後，加上下列新的第 5 款：

“5 訓練手冊需用船上工作語言撰寫。”

第 XII 章

散貨船附加安全措施

第 6 條 散貨船結構及其他要求

46 刪去現有第 3 款並將現有第 4 和第 5 款重新編為第 3 和第 4 款。

第 12 條 貨艙、壓載艙和乾燥處所進水警報

47 在第 1.2 款中，所提“第 II-1/11 條”改為“第 II-1/12 條”。

第 13 條 泵系的有效性

48 在第 1 款中，所提“第 II-1/11.4 條”改為“第 II-1/12 條”。

附 錄

證 書

49 在客船安全證書、貨船構造安全證書和貨船安全證書中，“安放龍骨或處於類似建造階段的日期，或重大改裝或改建或改造開始之日期”這一短語，由下列文字取代：

“建造日期：

— 建造合同日期.....

— 安放龍骨或處於類似建造階段的日期.....

— 交船日期.....

— 重大改裝或改建或改造開始的日期.....

所有適用日期均須填寫。”

客船安全證書設備記錄（格式 P）

50 在客船安全證書設備記錄（格式 P）中，在第 5 節第 4 項之後加入下列新的第 4.2 項：

“4.2 遠距識別與跟蹤系統”，

並將第 4 項（自動識別系統（AIS））重新編為第 4.1 項。

貨船設備安全證書設備記錄（格式 E）

51 在貨船設備安全證書設備記錄（格式 E）中，在第 3 節第 4 項之後加入下列新的第 4.2 項：

“4.2 遠距識別與跟蹤系統”，

並將第 4 項（自動識別系統（AIS））重新編為第 4.1 項。

貨船安全證書設備紀錄（格式 C）

52 貨船安全證書設備紀錄（格式 C）中，在第 5 節第 4 項之後加入下列新的第 4.2 項：

“4.2 遠距識別與跟蹤系統”，

並將第 4 項（自動識別系統（AIS））重新編為第 4.1 項。

核能客船安全證書格式

53 第 2.1.3 段的表格中，在以“**茲證明：**”一詞開始的一節中，所提及的“第 II-1/13 條”改為“第 II-1/18 條”。

附件 2

《經修正的 1974 年國際海上人命安全公約》的修正案

第 II-1 章

構造－結構、分艙及穩性、機電設備

1 現有 A、B 和 B-1 部分的條文由下列條文取代：

"A 部分

通則

第 1 條 適用範圍

1.1 除另有明文規定外，本章適用於 2009 年 1 月 1 日或之後安放龍骨或處於類似建造階段的船舶。

1.2 就本章而言，*相似建造階段*係指在這樣一個階段：

.1 可辨認出某一具體船舶的建造已經開始；和

.2 該船已開始的裝配量至少為 50 噸，或為所有結構材料估算量的 1%，取較小者。

1.3 就本章而言：

.1 *建造的船舶*係指已安放龍骨或處於相似建造階段的船舶；

.2 *所有船舶*係指 2009 年 1 月 1 日之前或當日或之後建造的船舶；

.3 無論何時建造的貨船，一經改裝成客船後，須被視為於開始改裝之日建造的客船；

.4 *重大改建和改造*的表述，對於貨船分艙和穩性而言，意味着對影響該船分艙水平的結構作出的任何改變。如果貨船經過如此改造，必須證明為改造後的該船計算的 *A/R* 比率不小於為改造之前的船舶計算的 *A/R* 比率。但在船舶的改造前 *A/R* 比率等於或大於一的情形裏，只需要改造後船舶的 *A* 值不小於為改造後船舶計算的 *R* 值。

2 除另有明文規定外，對於 2009 年 1 月 1 日之前建造的船舶，主管機關須確保其符合根據海安會第 MSC.1（XLV）號、第 MSC.6（48）號、第 MSC.11（55）號、第 MSC.12（56）號、第 MSC.13（57）號、第 MSC.19（58）號、第 MSC.26（60）號、第 MSC.27（61）號、1995 年《安全公約》大會第 1 號、第 MSC.47（66）號、第 MSC.57（67）號、第 MSC.65（68）號、第 MSC.69（69）號、第 MSC.99（73）號、第 MSC.134（76）號、第 MSC.151（78）號和第 MSC.170（79）號決議修正後的《1974 年國際海上人命安全公約》第 II-1 章適用的要求。

3 所有船舶在進行修理、改建、改造以及配備有關艏裝時，須繼續至少符合原先適用於這些船舶的要求。上述船舶如果是在相關修正案生效之日前建造，在符合對該日或之後建造船舶的要求方面，通常須至少達到該船修理、改建、改造和艏裝之前的同等程度。重大修理、改建和改造以及相關艏裝，須在主管機關認為合理可行的範圍內，滿足對任何相關修正案生效之日或之後建造的船舶的要求。

4 如果考慮到航程的遮蔽性及航行的條件，一國的主管機關認為適用本章的某些特定要求為不合理或不必要時，可對懸掛其國旗並在其航程中距最近陸地不超過 20 海里的個別船舶或某些類型船舶免除這些要求。

5 在客船用於運載大量特殊乘客（如朝覲乘客）的特種業務時，若這些船舶的船旗國主管機關認為適用本章的要求為不切實際的，它可對這些船舶免除那些要求，但它們必須完全符合下列規定：

.1 《1971 年特種業務客船協定》所附的規則；和

.2 《1973 年特種業務客船艙室要求議定書》所附的規則。

第 2 條 定義

除另有明文規定外，就本章而言：

1 船舶*分艙長度（Ls）*係指在最深分艙吃水處限制垂直進水範圍的一層或多層甲板或以下的那部分船舶的凸出的最大型長。

2 *中間長度*係指船舶分艙長度的中點。

3 *艉端*係指船舶分艙長度的尾極限。

4 *艏端*係指船舶分艙長度的首極限。

5 *長度（L）*係指現行的《國際載重線公約》中界定的長度。

6 *乾舷甲板*係指現行的《國際載重線公約》中界定的甲板。

7 *艏垂線*係指現行的《國際載重線公約》中界定的首垂線。

8 *船寬（B）*係指在最深分艙吃水或以下的船舶最大型寬。

9 *吃水（d）*係指在船長中點從龍骨線至所述水線的垂直距離。

10 *最深分艙吃水（d_s）*係指相當於船舶夏季載重線吃水的水線。

11 *空載吃水（d_1）*係指相應於最輕預期裝載量和相關艙容的營運吃水，但包括可能為了穩性和（或）浸水的壓載吃水。客船應包括所有額定旅客和船員全部登船。

12 *部分分艙吃水（d_p）*係指空載吃水加上空載吃水與最深分艙吃水之間差異的 60%。

13 *縱傾*係指艏吃水和艉吃水之間的差異，這種吃水分別是從首部和尾部量得，不考慮龍骨的任何傾斜。

14 某一處所的*滲透率（μ）*係指該處所能被水佔去的浸沒容積的比例。

15 *機器處所*係指裝有主輔推進機械，包括鍋爐、發電機和主要用於推進的電動機的處所的水密邊界圍成的空間。對於異常佈置的船舶，主管機關可以確定機器處所的界限。

16 *風雨密*係指在任何海況下水都不會滲入船舶。

17 *水密*係指船材尺度和佈置能夠防止水在完整和破損情況中可能出現的水壓下從任何方向通過。在破損的情況下，水的壓頭是按最壞的平衡狀態來考慮，包括中間進水階段。

18 *設計壓力*係指根據設計，在完整和破損穩性中假定為水密的每一結構和設備都能承受的靜水壓力。

19 客船中的*艙壁甲板*係指在分艙長度（*Ls*）任何一點上，主艙壁和船殼板保持水密的最高甲板，以及在本章第 8 條和 B-2 部分中界定的破損情況下，旅客和船員的撤離在任何進水階段亦不會受水阻礙的最低甲板。艙壁甲板可以是階形甲板。在貨船中，乾舷甲板可作為艙壁甲板。

20 *載重量*係指船舶在比重為 1.025 的水中，相應於所勘劃的夏季載重線的排水量與該船空船排水量之差，用噸表示。

21 *空載量*係指船舶艙內沒有貨物、燃料、潤滑油、壓載水、淡水、水箱給水、消耗品以及乘客和船員及其物件時的排水量，用噸表示。

22 *油船*係指《經 1978 年相關議定書修訂的 1973 年國際防止船舶造成污染公約》附則 I 第 1 條界定的油船。

23 *滾裝客船*係指具有第 II-2/3 條界定的滾裝處所或特種處所的客船。

24 *散貨船*係指第 XII/1.1 條界定的散貨船。

25 *龍骨線*係指在以下位置穿越船舯、與龍骨斜坡平行的一條線：

.1 在有金屬外殼的船上，中線上龍骨頂部，或如果一條方龍骨延伸至該線之下，船殼板內側與龍骨的切線上龍骨的頂部；或

.2 在木質和合成材料的船上，從龍骨鑲口的下緣量得的距離。當在船舯截面的較低部分形成空洞或安裝有厚的護板時，則該距離得量自船舶內延平底線與船舯的中心線相交處。

26 *船舯*係指長度（*L*）的中間點。

第 3 條 有關 C、D 和 E 部分的定義

除另有明文規定外，就 C、D 和 E 部分而言：

1 *操舵裝置控制*系統係指用以將舵令由駕駛室傳至操舵動力裝置的設備。操舵裝置控制系統由發送器、接收器、液壓控制泵及其電動機、電動機控制器、管系和電纜組成。

2 *主操舵裝置*係指在正常情況下為操縱船舶而使舵產生動作所必需的機械、舵執行器、操舵動力設備（如設有的話）以及附屬設備和對舵杆施加扭矩的設施（如舵柄或舵扇）。

3 *操舵裝置動力設備*：

.1 如為電動操舵裝置，係指電動機及有關的電氣設備；

.2 如為電動液壓操舵裝置，係指電動機及其有關的電氣設備和與之相連接的泵；或

.3 如為其他液壓操舵裝置，係指驅動機及與之相連接的泵。

4 *輔助操舵裝置*係指在主操舵裝置失效時操縱船舶所必須的設備，它不屬於主操舵裝置的任何部分，但不包括舵柄、舵扇或作同樣用途的部件。

5 *正常操作和居住條件*係指這樣的一種狀態，即船舶作為一個整體，為推進力、操舵能力、安全航行、消防和防浸安全、內外通訊和信號、脫險通道和應急救生艇絞車、以及所設計的舒適居住條件提供保證的機器、設施與輔助設備均工作正常並發揮着效用。

6 *緊急狀態*係指由於主電源發生故障以致正常操作和居住條件所需的設施均工作失常的狀態。

7 *主電源*係指向主配電板供電以向保持船舶正常操作和居住條件所必需的一切設施配電的電源。

8 *癱船狀態*係指由於失去動力，致使主推進裝置、鍋爐和輔機不能運轉的狀態。

9 *主發電站*係指主電源所在的處所。

10 *主配電板*係指由主電源直接供電並將電能分配給船上各種設施的配電板。

11 *應急配電板*係指在主電源供電系統發生故障的情況下，由應急電源或臨時應急電源直接供電，並將電能分配給應急設施的配電板。

12 *應急電源*係指在主電源供電發生故障的情況下，用來向應急配電板供電的電源。

13 *動力執行系統*係指提供動力以轉動舵杆的液壓設備，由一個或多個操舵裝置動力設備，連同有關的管系和附件以及舵執行器組成。各個動力執行系統可共用某些機械部件，即舵柄、舵扇和舵杆，或共用相同用途的部件。

14 *最大營運前進航速*係指船舶在最大航海吃水情況下保持海上營運的最大設計航速。

15 *最大後退速度*係指船舶在最大航海吃水情況下用設計的最大倒退功率估計能夠達到的速度。

16 *機器處所*係指一切 A 類機器處所和其他所有裝設推進裝置、鍋爐、燃油裝置、蒸汽機和內燃機、發電機和主要電動機械、加油站、製冷機、防搖裝置、通風機和空調機的處所以及類似處所，和通往這些處所的圍壁通道。

17 *A 類機器處所*係指裝有下列設備的處所和通往這些處所的圍壁通道：

.1 用於主推進的內燃機；或

.2 用於非主推進的合計總輸出功率不小於 375kW 的內燃機；或

.3 任何燃油鍋爐或燃油裝置。

18 *控制站*係指船舶無線電設備或主要導航設備或應急電源所在的處所，或火災記錄器或火災控制設備集中的處所。

19 *化學品液貨船*係指經建造或改建用於散裝運輸下述兩規則章節之一所列的任何一種液體貨品的貨船：

.1 海安會以第 MSC.4（48）號決議通過、並可能由本組織修正的《散裝運輸危險化學品船舶構造和設備國際規則》（以下簡稱《國際散化規則》）第 17 章；或

.2 本組織大會以第 A.212（VII）號決議通過、並已經或可能由本組織修正的《散裝運輸危險化學品船舶構造和設備規則》（以下簡稱《散化規則》）第 VI 章，

以適用者為準。

20 *氣體運輸船*係指經建造或改建用於散裝運輸下述兩規則章節之一所列的任何液化氣體或其他產品的貨船：

.1 海安會以第 MSC.5（48）決議通過、並可能由本組織修正的《散裝運輸液化氣體船舶構造和設備國際規則》（以下簡稱《國際氣體運輸船規則》）第 19 章；或

.2 本組織以大會第 A.328（IX）決議通過、並已經或可能由本組織修正的《散裝運輸液化氣體船舶構造和設備規則》（以下簡稱《氣體運輸船規則》）第 XIX 章，

以適用者為準。

B 部分

分艙與穩性

第 4 條 通則

1 B-1 至 B-4 部分的破損穩性要求須適用於長度（*L*）為 80m 及以上的貨船和任何長度的所有客船，但須排除表明符合本組織制定的其他文書中有關分艙和破損穩性規則的那些貨船。

2 對具體一艘或一組船舶，如主管機關認為已至少達到等同於這些條款規定的安全程度，可以接受替代方法。任何主管機關允許採用替代方法，須將有關細節通報本組織。

3 在考慮到船舶預定用途的性質的情況下，對船舶須儘可能有效地進行分艙。分艙程度須因船舶的分艙長度（*Ls*）和營運業務而異，分艙方法為，最高等級的分艙適合具有最大分艙長度的、主要從事旅客運輸的船舶。

4 若建議配置有足夠水密性的甲板、內殼板或縱向艙壁以嚴格限制水流，則須令主管機關滿意地認為，在計算中已對此類結構的有利或不利影響給與適當考慮。

B-1 部分

穩 性

第 5 條 完整穩性資料

1 不管大小的每艘客船和長度（L）為 24 米及以上的每艘貨船，須在完工後進行傾斜試驗，並確定其穩性要素。

2 主管機關可允許對某一艘貨船免除傾斜試驗，但須具有其姊妹船所做傾斜試驗的基本穩性數據，且使主管機關滿意地認為可從這些基本數據中獲得第 5-1 條要求的被免除船舶的可靠穩性資料。在船舶完工時須進行空船測驗，如與從姊妹船獲得的數據相比，長度為 160 米或以上船舶的空船排水量偏差超過 1%，長度為 50 米或以下和通過線性內插法確定的中間長度的船舶空船排水量偏差超過 2%，或發現空船縱向穩心高度偏差超過 Ls 的 0.5%，則須進行傾斜試驗。

3 如果參考相似船舶的已有數據，能夠明確表明由於船舶的尺寸比例及佈置，在所有可能的裝載條件下，均具有大於足夠的初穩性高度，主管機關也可以允許對專門為運載散裝液體或礦砂設計的某一艘或某一類船舶免除傾斜試驗。

4 如果船舶經過任何改建，以致在實質上影響到提供給船長的穩性資料，則須提供經修改的穩性資料。必要時，須重新進行船舶傾斜試驗。如果預期偏差超出第 5 款規定的數值之一，則須重新進行船舶傾斜試驗。

5 所有客船均須定期進行空船檢驗，間隔期不得超過五年，以驗證空船排水量和縱向重心高度的任何變化。當與經核准的穩性資料相比，發現或預計空船排水量偏差超過 2%或縱向重心高度偏差超過 *Ls* 的 1%時，須重新進行傾斜試驗。

6 每艘船舶均須在船首和船尾標有清晰的吃水刻度。在吃水標誌不在容易讀到的位置或特種運輸的操作限制使它難以讀到的情況下，船舶須安裝能確定船首和船尾吃水的可靠吃水指示系統。

第 5-1 條 提供給船長的穩性資料

1 為使船長能以迅速和簡便的程序就不同營運狀態下的船舶穩性獲得有關準確指導，須向他提供令主管機關滿意的所需資料。須將穩性資料的一份副本提供給主管機關。

2 這些資料應包括：

.1 保證符合有關完整和破損穩性要求的最小營運穩心高度（GM）與吃水的關係曲線或表格，或者相應的最大允許重心高度（KG）與吃水的關係曲線或表格，或者這些曲線之一的等效物；

.2 有關橫傾調整裝置的操作說明；和

.3 為保持所要求的完整穩性和破損後穩性而可能需要的其他數據和輔助措施。

3 穩性資料須表明在作業縱傾範圍超過 *Ls* 的＋/－0.5%的情況下各種縱傾的影響。

4 對於須滿足 B-1 部分穩性要求的船舶，第 2 款所述的資料應按照下述方式通過分艙指數有關的考慮確定：與 d_s、d_p 和 d_1 三種吃水對應的最小要求 GM（或最大許用重心高度 KG）等於用來計算生存因數 *Si* 的相應裝載情況下的 GM（或 KG 值）。對於中間吃水，須分別通過最深分艙吃水和部分分艙吃水之間以及部分載重線吃水和空船營運吃水之間的 GM 值的線性內插法獲得所採用數值。通過保留每一吃水的最小要求 GM 值的最大值或最大許用 KG 值的最小值，來計入完整穩性衡準。如果對不同縱傾計算分艙指數，將以相同方式確定所要求的若干 GM 曲線。

5 當最小營運穩心高度（GM）與吃水的關係曲線或表格不恰當時，船長應確保營運狀態不會偏離經研究的裝載條件，或通過計算核驗這種裝載條件的穩性衡準可以得到滿足。

第 6 條 要求的分艙指數 *R*

1 如果按照第 7 條確定的達到的分艙指數 *A* 不低於按照本條計算所得的要求分艙指數 R，此外如果局部指數 A_s、A_p 和 A_l 就客船而言不低於 0.9*R*、就貨船而言不低於 0.5*R*，則船舶分艙可視為足夠。

2 對於適用本章破損穩性要求的所有船舶，提供的分艙程度由下述所要求的分艙指數 R 來確定：

.1 對於船長（L_s）在 100 米以上的貨船：

$$R = 1 - \frac{128}{Ls + 152}$$

.2 對於船長（L_s）在 80 米及以上但不超過 100 米的貨船：

$$R = 1 - [1/(1 + \frac{Ls}{100} \times \frac{Ro}{1-Ro})]$$

式中：R_0 等於按照第.1 項的公式計算所得的 *R* 值。

.3 對於客船：

$$R = 1 - \frac{5,000}{Ls + 2.5N + 15,225}]$$

式中：

$N = N_1 + 2N_2$

N_1 = 需要提供救生艇的人數

N_2 = 允許船舶載運的超出 N_1 的人數（包括高級船員和普通船員）。

.4 若因營運條件而難以在 $N = N_1 + 2N_2$ 基礎上符合本條第 2.3 款，和若主管機關認為存在的危險程度適當降低，則可以採用一較小的 N 值，但無論如何不得小於 $N = N_1 + N_2$。

第 7 條 達到的分艙指數 *A*

1 達到的分艙指數 A 通過對第 2 條定義的吃水 d_s、d_p、d_l 的計算所得的局部指數 A_s、A_p、A_l 的相加（加權如所示）總和得出，按下式計算：

$A = 0.4A_s + 0.4A_p + 0.2A_l$

每一局部指數是對考慮的所有破損情況的影響的總和，應按下式計算：

$A = \Sigma\ Pi\ Si$

式中：

i 代表所考慮的每艙或艙組，

Pi 表示只有所考慮的艙或艙組可能浸水的概率，不考慮第 7-1 條界定的任何水平分艙，

Si 表示所考慮的艙或艙組浸水後的倖存概率，包括第 7-2 條界定的任何水平分艙的影響。

2 在計算 *A* 時，最深分艙吃水和局部分艙吃水須採用水平縱傾。空船營運吃水須採用實際營運縱傾。若在任何營運條件下，與計算所得的縱傾相比較，縱傾變量大於分艙長度 *Ls* 的 0.5%，則需要對同一吃水但不同的縱傾進行一次或以上 *A* 的額外計算，以使在所有營運條件下，與用於一次計算的參考縱傾相比較縱傾的差異將小於 *Ls* 的 0.5%。

3 在確定剩餘穩性曲線的正復原力臂（*GZ*）時，應採用完整條件下的排水，即採用恆量排水計算方法。

4 上述公式所表示的總和須計及整個船舶分艙長度（*Ls*）範圍內單個艙或兩個或更多相鄰艙的所有浸水情況。在不對稱佈置的情況下，計算得出的 A 值應是對兩邊計算值的平均值，或是明顯得出最不利結果的那邊的值。

5 若設有邊艙，涉及邊艙的所有浸水情況均須加入公式所表示的總和中。此外，一個或一組邊艙和其相鄰的一個或一組內側艙同時浸水的所有情況也可加入總和，但是不包括破損的橫向範圍大於一半船寬 *B* 的情況。就本條而言，橫向範圍的測量從船舶內側正交量至最深分艙吃水水平面中心線。

6 在按照各規則進行的浸水計算時，僅需假定船殼一處破損和一個自由液面。假定的破損垂直範圍為從基線向上擴展至水線之上或更高的任一水密水平分艙。但是，如果一個較小範圍的破損將產生更為嚴重的後果，則應假定為該範圍。

7 如在假定破損範圍內設有管子、導管或軸隧，其佈置應做到保證繼續浸水不會擴展到那些假定浸水的艙室以外的其他艙室。

但是，如果證實繼續浸水的影響能容易地得到控制並且不妨礙船舶安全，則主管機關可允許較小的連續浸水。

第 7-1 條 因數 *Pi* 的計算

1 艙或艙組的因數 *Pi* 須採用下列表示法按照第 1.1 款和第 1.2 款計算：

j ＝破損波及的最末端破損區域號，從船尾 1 號開始；

n ＝破損波及的相鄰破損區域的數量；

k ＝從船殼向中心線算起的作為破損區域內阻斷橫向穿透的某一特定縱向艙壁的編號。船殼為 *k*=0；

*x*1 ＝從 *Ls* 的後端點至所考慮的區域後端的距離；

*x*2 ＝從 *Ls* 的後端點到所考慮的區域前端的距離；

b ＝在最深分艙載重線處與中線成直角的、船殼板至假定垂直平面之間的平均橫向距離（米），該垂直平面介於計算 *Pi* 因數所用的縱向極限之間，並與所考慮的縱艙壁離中心最遠部分的全部或部分相切或相同。該垂直平面的定位方式須是：至船殼板的橫向平均距離為最大值，但不超過平面至船殼板最小距離的兩倍。如果縱艙壁的上部分在最深分艙載重線以下，則可假定用於確定 *b* 的垂直平面向上延伸至最深分艙水線。無論如何，所取的 *b* 不得大於 *B*/2。

若破損僅涉及單一區域：

$$Pi = p\,(x1_j\,,\,x2_j)\cdot[r\,(x1_j\,,\,x2_j\,,\,b_k)\,-r\,(x1_j\,,\,x2_j\,,\,b_{k-1})\,]$$

若破損涉及兩個相鄰區域：

$$Pi = p(x1_j, x2_{j+1}) \cdot [r(x1_j, x2_{j+1}, b_k) - r(x1_j, x2_{j+1}, b_{k-1})]$$
$$- p(x1_j, x2j) \cdot [r(x1_j, x2_j, b_k) - r(x1_j, x2_j, b_{k-1})]$$
$$- p(x1_{j+1}, x2_{j+1}) \cdot [r(x1_{j+1}, x2_{j+1}, b_k) - r(x1_{j+1}, x2_{j+1}, b_{k-1})]$$

若破損涉及三個或三個以上相鄰區域：

$$Pi = p(x1_j, x2_{j+n-1}) \cdot [r(x1_j, x2_{j+n-1}, b_k) - r(x1_j, x2_{j+n-1}, b_{k-1})]$$
$$- p(x1_j, x2_{j+n-2}) \cdot [r(x1_j, x2_{j+n-2}, b_k) - r(x1_j, x2_{j+n-2}, b_{k-1})] - p(x1_{j+1}, x2_{j+n-1}) \cdot [r(x1_{j+1}, x2_{j+n-1}, b_k) - r(x1_{j+1}, x2_{j+n-1}, b_{k-1})] + p(x1_{j+1}, x2_{j+n-2}) \cdot [r(x1_{j+1}, x2_{j+n-2}, b_k) - r(x1_{j+1}, x2_{j+n-2}, b_{k-1})]$$

且式中 $r(x1, x2, b_0) = 0$

1.1 因數 $p(x1, x2)$ 應按照下列公式計算：

總的規範最大破損長度：	J_{max}	=	10/33
分佈中的肘接點：	J_{kn}	=	5/33
Jkn 的累計概率：	P_k	=	11/12
最大絕對破損長度：	l_{max}	=	60m
在正常分佈末端的長度：	L^*	=	260m

在 $J=0$ 時概率密度：

$$b_0 = 2\left(\frac{P_k}{J_{kn}} - \frac{1-P_k}{J_{max}-J_{kn}}\right)$$

當 $Ls \le L^*$時：

$$I_m = min\left\{J_{max}\ ,\ \frac{l_{max}}{L_s}\right\}$$

$$I_k = \frac{J_m}{2} + \frac{1-\sqrt{1+(1-2p_k)b_0 J_m + \frac{1}{4}b_0^2 J_m^2}}{b_0}$$

$$b_{12} = b_0$$

當 $Ls > L^*$時：

$$I_m{}^* = min\left\{J_{max}\ ,\ \frac{l_{max}}{L^*}\right\}$$

$$I_k{}^* = \frac{J_m{}^*}{2} + \frac{1-\sqrt{1+(1-2P_k)b_0 J_m{}^* + \frac{1}{4}b_0{}^2 J_m{}^{*2}}}{b_0}$$

$$I_m = \frac{J_m{}^* \cdot L^*}{L_s}$$

$$I_k = \frac{J_k{}^* \cdot L^*}{L_s}$$

$$b_{12} = 2\left(\frac{P_k}{J_k} - \frac{1-P_k}{J_m - J_k}\right)$$

$$b_{11} = 4\frac{1-P_k}{(J_m - J_k)J_k} - 2\frac{P_k}{J_k^2}$$

$$b_{21} = -2\frac{1-P_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21}J_m$$

無量綱破損長度：

$$J = \frac{(x2-x1)}{L_s}$$

艙或艙組的規範長度：

J_n 應以 J 和 Jm 小者計入

1.1.1 若所考慮的艙或艙組的界限均不與後端點或前端點相重合：

$J \leq Jk$:

$$p\ (x1\ ,\ x2\ ) = p_1 = \frac{1}{6}J^2\ (b_{11}J + 3b_{12})$$

$J > Jk$:

$$p\ (x1\ ,\ x2\ ) = p_2 =$$

$$-\frac{1}{3}b_{11}J_k^3 + \frac{1}{2}(b_{11}J + b_{12})J_k^2 + b_{12}JJ_k - \frac{1}{3}b_{21}(J_n^3 -$$

$$J_k^3) + \frac{1}{2}(b_{21}J - b_{22})\ (J_n^2 - J_k^2) + b_{22}J\ (J_n - J_k)$$

1.1.2 若所考慮的艙或艙組的後界限與後端點相重合，或者所考慮的艙或艙組前界限與前端點相重合：

$J \leq Jk$:

$$P\ (x1\ ,\ x2\ ) = \frac{1}{2}\ (P_1 + J)$$

$J > Jk$:

$$P\ (x1\ ,\ x2\ ) = \frac{1}{2}\ (P_2 + J)$$

1.1.3 若所考慮的艙或艙組延伸超過整個分艙長度（*Ls*）：

$$P\ (x1\ ,\ x2\ ) = 1$$

1.2 因數 r（x1，x2，b）須由下列公式確定：

$$r\ (x1\ ,\ x2\ ,\ b) = 1 - (1 - C)\left[1 - \frac{G}{p(x1,\ x2)}\right]$$

式中：

C＝$12J_b$（$-45J_b+4$），其中

$$J_b = \frac{b}{15 \cdot B}$$

1.2.1 若所考慮的艙或艙組延伸超過整個分艙長度（Ls）：

$$G = G_1 = \frac{1}{2} b_{11} J_b^2 + b_{12} J_b$$

1.2.2 若所考慮的艙或艙組的界限均不與後端點或前端點相重合：

$$G = G_2 = -\frac{1}{3}b_{11}J_0^3 + \frac{1}{2}(b_{11}J - b_{12})J_0^2 + b_{12}JJ_0$$，其中

$$J_0 = \min\ (J\ ,\ J_e)$$

1.2.3 若所考慮的艙或艙組的後界限與後端點相重合，或者所考慮的艙或艙組的前界限與前端點相重合：

$$G = \frac{1}{2}\ (G_2 + G_1 J)$$

第 7-2 條 因數 *Si* 的計算

1 艙或艙組的假定浸水的每種情況的因數 s_i 須按照下列表示法和本條有關規定來確定。

θ_e 係指在任何浸水階段的平衡傾斜角（度）；

θv 係指在任何浸水階段復原力臂變為負數的角度，或者一不能被關閉成風雨密的開口被淹沒的角度；

GZ_{max} 係指至 θv 角的最大正復原力臂（米）；

*範圍*係指從 θ_e 角測量的正復原力臂的範圍（度）。正範圍應直至 θv 角；

*浸水階段*係指在達到最後平衡前的浸水過程中的任何間斷步

驟，包括在任何均衡之前的階段。

1.1 因數 s_i，對於在初始裝載狀況的任一破損情況，d_i，須從下列公式中取得：

$$s_i = \text{minimum}\{s_{intermediate,i} \text{ 或 } s_{final,i} \cdot s_{mom,i}\}$$

式中：

$s_{intermediate,i}$ 係指在最後平衡階段前所有中間浸水階段的倖存概率，並應按照第 2 款計算；

$s_{final,i}$ 係指在最後平衡浸水階段的倖存概率，它應按照第 3 款計算；

$s_{mom,i}$ 係指對傾斜力矩的倖存概率，應按照第 4 款計算。

2 因數“$s_{intermediate,i}$”只適用於客船（對於貨船因數“$s_{intermediate,i}$”應為一）且須為包括任何均衡之前的階段在內的所有浸水階段所得到的最小 s 因數，並應按下述計算：

$$s_{intermediate,i} = \left[\frac{GZ_{max}}{0.05} \cdot \frac{Range}{7}\right]^{\frac{1}{4}}$$

其中，GZ_{max}不得大於 0.05 米且範圍（range）不得超過 7°。如果中間橫傾角超過 15°，則 $s_{intermediate,i} = 0$。若需要橫貫浸水裝置，則均衡的所需時間不得超過 10 分鐘。

3 因數 $s_{final,i}$ 須從下述公式取得：

$$s_{final,i} = K\left[\frac{GZ_{max}}{0.12} \frac{Range}{16}\right]^{\frac{1}{4}}:$$

式中：

GZ_{max}不得大於 0.12 米；

範圍不得大於 16°；

K＝1　　如果 $\theta_e \leq \theta min$

K＝0　　如果 $\theta_e \geq \theta max$

否則，$K = \sqrt{\frac{\theta_{max} - \theta_e}{\theta_{max} - \theta_{min}}}$ ；

式中：

θ_{min}對客船為 7°，對貨船為 25°，且

θ_{max}對客船為 15°，對貨船為 30°。

4　因數 $S_{mom,i}$只適用於客船（對貨船而言因數“$S_{mom,i}$”須取為一）且須在最終平衡狀態下從下列公式計算得出：

$$S_{mom,i} = \frac{(GZ_{max} - 0.04).Displacement}{M_{heel}}$$

式中：

Displacement 係指在分艙吃水的完整排水；

M_{heel}係指按照第 4.1 款計算所得的最大假定橫傾力矩；和

$S_{mom,i} \leq 1$

4.1 橫傾力矩“M_{heel}”應按下列計算：

M_{heel} = maximum{$M_{passenger}$ 或 M_{wind} 或 $M_{survivalcraft}$}

4.1.1 $M_{passenger}$ 係指乘客移動所導致的最大假定橫傾力矩；並按下列取得：

$M_{passenger}$ = （0.075·N_p）•（0.45·B）•（tm）

式中：

Np 是與所考慮的最深分艙吃水相對應的營運條件下，船上所允許運載的最大乘客數；和

B 係指船舶的橫樑。

或者，為計算橫傾力矩，假定乘客按照每平米 4 人分佈在各層甲板的集合站所處一舷可供站立的甲板區域，並產生最不利的橫傾力矩。如此計算時，應假定每一乘客的重量為 75kg。

4.1.2 M_{wind} 係指在破損情況下所作用的最大假定風力。

M_{wind} = （P·A·Z）/9,806（tm）

式中：

P = 120N/m^2；

A = 水線以上投射側面；

Z = 水線以上投射側面中間至 T/2 的距離；和

T = 船舶吃水，d_i。

4.1.3 $M_{survivalcraft}$ 係指在船舶一舷降放所有滿載的吊架降放式救生艇筏時所產生的最大假定橫傾力矩。應採用下述假設來計算：

.1 假定船舶破損後位於船舶傾斜一舷的所有救生艇和救助艇，均滿載懸掛於舷外並準備降放；

.2 對於佈置為從存放位置滿載降放的救生艇，應以在降放過程中的最大橫傾力矩計算；

.3 假定船舶破損後位於傾斜一舷的每個吊架上均吊有滿載的吊架降落式救生筏，救生筏已懸掛於舷外並準備降放；

.4 不在懸掛於舷外的救生設備內的人員不增加傾側力矩或復原力矩；

.5 位於船舶傾斜相反一舷的救生設備假定為處於存放位置。

5 應使不對稱浸水降至與有效佈置相一致的最小程度。如需要校正大橫傾角，所採用的方法應儘可能是自動的；但在設有均衡裝置控制設備的任何情形裏，此項設備須能在艙壁甲板以上操作。這些裝置連同其控制設備須為主管機關可接受者。關於使用均衡裝置的相關資料須提供給船長。

5.1 均衡所用的液艙和艙室應設置具有充足橫截面的空氣管或等效裝置以確保不會延遲水流入均衡艙室的進程。

5.2 在任何情況下，在考慮到下沉、橫傾和縱傾以後，若最終水線浸沒以下部位，則 s_i 應取值為 0：

.1 某些開口的下緣，通過該開口可能發生連續浸水，且這些浸水並未在計算 s_i 因數時計入。這些開口須包括空氣管、通風筒和以風雨密門或艙口蓋關閉的開口；和

.2 根據第 II-2 章被認為是水平撤離路線的客船艙壁甲板的任何部分。

5.3 若在考慮到下沉、橫傾和縱傾以後，在任何中間浸水階段或最終浸水階段中發生任一下列情況，則 s_i 應取值為 0：

.1 擬符合第 II-2 章的艙壁甲板上任何垂直逃生艙口被浸沒；

.2 擬從艙壁甲板上方對用以保持水密艙壁完整性的水密門、均衡裝置、管子或通風管的閥門進行操縱的任何控制裝置變得無法接近或無法操作；

.3 穿過位於造成達到的指數 A 的破損情形裏任一艙室中水密界限的管子或通風管的任何部分被浸沒，若沒在每一界限裝設水密關閉裝置的話。

5.4 但是，若假定由於連續浸水而浸水的艙室被計入破損穩性計算中，則為計算 $S_{\text{intermediate},i}$ 的多項值可以假設在額外浸水階段為均衡。

5.5 除第 5.3.1 款規定者外，用水密人孔蓋和平面艙蓋關閉的開口、小型水密艙口蓋、遙控操作的滑動水密門、非打開型舷窗以及按要求在海上航行中保持關閉的水密出入門和艙口蓋，可以不必考慮。

6 若水平水密界限設在所考慮的水線以上，則對水線以下的艙或艙組其 s 值須以第 1.1 款確定的值按照第 6.1 款乘以表示水平分艙以上處所不浸水的概率的縮減因數 *Vm* 求得。

6.1 因數 *Vm* 須按下列公式求得：

$$v_m = v\ (Hj, n, m, d) - v\ (Hj, n, m-1, d)$$

式中：

$H_{j,n,m}$ 係指基線以上的最小高度（米），並處於第 m^{th} 水平界限的 $X_{1(j)} \ldots X_{2(j+n-1)}$ 的縱向範圍內，假設該界限是限制所考慮的破損艙室的浸水垂直範圍；

$H_{j,n,m-1}$ 係指基線以上的最小高度（米），並處於第 $(m-1)^{th}$ 水平界限的 $X_{1(j)} \ldots X_{2(j+n-1)}$ 的縱向範圍內，假設該界限是限制所考慮的破損艙室的浸水垂直範圍；

j 表示所考慮的破損艙室的後端點；

m 表示從所考慮的水線向上數的每一個水平界限；

d 係指第 2 條定義的當前吃水；和

*x*1 和 *x*2 表示第 7-1 條所考慮的艙或艙組的端點。

6.1.1 因數 $v(H_{j,n,m}, d)$ 和 $v(H_{j,n,m-1}, d)$ 須從下列公式取得：

如果（H_m-d）小於或等於 7.8 米，$v(H, d) = 0.8\frac{(H-d)}{7.8}$；

在所有其他情況下，$v(H, d) = 0.8 + 0.2[\frac{(H-d)-7.8}{4.7}]$，

式中：

$v(H_{j,n,m,d})$ 應取值為 1，如果 H_m 在（$x_{1(j)} \ldots x2_{(j+n-1)}$）範圍內與船舶最上層的水密界限重合，及

$v(H_{j,n,0,d})$ 應取值為 0。

無論如何，Vm 取值不應小於 0 或大於 1。

6.2 一般而言，每一指數 A 的輔助 dA 在水平分隔的情況下由下列公式取得：

$$dA=\text{pi}[v_1.s_{min1}+(v2-v1).s_{min2}+\ldots\ldots+(1-v_{m-1}).s_{min\,m}]$$

式中：

V_m ＝按照第 6.1 款計算出的 V 值；

S_{min}＝當假定破損從假定破損高度 Hm 向下延伸時所取得的破損各種組合的最小因數 s。

第 7-3 條 滲透率

1 就各條款中的分艙和破損穩性計算而言，每一通常艙室或某艙室的一部分的滲透率須如下表：

處所	滲透率
儲物處所	0.60
起居處所	0.95
機器處所	0.85
空艙處所	0.95
液體處所	0 或 0.95[1]

[1] 取其導致更加嚴格要求者。

2 就各條款中的分艙和破損穩性計算而言，每一貨物艙室或某

一艙室部分的滲透率須如下表：

處所	吃水 *ds* 處的滲透率	吃水 *dp* 處的滲透率	吃水 d_1 處的滲透率
乾貨處所	0.70	0.80	0.95
集裝箱處所	0.70	0.80	0.95
滾裝處所	0.90	0.90	0.95
液體貨處所	0.70	0.80	0.95

3 如果有計算支持也可以使用其他滲透率數字。

第 8 條 客船穩性的特殊要求

1 擬載運 400 名或以上乘客的客船須具備防撞艙壁後水密分艙，以便在計算分艙指數所基於的三種裝載條件下及發生從首垂線量起 $0.08L$ 以內的所有艙室的破損時，S_i=1。

2 擬載運 36 名或以上乘客的客船須能夠承受沿着船側板至第 3 款所述範圍內的破損。通過證明在計算分艙指數所基於的三種裝載條件下，第 7-2 條界定的 Si 不小於 0.9，即認為符合本條規定。

3 若證明符合第 2 款，假定的破損程度將同時取決於第 6 條界定的 N 和第 2 條界定的 L_s，以致：

.1 垂直破損範圍從船舶的型基線延伸至第 2 條界定的最深分艙吃水位置以上達 12.5 米的位置，除非較小的垂直破損範圍給出一個較低的 Si 值，在這種情況下，可以採用該減小的程度；

.2 若載運 400 名或以上乘客，則須在沿着船側板任何位置假設 $0.03L_s$、但不小於 3 米的破損長度，連同最深分艙吃水水平面中心線的直角距離 $0.1B$、但是從船內側量起至不

小於 0.75 米的向內穿透；

.3 若載運 400 名以下乘客，則須在沿着橫向水密艙壁之間的船殼板的任何位置假設破損長度，但條件是兩個相鄰橫向水密艙壁之間的距離不小於假設的破損長度。若兩個相鄰橫向水密艙壁之間的距離小於假設的破損長度，則就證明符合第 2 款規定而言，只有一個這樣的艙壁可被視為有效；

.4 如載運 36 名乘客，則可假設 $0.015L_s$、但不小於 3 米的破損長度，連同 $0.05B$、但不小於 0.75 米的向內穿透；以及

.5 若載運 36 名以上 400 名以下乘客，則用於確定假設破損範圍的破損長度和向內穿透的值，須通過對第.4 項和第.2 項所述適用於載運 36 名乘客及 400 名乘客的破損長度和穿透值之間線性插值法取得。

第 8-1 條 客船進水事故後的系統能力

1 適用範圍

本條適用於 2010 年 7 月 1 日之後建造的、第 II-2/21 條所適用的客船。

2 發生進水破損時關鍵系統的有效性

客船應如此設計，使第 II-2/21.4 條所列明的系統在船舶任一單個水密艙室進水時仍可運行。

B-2 部分

分艙、水密和風雨密完整性

第 9 條 客船和除液貨船以外的貨船的雙層底

1 雙層底的設置須在適合船舶設計及船舶正常作業要求的情況下儘量自防撞艙壁延伸至尾尖艙艙壁。

2 如需要設置雙層底，其內底須如此延伸至船舶兩側，以致保護船底至舭部彎曲處。此項保護如能使內底在任何部分都不低於平行於龍骨線的平面，且其位於距龍骨線量起不小於 h 垂直距離處，即認為滿意。垂直距離 h 由下列公式計算得到：

$h = B/20$。

但是，無論如何 h 值不得小於 760mm，也無需大於 2,000mm。

3 設於雙層底內且與貨艙排水裝置連接的小阱等，不得向下延伸至超過所需的深度，但可以准許軸隧後端的阱延伸至外底。其他的阱（如主機下的潤滑油阱），如其佈置具有等效於本條要求的雙層底的保護作用，則經主管機關同意可予設置。無論如何，此阱阱底至與龍骨線重合的平面的垂直距離不得小於 500mm。

4 對於包括大小適度的乾艙在內的水密艙，當該船的船底或船側破損時不妨礙船舶的安全時，可不設雙層底。

5 適用第 1.5 條規定且在第 III/3.22 條界定的短程國際航行範圍內從事定期運輸的客船，如主管機關認為在該部分設置雙層底將與船舶設計和船舶正常作業不相適應時，可允許免設雙層底。

6 根據本條第 1 款、第 4 款或第 5 款設有設置雙層底的客船或貨船的任何部分須能夠承受在船舶該部分發生的如第 8 款所述的船底破損。

7 對於客船或貨船的特殊船底佈置，須證明該船能夠承受第 8 款所述的船底破損。

8 證明滿足第 6 款或第 7 款的方法是：若沿着船底的任何位置出現船底艙破損，且船舶受影響部分的破損範圍如第.2 項所述，按照第 7-2 條計算出的 *Si* 在所有營運情況下不小於 1.0：

.1 這些處所的浸水不得使該船其他部分的應急電源、照明、內部通訊、信號或其他應急裝置癱瘓。

.2 假設的破損範圍如下：

	距船舶首垂線的 0.3*L* 處	船舶任何其他部分
縱向範圍	$1/3L^{2/3}$ 或 14.5 米，取小者	$1/3L^{2/3}$ 或 14.5 米，取小者
橫向範圍	*B*/6 或 10 米，取小者	*B*/6 或 5 米，取小者
從龍骨線量起的垂直範圍	*B*/20 或 2 米，取小者	*B*/20 或 2 米，取小者

.3 如果小於第.2 項所述最大破損範圍的任何破損將會導致更加嚴重的狀況，則此破損應予以考慮。

9 對於客船的大底艙，主管機關可以要求增加雙層底高度，但從龍骨線量起不超過 B/10 或 3 米，取小者。或者，可按照第 8 款對這些區域進行船底破損計算，但假設更大的垂直範圍。

第 10 條 水密艙壁的構造

1 每一水密分艙艙壁，無論橫向或縱向，其構造須具有第 2.17

條所述的船材尺度。在任何情況下，水密分艙艙壁須至少能夠支持高達艙壁甲板的水頭壓力。

2 水密艙壁上的階層及凹壁均須與其所在地方的艙壁具有同等強度。

第 11 條 水密艙壁等的初次試驗

1 對非擬用於裝載液體的水密處所和擬用於裝載壓載水的貨艙，灌水試驗並非強制。若不進行灌水試驗，則須儘可能進行沖水試驗。此項試驗須在船舶舾裝工作的最後階段進行。若由於對機械、電子設備絕緣或舾裝設備的可能損壞而使沖水試驗不可行，則可代之以對焊連接做仔細的目視檢查，必要時輔之以染色滲透試驗、聲納滲漏試驗或等效試驗等方法。無論如何，均須對水密艙壁進行徹底的檢查。

2 首尖艙、雙層底（包括箱形龍骨）及內側殼板均須以相當於第 10.1 條要求的水頭作試驗。

3 擬裝載液體並作為船舶水密分艙組成部分的艙櫃，須以相當於其設計壓力的水頭作密閉性和結構強度的試驗。在任何情況下，水頭不得低於空氣管頂部或該艙頂以上 2.4 米的高度，取其大者。

4 本條第 2 款和第 3 款所述的試驗，其目的是確保分艙結構佈置的水密性，並不應被視作是該艙用於儲藏燃油或其他特殊用途的適用性試驗。對此項儲藏或特殊用途，可按照液體進入艙內或其連接部分的高度，要求作較嚴格的試驗。

第 12 條 尖艙及機器處所的艙壁、軸隧等

1 船舶須設有水密高達艙壁甲板的防撞艙壁。此艙壁距首垂線的距離不得小於 0.05*L* 或 10 米處（取小者）；且除非經主管機關許可，不得大於 0.08*L* 或 0.05*L* 加 3 米（取大者）。

2 如船舶水線以下的任何部分自首垂線向前延伸，例如球鼻首，則須從下列任一點來測量第 1 款所規定的距離：

.1 此類延伸的長度中點；

.2 首垂線前方距離 0.015*L* 處；或

.3 首垂線前方距離 3 米處；

取最小者。

3 艙壁可以有階層或凹壁，但它們須在第 1 款或第 2 款規定的範圍內。

4 在艙壁甲板以下的防撞艙壁中不得設置門、人孔、通道開口、通風管或任何其他開口。

5.1 除第 5.2 款規定者外，防撞艙壁在艙壁甲板以下僅可穿過 1 根管子來處理首尖艙內的液體，但是該管子應裝設有能在艙壁甲板以上操作的螺旋閥，其閥體應設於首尖艙內的防撞艙壁上。如果閥位於在所有營運情況下均可到達之處，且其所位於的處所不是貨物處所，則主管機關可以允許該閥設於防撞艙壁的後側。所有閥須用鋼、青銅或其他經認可的韌性材料製成。不得採用普通鑄鐵或類似材質的閥。

5.2 如果首尖艙被分隔用來裝載兩種不同的液體，主管機關可允許防撞艙壁在艙壁甲板以下穿過 2 根管子，每根管子均應按照第

5.1 款的要求進行設置，但應使主管機關確信除裝設第二根管子外別無其他切實可行辦法，及慮及首尖艙內增加的分艙，仍可保證船舶安全。

6 如果船舶設有長的前部上層建築，則防撞艙壁須風雨密地延伸至艙壁甲板的上一層甲板。此延伸部分不必直接設於下面艙壁之上，但它須位於第 1 款或第 2 款規定的範圍內（第 7 款允許的情況除外），且形成階層的甲板部分應有效地風雨密。此延伸部分的佈置須避免在首門發生破損或脫落時，對其造成損壞的可能性。

7 當設有首門且裝貨斜坡道形成艙壁甲板以上的防撞艙壁的延伸部分時，坡道全長範圍內均須風雨密。就貨船而言，高出艙壁甲板 2.3 米的坡道部分可超出第 1 款或第 2 款規定的範圍界限向前延伸。不符合上述要求的坡道不得視為防撞艙壁的延伸。

8 乾舷甲板以上防撞艙壁延伸處的開口數量，須在適合船舶設計和正常作業的情況下減至最少。所有這類開口須能夠關閉成風雨密。

9 為將機器處所與前後貨物和居住處所隔開，須設置艙壁，並使其水密延伸至艙壁甲板。就客船而言，還須設置尾尖艙艙壁，並使其水密延伸至艙壁甲板。但是，只要不降低船舶分艙的安全程度，尾尖艙艙壁可在艙壁甲板下方做成階層。

10 在任何情況下，尾管須封閉在適當容積的水密處所內。就客船而言，尾填料函壓蓋須裝設在水密軸隧內或與尾管艙室分開的其他水密處所內，且該處所具如此容積，以至在尾填料函壓蓋滲

漏而浸水時，將不淹沒艙壁甲板。就貨船而言，經主管機關酌定可以採取其他措施，使在尾管佈置受損的情況下向船內滲水的危險降到最低程度。

第 13 條 客船艙壁甲板以下水密艙壁上的開口

1 水密艙壁上的開口數量須在適合船舶設計和正常作業的情況下減至最少，這些開口均須備有可靠的關閉設備。

2.1 凡管子、排水管和電纜等穿過水密艙壁時，須設有保證艙壁水密完整性的裝置。

2.2 不構成管系組成部分的閥門不得設在水密艙壁上。

2.3 鉛或其他易熔材料不得用於穿過水密艙壁的管系上，因為發生火災時這種管系的損壞將會破壞艙壁的水密完整性。

3 分隔相鄰貨艙之間的水密橫艙壁上不得設有門、人孔和出入口，但本條第 9.1 款和第 14 條規定者除外。

4 在第 10 款規定之下，在主、輔推進機械，包括推進所需鍋爐的處所內，其每一水密艙壁上，除通往軸隧的門外，只准設置 1 扇門。如裝有 2 根或更多的軸，其軸隧之間應設有一個互通的連接通道。若裝設 2 根軸，在機器處所與軸隧間僅准設 1 扇門；如裝設 2 根軸以上者，則只准設 2 扇門。所有這類門均須為滑動式，且須位於可儘量高設其門檻之處。艙壁甲板上方操縱這些門的手柄應設置在機器處所之外。

5.1 除本條第 9.1 款和第 14 條規定者外，水密門須為符合本條第 7 款規定的動力式滑動門，當船舶正浮時，須能從駕駛室的總控

制台於 60 秒內同時關閉這些門。

5.2 任何動力式滑動水密門的操縱裝置，無論是動力式還是手動式，均能夠在船舶向任一舷橫傾至 15 度的情況下將門關閉。還須考慮當水從開口處湧入時，在門的任一側受到一個相當於在門的中心線處門檻以上至少 1 米高度的靜水壓頭的作用力。

5.3 水密門的操縱裝置，包括液壓管路和電纜，須儘可能靠近裝設該門的艙壁，以儘量減少當船舶遭受破損時此類裝置也被損壞的可能性。水密門與其操縱裝置須如此定位，若船舶在按照第 2 條界定的船寬的 1/5 範圍內遭受破損，位於船舶破損部分以外的水密門的操縱不得受妨礙，該距離在最深分艙吃水平面上與中心線成直角量計。

6 所有動力式滑動水密門須配備指示器，它們在所有的遙控操縱位置上顯示出這些門的開啟或關閉。遙控操縱位置只能位於本條第 7.1.5 款要求的駕駛室內和本條第 7.1.4 款要求的艙壁甲板上方的手動操縱位置處。

7.1 每一動力式滑動水密門：

.1 須為豎動式或橫動式；

.2 在本條第 10 款規定下，最大淨開口寬度一般須限於 1.2 米。只有在認為船舶有效操作需要時，主管機關方可允許設更寬的門，但須考慮到其他安全措施，包括下列措施在內：

.1 須特別考慮到門的強度及其關閉設備，以防滲漏；以及

.2 門須位於 B/5 的破損區域以內；

.3 須配置必要的設備，使用電力、液壓或主管機關可接受的其他形式的動力開啟和關閉門；

.4 須配備一套獨立的手動機械裝置。它須能從門的任一側用手開啟和關閉；此外，還能在艙壁甲板上方可到達之處，用全周旋轉搖柄轉動或主管機關認為具有同樣安全程度的其他動作關閉該門。旋轉的方向或其他動作的方向應在所有操縱位置上清楚地予以標明。當船舶正浮時，用手動裝置操作將門完全關閉所需的時間不得超過 90 秒鐘；

.5 須設置從門的兩側用動力開啟和關閉門的控制裝置；還須設置從駕駛室總控制台用動力關閉該門的控制裝置；

.6 須設置一個與該區域內其他警報器不同的聲音警報，當該門用動力遙控關閉時，該警報器在門開始移動前至少 5 秒但不超過 10 秒鐘報警，且連續報警直至該門完全關閉。在手動遙控操作的情況下，只要當門移動時聲響警報器能發出聲響即可。此外，在旅客區域和高環境噪聲區域，主管機關可以要求為聲音報警器增配一個裝在門上的間歇發光信號器；和

.7 用動力關閉門時，關閉速率須大致均勻。當船舶正浮時，從門開始移動至門完全關閉的時間，在任何情況下不得少於 20 秒，但也不得大於 40 秒。

7.2 動力式滑動水密門所需的電力須由應急配電板直接供給，或由位於艙壁甲板上方的專用配電板供給。有關的控制裝置、指示

器和報警電路也須由應急配電板直接供電或由位於艙壁甲板上方的專用配電板供電，且當主電源或應急電源發生故障時，能自動地由第 42.3.1.3 款要求的臨時應急電源供電。

7.3 動力式滑動水密門須具有：

.1 一個配備兩套獨立動力源的集中液壓系統，每一動力源由一台能同時關閉所有門的馬達和泵組成。此外，整個裝置的液壓蓄能器須有足夠的能量，在不利的 15 度橫傾時至少能操作所有的門 3 次，即關閉－開啟－關閉。這個操作循環須能夠在蓄能器處於泵啟動壓力下時進行。選擇所用液體時須考慮到該裝置工作中可能遇到的溫度。該動力操作系統的設計須使液壓管路中由單一故障而影響 1 扇以上門的操作的可能性減至最小。該液壓系統須配有用於動力操作系統儲液箱的低液位報警器和低氣壓報警器或其他能監測液壓儲能器內能量損失的有效裝置。這些報警器須是聲響的或燈光報警器，並且須裝在駕駛室內的集中控制台上；或者

.2 用於每扇門的一套獨立液壓系統，該系統具有能開啟和關閉該門的馬達和泵組成的動力源。此外，還應設有一個有足夠能量的液壓儲能器，在不利的 15 度橫傾時至少能操作該門 3 次，即關閉－開啟－關閉。這個操作循環須能夠在儲能器處於泵啟動壓力下時進行。選擇所用液體時須考慮到該裝置工作中可能遇到的溫度。在駕駛室的集中控制台上須設置一組低氣壓報警器或其他能監測液壓儲能器內能量損失的有效裝置。在每個局部操作位置處也須設置

儲藏能量損失的顯示器；或者

.3 用於每扇門的一套獨立電力系統和馬達，該系統具有一台能開啟和關閉該門的馬達組成的動力源。該動力源在主電源或應急電源發生故障時須能自動地由第 42.4.2 款要求的臨時應急電源供電，且具有足夠的能量，在不利的 15 度橫傾時至少能操作該門 3 次，即關閉－開啟－關閉。

對於第 7.3.1 款、第 7.3.2 款和第 7.3.3 款所規定的系統，應配置如下：

動力式水密滑動門的動力系統須和任何其他動力系統分開。電力或液壓動力操作系統（不包括液壓執行器）中的某一故障須不妨礙任何門的手動操作。

7.4 控制手柄須裝設在艙壁的兩側地板以上至少 1.6 米的高處，並且其佈置須使通過該門的人員能將兩側的手柄把定在開啟位置，而不致意外地啟動動力關閉裝置。開啟和關閉門時手柄的運動方向須與門移動的方向一致，並且須清楚地予以標明。

7.5 水密門的電器設備和部件須儘可能設置於艙壁甲板以上及危險區域和處所之外。

7.6 必須裝設在艙壁甲板以下的電器部件須設有適宜的防進水保護。

7.7 電源、控制器、指示器和報警器電路須如此設置防故障保護，某一扇門的電路中的故障不致引起任何其他門的電路發生故障。一扇門的報警器或指示器電路的短路或其他故障不得導致該門動力操作失靈。其佈置須使位於艙壁甲板以下的電器設備一旦

受到水的滲入也不會導致門的開啟。

7.8 動力式滑動水密門的動力操作系統或控制系統中的單一電器故障不得導致一扇關閉的門被開啟。應在電路中儘可能靠近第 7.3 款要求的每一台電機的一點上連續監視電源供電的有效性。任何此種供電失效時，應在駕駛室的集中控制台上發出聲響和燈光報警。

8.1 駕駛室內的集中控制台須有一個“控制模式”開關，它具有兩套控制模式：一套是“就地控制”模式，它須允許任何門不經使用自動關閉裝置而能被就地開啟和在使用後沒自動關閉時就地關閉；另一套是“關閉門”模式，它須自動關閉任何開啟着的門。該“關閉門”模式須自動關閉開啟着的門。該“關閉門”模式須准許門被就地開啟，而當脫開就地控制機械時應能自動重新關閉該門。“控制模式”開關一般應採用“就地控制”模式。“關閉門”模式須僅在緊急情況下或為試驗的目的才使用。須特別重視“控制模式”開關的可靠性。

8.2 駕駛室內的總控制台須設有指明每扇門位置的圖，並附有發光指示器以顯示出每扇門是開啟的還是關閉的。紅燈須表示為一扇門完全開着，而綠燈須表示一扇門完全關閉。當門被遙控關閉時，紅燈須以閃光表示門處於中間的位置。指示器電路須與每扇門的控制電路相互獨立。

8.3 任何一扇門都不得有可能從總控制台遙控開啟。

9.1 如果主管機關認為至關重要，則可在甲板處所之間分隔貨物的水密艙壁上裝設適當構造的水密門。此類門可以是鉸鏈式、滾

動式或滑動式，但不能是遙控的。它們須裝在最高處並須儘可能遠離船殼板，但無論如何其垂直外緣的位置與船殼板的距離不得小於第 2 條界定的船寬的 1/5 處，此距離在最深分艙吃水水平面上與中心線成直量計。

9.2 如果在航行中可以通達此類門，則它須配備裝置，以防止被擅自開啟。如擬裝設此類門，其數量及佈置均須經主管機關特別考慮。

10 可移式平板門不允許裝在艙壁上，但在機器處所內除外。主管機關可以允許在每一個水密艙壁上設一扇寬度超過第 7.1.2 款規定的動力式滑動水密門取代這些可移動式平板門，但這些門在航行中應保持關閉，但在緊急情況下船長酌定必需者除外。此類門不需滿足第 7.1.4 款關於在 90 秒之內用手動操作裝置完全關閉門的要求。

11.1 凡由船員居住艙室通至鍋爐艙的圍壁通道或隧道，或用於管子或任何其他用途的圍壁通道或隧道，如穿過水密艙壁，則須為水密，並須符合第 16-1 條的要求。在航行中用作通路的每一圍壁通道或隧道，至少其一端的出口須通過保持水密到足夠高度的圍壁使其能由艙壁甲板以上出入。圍壁通道或隧道的另一端出入口，可經過一水密門，其類型按其所在位置決定。此類圍壁通道或隧道不得通過在防撞艙壁後的第一個分艙艙壁。

11.2 凡擬裝設穿過水密艙壁的隧道時，須經主管機關的特殊考慮。

11.3 如果連接冷藏貨物處所和通風設備的圍壁通道或強力通風

圍壁穿過一道以上水密艙壁時，此類開口的關閉裝置須由動力操作，且能從位於艙壁甲板以上的集中控制位置處將其關閉。

第 13-1 條 貨船水密艙壁和內部甲板上的開口

1 水密分艙上的開口數量應在適合船舶設計和船舶正常作業的情況下減至最少數量。凡出入口通道、管子、通風管道、電纜等需要穿過水密艙壁和內部甲板時，應做出保持水密完整性的佈置。主管機關可以允許放鬆對乾舷甲板以上開口的水密性要求，但應證明可以容易地控制任何連續浸水且不會妨礙船舶安全。

2 在航行中使用的、旨在保證內部開口水密完整性的門應為滑動水密門，它們能夠從駕駛室遙控關閉，也能從艙壁每側就地操作。在控制位置應設置指示器顯示門開啟或關閉狀態，且在門關閉時提供聲響報警。在主電源發生故障時，電源、控制和指示器應維持工作狀態。特別要注意將控制系統故障的影響減至最低程度。每扇動力操作的滑動水密門須配備一單獨的手動操作機械裝置。門須可以從其兩側手動開啟或關閉。

3 通常在海上保持關閉的、旨在保證內部開口水密完整性的通道門和通道艙口蓋須就地和在駕駛室配備指示裝置，表明這些門或艙口蓋是否開啟或關閉。每扇這樣的門或艙口蓋應附貼一個通告牌，說明其不得敞開。

4 如主管機關認為水密門或坡道為必須者，則可以設置適當構造的此類門或坡道，以便對大的貨物處所進行內部分艙。這些門或坡道可採用鉸鏈式、滾動式或滑動式，但不得採用遙控式。這些門或坡道如果在航程中是可以到達的，則須裝有裝置防止未經

授權的開啟。

5 為保證內部開口水密完整性而在海上保持永久關閉的其他關閉裝置，須在每個裝置上附貼一個告示牌，說明其必須保持關閉。對裝有緊密螺栓蓋子的人孔則無需如此標明。

第 14 條 載運貨車和隨車人員的客船

1 本條適用於為載運貨車和隨車人員而設計或改建的客船。

2 若這些船上包括隨車人員在內的旅客總數不超過 $12 + A_d/25$，其中 A_d 等於用來裝載貨車處所的甲板總面積（平方米），而且裝載車輛處和這類處所入口的淨高不低於 4 米，則關於水密門的第 13.9.1 條和第 13.9.2 條的規定須適用，但這些門可以設置在分隔裝貨處所的水密艙壁的任何高度上。此外，要求在駕駛室設置指示器，在每扇門關閉時及所有門閂已扣緊時自動顯示。

3 如果根據本條規定設置了水密門，則船舶不得核准搭載比第 2 款假定人數更多的旅客。

第 15 條 客船艙壁甲板和貨船乾舷甲板以下船殼板上的開口

1 船殼板上的開口數量須在適合船舶設計及船舶正常作業的情況下減至最少數量。

2 船殼板開口的關閉設備的佈置及效用須與其預定用途及設置的位置相適應，且一般須令主管機關滿意。

3.1 除非根據現行《國際載重線公約》的要求，舷窗的佈置須使舷窗窗檻不得低於平行於艙壁甲板的邊線，且其最低點在最深分

艙吃水以上 2.5%船寬處或 500 毫米，取其大者。

3.2 凡第 3.1 款允許的、窗檻在客船艙壁甲板和貨船乾舷甲板以下的舷窗，其構造須能有效地防止任何人未經船長許可而予開啟。

4 所有舷窗均須裝設有效的內部鉸鏈舷窗蓋，其佈置應能便利和有效地關閉和緊固成水密，但在距首垂線 1/8 船長以後，且在平行於艙壁甲板邊線，其最低點在最深分艙吃水以上 3.7 米加 2.5%船寬所繪的線以上者，則除統艙外的乘客艙室的舷窗蓋可為可移式的，但按照現行《國際載重線公約》要求需固定在相應位置者除外。這些可移式舷窗蓋須存放於其所屬的舷窗附近。

5.1 凡專供載貨或裝煤的處所內不得設置舷窗。

5.2 供交替載貨或載客的處所，可設置舷窗。但是其構造須能有效地防止任何人未經船長許可而打開舷窗或舷窗蓋。

6 未經主管機關特准，不得在客船艙壁甲板和貨船乾舷甲板以下的船殼板上設置自動通風舷窗。

7 船殼板上的排水孔、衛生排泄口和其他類似開口，須採取每個排水口供儘可能多的衛生水管及其他管道共用或以其他適當的辦法減至最少數量。

8.1 船殼板上的所有進水孔和排水孔均須裝設防止海水意外進入船內的有效並可到達的裝置。

8.2.1 除非根據現行《國際載重線公約》的要求，且除第 8.3 款規定外，凡客船艙壁甲板和貨船乾舷甲板以下處所穿過船殼板的每

一獨立排水孔，須設有一個自動止回閥，此閥須具有從艙壁甲板以上將其關閉的可靠裝置，或者代以兩個無此項關閉裝置的自動止回閥，但內側一閥須設置在最深分艙吃水以上且能在營運狀態下隨時可接近以便達查驗。如果設置具有可靠關閉裝置的閥，其在艙壁甲板以上的操作位置應隨時易於接近，並須備有表明閥門開啟或關閉的顯示裝置。

8.2.2 現行《國際載重線公約》的要求須適用於從客船艙壁甲板和貨船乾舷甲板以上處所穿過船殼板的排水孔。

8.3 機器處所和與機械運行相關的主、輔海水進水孔及排水孔，須在管系與船殼板之間或管系與附着於船殼板的組合箱之間設置易於接近的閥門。在有人的機器處所內，閥門可以就地控制，並須配有表明其開啟或關閉的顯示器。

8.4 穿過最深分艙吃水以下船殼板的移動部件須裝設主管機關認可的水密封閉裝置。內側函壓蓋須位於如此容積的水密處所內，即使該處所浸水，艙壁甲板也不會被淹沒。主管機關可以要求，若此類艙室浸水，在船舶其他部分的關鍵或應急電源和照明、內部通訊、信號或其他應急裝置須仍可用。

8.5 本條規定的所有船殼板裝置和閥門均須用鋼、青銅或其他經認可的延性材料製造。不得使用普通鑄鐵或類似材料的閥門。本條所述的所有管系須用鋼或主管機關同意的其他等效材料製成。

9 設置於客船艙壁甲板和貨船乾舷甲板以下的舷門、裝貨口和加燃油口應為水密，且其設置在任何情況下均不得使其最低點低於最深分艙吃水。

10.1 每一出灰管、垃圾管等的內側開口須裝有有效的蓋子。

10.2 如內側開口位於客船艙壁甲板和貨船乾舷甲板以下，此蓋須為水密，此外須在管內最深分艙吃水以上易於到達的位置裝設一自動止回閥。

第 15-1 條 貨船上的外部開口

1 通向在破損分析中假定為完整的、且位於最終破損水線以下的艙室的所有外部開口，均要求是水密的。

2 根據第 1 款要求為水密的外部開口，除貨艙蓋外，須在駕駛室設有指示器。

3 在限制垂向破損範圍的甲板以下船殼板上的開口，如果在航程中可以接近，則須設置防止擅自開啟的裝置。

4 為保證外部開口水密完整性而在海上保持永久關閉的其他關閉裝置，須在每個裝置上附貼一個告示牌，說明其必須保持關閉。對裝有緊密螺栓蓋子的人孔則無需如此標明。

第 16 條 水密門、舷窗等的構造和初次試驗

1 在所有船舶上：

.1 這些條款所述的一切水密門、舷窗、舷門、裝貨口、閥門、管子、出灰管和垃圾管的設計、材料和構造均須令主管機關滿意；

.2 此類閥門、門和機器須作適當標識，以確保正當使用以提供最大限度的安全；和

.3 豎動式水密門的門框，其底部不得有可能積聚污穢的槽，以免妨礙門的正常關閉。

2 對客船和貨船的水密門須按其在最後或中間浸水階段可能承受的水頭進行水壓試驗。如果由於絕緣或舾裝設備可能損壞而沒有對個別門進行試驗，可用至少相應於預定位置所要求的試驗壓力對每種類別和尺寸的門進行原型試驗，取代對每一扇門的試驗。原型試驗須在安裝門之前進行。在船上設置門的安裝方法和程序應與原型試驗相符。每一扇門在船上設置後，應對艙壁、門框和門之間的恰當位置予以核查。

第 16-1 條 水密甲板、圍壁通道等的構造和初次試驗

1 水密甲板、圍壁通道、隧道、箱形龍骨及通風管道，均須與在同一高度的水密艙壁具有同等的強度。做成水密的措施以及關閉其開口所用的裝置，須令主管機關滿意。水密通風管道及圍壁通道須至少向上延伸至客船的艙壁甲板和貨船的乾舷甲板。

2 如穿過某一結構的通風管道穿過艙壁甲板，在根據第 7－2 條計入各中間浸水階段許用的最大橫傾角後，該通風管道須能承受可能出現於其中的水壓。

3 如果艙壁甲板的穿透結構全部或部分位於主滾裝甲板上，該通風管道須能夠承受滾裝甲板積水的內部水運動（晃動）引起的衝擊壓力。

4 在完工以後，水密甲板須作沖水或灌水試驗，而水密圍壁通道、隧道和通風管道則作沖水試驗。

第 17 條 艙壁甲板以上的客船內部水密完整性

1 主管機關可要求採取一切合理和可行的措施，以限制海水在艙壁甲板以上的進入及漫流。此類措施可包括裝設局部艙壁或腹板。當局部水密艙壁和腹板裝於艙壁甲板上水密艙壁上方或緊鄰之處時，須與船殼板和艙壁甲板水密連接，以使在船舶破損傾斜的情況下限制海水沿甲板漫流。如局部水密艙壁與其下方的艙壁錯開，則兩者間的艙壁甲板須做成有效的水密。若開口、管子、排水口、電纜等經過局部水密艙壁或艙壁甲板浸沒部分的甲板時，須作出佈置以確保艙壁甲板以上結構的水密完整性。

2 露天甲板上的所有開口須設有足夠高度和強度的圍板，並須設有能迅速關閉成風雨密的有效設備。須按需要裝設流水口、敞式欄杆和排水孔，以便能在任何氣候情況下迅速排除露天甲板上的積水。

3 在上層建築內終止的空氣管開口端須在船舶橫傾至15度或至各中間浸水階段的最大橫傾角時（由直接計算確定，取其大者）至少高出水線1米。或者，除油艙以外的其他艙櫃的空氣管可通過上層建築的側面排氣。本款的規定不妨礙現行《國際載重線公約》的規定。

4 在艙壁甲板以上船殼板上的舷窗、舷門、裝貨門和加油門及其關閉開口的其他裝置，須就其所裝設的處所及其相對於最深分艙吃水的位置，進行有效設計和構造，並須具有足夠的強度。

5 在艙壁甲板以上的第一層甲板以下處所內的所有舷窗，須備有有效的內側舷窗蓋，其佈置須能易於有效地關閉，並緊固成水密。

第 17-1 條 滾裝客船的船體與上層建築的完整性、破損預防和控制

1.1 除非根據第 1.2 款和第 1.3 款的規定，所有通向艙壁甲板以下處所的通道口的最低點至少須高出艙壁甲板 2.5 米。

1.2 如設有通至艙壁甲板以下處所的車輛坡道，則其開口的關閉須能夠保持風雨密，以防止下面進水，並能向駕駛室作出報警和顯示。

1.3 如船上的某些重要工作（如機器和儲藏品的移動）有此必要，主管機關可以允許設置通向艙壁甲板以下處所的特別通道，但是該通道應做成水密，並能在駕駛室發出報警和顯示。

2 駕駛室內須配備所有舷門、裝貨門和主管機關認為在未加關閉和正確繫固時會導致特種處所或滾裝處所浸水的其他關閉設施的指示器。指示器系統須按故障保險原則設計，如果門未完全關閉或任何繫固裝置未就位或未完全鎖閉，則以燈光報警顯示；如果此種門或關閉設備成開啟狀態或繫固裝置鬆開，指示器應以聲響報警指示。在駕駛室的指示器板上應設有“港口／海上航行”模式選擇功能，並如此佈置：在船舶離港時首門、內門、尾坡道或任何其他舷側門未關閉或任何關閉裝置沒有位於正確位置，則會在駕駛室發出聲響報警。指示器系統的電源應獨立於操作和繫固門的供電。

3 為向駕駛室與機艙控制站顯示經內外首門、尾門或任何其他可能導致特種處所或滾裝處所浸水的舷門的任何漏水信息，須設有電視監視與漏水探測系統。

B-3 部分

客船分艙載重線的勘定

第 18 條 客船分艙載重線的勘定、繪劃與記載

1 為了保持所要求的分艙程度，須在船舶兩舷勘定並繪劃對應於所核准的分艙吃水的載重線。若船舶用於交替營運模式，如船舶所有人請求，可以勘定和繪劃一個或數個與主管機關核准的交替營運模式的分艙吃水相對應的附加載重線。每一核准的業務構型須符合本章 B-1 部分的要求，獨立於其他營運模式下取得的結果。

2 所勘定和繪劃的分艙載重線須載入客船安全證書，並以 P1 表示主要載客構型和 P2、P3 等分別表示交替構型。主要載客構型須被視作所要求的分艙指數 R 將達到最高值的營運模式。

3 對應於每一載重線的乾舷，須按照現行的《國際載重線公約》確定的乾舷在同一位置上並從同一甲板進行測量。

4 對應於每一經核准的分艙載重線及經核准的營運條件的乾舷，均須清楚地記載在客船安全證書中。

5 在任何情況下，任何分艙載重線均不得繪劃在按照船舶強度或現行《國際載重線公約》所確定的海水中最深載重線以上。

6 不論分艙載重線標誌的位置如何，船舶的裝載均不得使按照現行《國際載重線公約》所確定的適合於所處季節和區域的載重線標誌淹沒於水中。

7 在任何情況下，船舶的裝載概不得使船舶在海水中時將適合

於該特定航次和營運狀態的分艙載重線淹沒於水中。

B-4 部分

穩性管理

第 19 條 破損控制資料

1 在駕駛臺上須長期地展示或隨時提供清晰地表明各層甲板及貨艙的水密艙室界限、其中的開口及其關閉裝置和控制裝置的位置以及用來校正浸水傾斜的裝置的平面圖，以便為值班高級船員提供指導。此外，還須給船上高級船員提供載有上述資料的小冊子。

2 客船在航行中允許敞開的水密門須在船舶穩性資料中予以清楚記載。

3 所包括的一般預防措施須由主管機關認為在正常船舶操作情況下保持水密完整性所必需的設備、狀態和操作程序清單構成。

4 所包括的具體預防措施須由主管機關認為對船舶、旅客和船員生存至關重要的要素（如關閉裝置、貨物繫固、警報聲響等）清單構成。

5 對於 B-1 部分的破損穩性要求所適用的船舶，破損穩性資料須為船長提供在一種簡單易懂的、評估船舶一艙室或一組艙室破損的所有情況下的倖存能力的方法。

第 20 條 客船裝載

1 在船舶完成裝載並在其啟航之前，船長須確定船舶的縱傾和穩性，並核實和記錄船舶符合相關規定的穩性標準。始終須通過計算確定船舶的穩性。主管機關可以接受使用電子裝載和穩性計

算機或這方面的等效裝置。

2 壓載水原則上不應裝載在燃油艙內。對於不能避免在燃油艙裝水的船舶，則須設置令主管機關滿意的油水分離設備，或者須提供主管機關可接受的處理含油壓載水的其他替代手段，如排放到岸上設施。

3 本條規定不妨礙現行《國際防止船舶造成污染公約》的規定。

第 21 條 客船水密門等的定期操作和檢查

1 水密門、舷窗、閥門以及排水孔、出灰管和垃圾管的關閉機構的操作演習，須每周進行一次。對航程超過一周的船舶，在離港前須進行一次全面的演習，此後在航行中至少每周進行一次。

2 水密艙壁上的一切水密門，無論是鉸鏈操作還是動力操作，凡需在航行中使用者，須每天進行操作。

3 水密門及其連接的所有機構和指示器、為使艙室水密而必須關閉的一切閥門及為破損控制橫貫連通所必須操作的一切閥門，須在航行中定期檢查，每周至少一次。

4 本條要求的所有演習和檢查的記錄均須記入航海日誌，並明確記載所發現的任何缺陷。

第 22 條 防止和控制進水等

1 所有水密門須在航行途中保持關閉，但本條第 3 款和第 4 款所規定的在航行中可以開啟的情況除外。第 13 條第 10 款所允許的機艙處所內寬度大於 1.2 米的水密門僅在該款所述的情況下才可以開啟。任何按照本款開啟的門須可以隨時迅速關閉。

2 船舶在海上航行時，位於艙壁甲板以下、最大淨開口寬度大於 1.2 米的水密門須保持關閉，但是在經主管機關確定的絕對必要有限時段除外。

3 在航行途中為准許旅客或船員通行，或因為在緊靠門的附近作業而必需時，可以開啟水密門。在穿過該門的通行已結束或必須開啟門的作業已完成時，須立即關閉該門。

4 只有在認為絕對必要時，即確認開啟某些水密門為船舶機械的安全和有效操作所必需者，或為准許旅客正常不受限制地出入旅客區域所必需者，則可以允許這些水密門在航行途中開啟。這樣的決定須由主管機關仔細考慮了對船舶操作和倖存性的影響之後作出。准許保持這樣開啟的水密門須清楚地記載於船舶穩性資料中，並須處於可隨時迅速關閉的狀態。

5 艙壁上的可移動板無論如何須在船舶離港前就位，並在航行中不得被移走，在緊急情況下船長認為必須者除外。為保證接縫水密，在把它們回復原處時，須採取必要的預防措施。根據第 13.10 條准許設在機艙處所內的動力操作滑動水密門須在船舶離港前關閉，並須在航行中保持關閉，但在緊急情況下船長認為必需者除外。

6 按照第 13.9.1 條設置在分隔甲板處所之間的貨物的水密艙壁上的水密門須在啟航前關閉，並在航行中保持關閉；在港口開啟這些門和在船舶離港前關閉這些門的時間，均應記錄在航海日誌中。

7 設置在艙壁甲板以下的舷門、裝貨門和加燃油門須在船舶離

港前有效關閉，並緊固成水密，且在航行途中保持關閉。

8 位於艙壁甲板以上的下列門，須在船舶進行任何航行之前關閉並鎖緊，且在船舶到達下一個泊位之前須保持關閉並鎖緊：

.1 船殼板上或封閉的上層建築圍壁上的裝貨門；

.2 裝在本條第 8.1 款所述位置上的罩式船首門；

.3 防撞艙壁上的裝貨門；和

.4 作為包括本條第 8.1 款至第 8.3 款界定的門的替代關閉的坡道。

9 如果某個門不能在船舶靠泊時開啟或關閉，則在該船靠近或拖離泊位時，該門可以開啟或保持開敞，但僅限於必需時，以使該門可迅速操作。在任何情況下，船首內側門必須保持關閉。

10 儘管有本條第 8.1 款和第 8.4 款的要求，當船舶位於安全錨地時，若其安全不受妨礙，如因為船舶操作或旅客上下船特殊情況的需要，主管機關可以授權船長酌定開啟特定的門。

11 船長須保證對本條第 8 款所述門的關閉和開啟實施有效的監督和報告制度。

12 船舶進行任何航行之前，船長須確保把本條第 13 款所述門的最後關閉時間和按照本條第 14 款開啟特定門的時間記錄在航海日誌中。

13 這些條款要求在航行途中保持關閉的鉸鏈式門、可移動式平板門、舷窗、舷門、裝貨門、加燃油門和其他開口，須在船舶離港前關閉。關閉和開啟（如果這些條款允許的話）這些開口的時

間須記錄在主管機關所規定的航海日誌中。

14 如在甲板夾層中，第 15.3.2 條所述的任何舷窗的窗檻低於平行於艙壁甲板邊線所繪的線且其最低點在船舶離港前水面以上 1.4 米加 2.5%船寬，則在該甲板夾層的所有舷窗須在船舶離港之前關閉成水密並鎖緊，且在船舶到達下一港口前不得開啟。在適用本款規定時，可視情對淡水吃水留出適當的餘量。

.1 在港口開啟這些舷窗的時間和在船舶離港前關閉並鎖緊它們的時間須記錄在主管機關規定的航海日誌中。

.2 如任何船舶在浮於其最深分艙吃水時有一個或數個舷窗位置適用第 14 款要求，主管機關可指明其限制平均吃水，在此吃水時這些舷窗窗檻將高於平行於艙壁甲板邊線所繪的線，其最低點在對應於限制平均吃水的水線以上 1.4 米加 2.5%船寬，而且在此吃水時，准許該船離港而不必事先將這類舷窗關閉和鎖緊，在開往下一港口的航程中在海上開啟這些舷窗由船長負責。在現行《國際載重線公約》所定義的熱帶地區內，該限制吃水可增加 0.3 米。

15 在航行時不能接近的舷窗及其舷窗蓋須在船舶離港前關閉並扣牢。

16 如在第 15.5.2 條提及的處所裝載貨物，舷窗及其舷窗蓋須在裝貨前關閉成水密並鎖緊，此項關閉和鎖緊須記錄在主管機關規定的航海日誌中。

17 在不使用出灰管等時，第 15.10.2 條要求的蓋子和閥門須保持關閉並扣緊。

第 22-1 條 2010 年 7 月 1 日及之後建造的載運 36 名及以上人員的客船的進水探測系統

艙壁甲板以下的水密處所須按照本組織擬訂的指南設有進水探測系統。

第 23 條 滾裝客船的特殊要求

1 對特種處所和滾裝貨物處所，須不斷地進行巡查或用有效手段（如電視監視）進行連續監控，以在船舶航行期間能夠發現車輛在惡劣氣候條件下的任何移動和旅客的擅自進入。

2 關閉和繫固所有舷門、裝貨門和主管機關認為在未關閉或未作適當繫固的情況下可能導致特種處所或滾裝貨物處所浸水的其他關閉裝置的書面操作程序，須隨船攜帶並張貼在適當的地方。

3 從滾裝甲板和車輛坡道通向艙壁甲板以下處所的所有通道，在船舶每次離開泊位啟航前，均須關閉，並在船舶抵達下一泊位之前保持關閉。

4 船長須保證對第 3 款所述開口的關閉和開啟實施有效的監督和報告制度。

5 在船舶每次離開泊位啟航前，船長須確保把最後關閉第 3 款所述開口的時間，按照第 22.13 條記錄在航海日誌中。

6 儘管有第 3 款的要求，主管機關可允許在航行期間開啟某些開口，但開啟時間僅限於通行和船舶關鍵性工作所需要的時間。

7 所有能有效控制滾裝甲板上積聚的海水的橫艙壁或縱艙壁在

船舶離開泊位前須就位並固定，並保持到船舶抵達下一個泊位。

8 儘管有第 7 款的要求，主管機關仍可允許在航行期間開啟此種艙壁的一些開口，但開啟時間僅限於通行和船舶關鍵性工作所需要的時間。

9 在所有滾裝客船上，船長或指定的高級船員須確保當船舶在航行時，任何旅客未經其明確同意，不得進入封閉的滾裝甲板。

第 24 條 貨船上防止和控制進水等

1 在海上時，位於限制垂直破損範圍的甲板之下的船殼板上的開口須長期關閉。

2 儘管有第 3 款的要求，若船舶安全不受妨礙，因為船舶操作的需要，主管機關可以授權船長酌定開啟特定的門。

3 為內部分隔寬大貨物處所而設置的水密門或車輛坡道須在啟航前關閉，並在航行途中保持關閉；在港口開啟這些門的時間和在船舶離港前關閉它們的時間須記錄在航海日誌中。

4 使用擬用於確保內部開口水密完整性的通道門和艙口蓋，須得到值班高級船員的許可。

第 25 條 散貨船以外的單一艙貨船上的水位探測器

1 2007 年 1 月 1 日以前建造的散貨船以外的單一艙貨船須在不晚於 2009 年 12 月 31 日符合本條的要求。

2 長度不足 80 米或 1998 年 7 月 1 日以前建造長度不足 100 米及乾舷甲板以下單一貨艙或在乾舷甲板以下的貨艙不被至少一堵使該甲板水密的艙壁隔開的船舶，須在此類處所裝配水位探測

器。

3 第 2 款要求的水位探測器須：

.1 在貨艙內底上方的水位高度達到不小於 0.3m 時，在駕駛臺上發出聲光報警，並在水位高度達到不小於貨艙平均深度的 15%時，再次在駕駛臺上發出聲光報警；和

.2 安裝在貨艙的尾端，或安裝在不與設計水線相平行的內底最低部分的上方。如腹板或部分水密艙壁裝設於內底的上方，主管機關可要求安裝附加的探測器。

4 在符合第 XII/12 條規定的船上，或在貨艙每側具有至少自內底板垂直延伸至乾舷甲板的、整個貨艙長度的水密邊艙的船上，第 2 款要求的水位探測器不必安裝。”

附件 3

《經修正的 1974 年國際海上人命安全公約》的修正案

第 II-1 章

構造－結構、分艙及穩性、機電設備

D 部分

電器設備

第 41 條 主電源及照明系統

1 將下列新的第 6 款加在現有第 5 款之後：

“6 在客船上，所有艙室均須設有輔助照明，以清楚地示明出口，使旅客能夠找到通向門的通道。輔助照明可與應急電源相連，或在每一艙室中配有自備電源，在艙室正常照明失去電源時自動點亮，並延續至少 30 分鐘。”

2 將下列新的 F 部分加在現有第 54 條之後：

“F 部分

替代設計與佈置

第 55 條 替代設計與佈置

1 目的

本條的目的是提供機電設備替代佈置與設計的方法。

2 通則

2.1 如其替代設計與佈置能滿足有關要求的意圖並能提供和本章同等的安全水平，機電設備的設計與佈置可以偏離 C、D 和 E 部分中的要求。

2.2 當替代設計與佈置偏離 C、D 和 E 部分的要求時，須按照本條規定對該設計與佈置進行工程分析、評估與認可。

3 工程分析

工程分析須按本組織制定的指南準備並向主管機關提交，並須至少包含下列內容：

.1 確定船舶類型、輪機、電氣設備及有關處所；

.2 找出該輪機和電器設備將滿足不了的條文要求；

.3 找出擬議設計不滿足該條文要求的理由，並以符合其他公認的工程或工業標準為證據；

.4 確定有關條文要求所闡明的關於該船舶、輪機、電氣設備或處所的性能標準：

.1 性能標準所提供的安全水平須不低於 C、D 和 E 部分中相關條文要求；及

.2 性能標準須能量化並能衡量；

.5 替代設計和佈置的詳細描述，包括列明設計中所使用的假設及任何建議的操作限制或條件；

.6 證明替代設計和佈置達到安全性能標準的技術證據；及

.7 查明該建議的有關潛在不足和危險後所做的風險評估。

4 替代設計與佈置的評估

4.1 主管機關須參照本組織制定的指南對第 3 款所要求的工程分析加以評估及認可。

4.2 船上須帶有經主管機關認可的證明替代設計與佈置符合本條規定的文件的副本。

5 交換資料

主管機關須向本組織通報其所認可的有關替代設計與佈置的相關資料，以向所有締約政府轉發。

6 條件變化後的重新評估

如替代設計與佈置中規定的假設和操作限制出現變化，須按照變化後的條件進行工程評估，並獲得主管機關的認可。”

第 II-2 章

構造－消防、探火及滅火

第 3 條 定義

3 將下列新的第 51 和 52 款加在現有第 50 款之後：

“51 *事故中的安全區*係指從可居住性的角度而言，任何未進水的或發生火災的主豎區之外的區域，其中可安全地容納船上所有人員，使其不受生命或健康威脅，並向其提供基本服務。

52 *安全中心*係指專用於管理緊急情況的控制站。對安全系統的運作，控制和（或）監測是該安全中心的組成部分。”

第 7 條 探測和報警

4 將下列新的第 2.4 款加在現有第 2.3 款之後：

“2.4 客船固定試探火和失火報警系統須能夠遠距離單獨識別每一個探測器及手動報警點。”

5 將下列新的案文加在第 5.2 和 5.3.1 款末尾：

“安裝在艙室中的探測器在被觸發時，須能夠在其所在處所中發出或引發聲響警報。”

第 8 條 控制煙氣傳播

6 將下列新的句子加在第 2 款末尾：

“安全中心的通風系統可為駕駛室通風系統的分支，但位於相鄰主豎區者除外。”

第 9 條 火情控制

7 從第 2.2.3.2.2（7）款中刪去“小賣部”。

8 在第 2.2.3.2.2（8）款中加上“小賣部”。

9 在列表 9.3 和 9.4 的註解中，將下列句子加在註腳“c”末尾：

“當安全中心位於駕駛室之中時，駕駛室和安全中心之間的隔斷不需要耐火等級。”

10 將下列新的第 2.2.7 款加在第 2.2.6 款之後：

“2.2.7 *中庭的保護*

2.2.7.1 中庭須位於“A”級分隔結構的圍壁之中。其圍壁的耐火等級按照所適用的列表 9.2 和 9.4 確定。

2.2.7.2 分隔中庭內處所的甲板，其耐火等級須按照所適用的列表 9.2 和 9.4 確定。”

11 將現有第 7.5.1 款重新編為第 7.5.1.1 款，並將下列新的第 7.5.1.2 款加在該款之後：

“7.5.1.2 安裝在開敞甲板上的炊事設備爐灶的排風道，在穿過居住處所或具有可燃物質的處所時，須符合第 7.5.1.1 款中的適用要求。”

12 將下列新的第 7.6 款加在現有第 7.5.2.1 款之後：

“7.6 *載有 36 名以上旅客的客船上的主洗衣房通風系統*

主洗衣房的排風道須裝有：

.1 易於拆下清洗的過濾器；

.2 位於風道下端可自動和遙控操作的阻火器；

.3 從該處所內部關閉排風扇和進風扇及操縱第 7.6.2 款所述阻火器的遙控裝置；及

.4 位置適當的有蓋開口以供檢查和清洗之用。”

第 10 條 滅火

13 在第 6.4 款的第一句話中，於“設備”和“須”之間，加入“安裝在圍壁處所中或開敞甲板上”。

第 13 條 逃生手段

14 在第 3.2.3 款中，刪去第三句中“公共處所”一詞並在第四句之前加入下列新的句子：

“公共處所亦可具有直通樓梯間的通道，但劇場後臺除外。”

15 將下列新的第 3.2.5.3 款加在現有第 3.2.5.2 款之後：

“3.2.5.3 如獲主管機關根據本組織制定的指南所給與的認可，亦可接受替代撤離導向系統以取代第 3.2.5.1 款所要求的逃生路徑照明系統。”

16 將下列新的第 21、22 和 23 條加在現有第 20 條之後：

“第 21 條 事故門限、安全返港及安全區

1 適用範圍

2010 年 7 月 1 日及以後建造、按照第 II-1/2.5 條的定義長度為 120 米及以上，或具有三個及以上主豎區的客船須符合本條的規定。

2 目的

本條款的目的是確定設計標準，使船舶在發生未超出第 3 款所規定門限的事故後，依靠自身動力安全返港；本條款還提出了安全區的功能性要求和性能標準。

3 事故門限

就失火而言，事故門限包括：

.1 失去原發處所直至最近的“A”級邊界，如該原發處所受固定式滅火系統保護，該邊界可以是原發處所的一部分；或

.2 失去原發處所以及相鄰處所直至最近的“A”級邊界，該邊界並非原發處所的一部分。

4 安全返港

當火損未超出第 3 款所界定的門限時，船舶須能夠返港，同時提供第 3.51 條所界定的安全區。為被視為有能力返港，在船上未受失火影響部分的下列系統須維持運轉：

.1 推進系統；

.2 操舵系統和操舵－控制系統；

.3 導航系統；

.4 燃油注入、轉輸和服務系統；

.5 駕駛台、輪機處所、安全中心、滅火隊及控損隊之間的內部通訊系統、以及通知和集合旅客和船員所需的內部通訊系統；

.6 對外通訊系統；

.7 消防總管系統；

.8 固定式滅火系統；

.9 火、煙探測系統；

.10 艙底水及壓載系統；

.11 動力操作的水密和半水密門；

.12 預計支持第 5.1.2 款所述“安全區”的系統；

.13 進水探測系統；及

.14 主管機關認定的對控損努力至關重要的其他系統。

5 安全區

5.1 ***功能性要求*****：**

.1 安全區一般須為內部處所，但主管機關在考慮到運營區域的任何限制和有關預期環境狀況後，亦可允許將某外部處所用作安全區；

.2 安全區須向所有居住者提供下列基本服務，以確保旅客和船員的健康得以維持：

.1 衛生設施；

.2 水；

.3 食物；

.4 後備醫療處所；

.5 風雨遮蔽；

.6 防暑防寒設施；

.7 照明；及

.8 通風；

.3 通風設計須減少可能影響安全區使用的煙和熱氣風險；及

.4 定為或用作安全區的每一區域須設有通往救生設備的通道，並要考慮到某一主豎區可能無法從內部穿行。

5.2 *後備醫療處所*

後備醫療處所須符合主管機關認可的標準。

第 22 條 在失火事故後維持運行的系統的設計標準

1 適用範圍

2010 年 7 月 1 日及之後建造，按照 II-1/2.2 條的定義長度為 120 米及以上，或具有三個及以上主豎區的客船須符合本條的規定。

2 目的

本規定的目的是為在超出第 21.3 款界定的事故門限後，為支持有序撤離及棄船而需要維持運行的系統定出設計標準。

3 系統

3.1 一旦任何一個主豎區因失火而無法使用，下列系統的佈置與分隔須能確保維持運行：

.1 消防總管；

.2 內部通訊（支援通知和集合旅客和船員所需要的滅火工作）；

.3 對外通訊手段；

.4 排除滅火用水的艙底水系統；

.5 逃生通道沿線、集中站和救生設備登乘站的照明；及

.6 須設有撤離導向系統。

3.2 上述系統，在假設無法使用的主豎區之外無損壞的情況下，須能運行至少 3 小時。這些系統毋須在無法使用的主豎區內維持運行。

3.3 就 3.1 款而言，在按照“A-60”標準建造的圍阱之內穿過無法使用的主豎區的電纜和管線須被視為完好及可用。主管機關可認可同等程度的電纜及管線保護。

第 23 條 客船上的安全中心

1 適用範圍

2010 年 7 月 1 日及之後建造的客船須在船上設有符合本條要求的安全中心。

2 目的

本條旨在為協助管理緊急情況的處所作出規定。

3 位置與佈置

安全中心須為駕駛室的一部分或者位於與駕駛室相鄰的處所但有直通駕駛室的入口，以使對緊急情況的管理不致影響到當班駕駛員的駕駛職責。

4 佈局和人機工程設計

安全中心的佈局和人機工程設計須酌情考慮到本組織制定的指南。

5 通訊

安全中心、中央控制站、駕駛室、機艙控制室、消防系統儲藏室和消防設備儲藏間之間須設有通訊手段。

6 安全系統的控制與監測

儘管公約中有其他要求，安全中心須具有下列安全系統的全部功能（操作、控制、監測或所需要的任何組合）：

.1 所有動力通風系統；

.2 防火門；

.3 總緊急報警系統；

.4 公共廣播系統；

.5 電動撤離導向系統；

.6 水密和半水密門；

.7 船殼門、裝貨門和其他關閉裝置的顯示器；

.8 內（外）首門、尾門及任何其他船殼門的漏水；

.9 電視監視系統；

.10 探火及報警系統；

.11 固定式局部滅火系統；

.12 灑水和同類系統；

.13 機器處所的水基滅火系統；

.14 召集船員用的警報系統；

.15 中庭排煙系統；

.16 進水探測系統；及

.17 消防泵及應急消防泵。”

第 III 章

救生設備與佈置

第 4 條 救生設備與佈置的評估、測試和認可

17 第 3 款由下列文字取代：

“3 在認可新穎救生設備或佈置之前，主管機關須確保：

.1 此設備所達到的安全標準至少與本章和《規則》的要求相等，並已根據本組織制定的指南加以評估及測試；或

.2 此佈置已按照第 38 條成功地進行了工程分析、評估與認可。”

18 將下列新的 C 部分加在現有第 37 條之後：

“C 部分

替代設計與佈置

第 38 條 替代設計與佈置

1 目的

本條旨在為救生設備與佈置提供替代設計與佈置的方法。

2 通則

2.1 如其替代設計與佈置能滿足有關要求的意圖並能提供和本章同等的安全水平，救生設備與佈置可以偏離 B 部分中的要求。

2.2 當替代設計與佈置偏離於 B 部分中的條文要求時，須按照本條規定對該設計與佈置進行工程分析、評估與認可。

3 工程分析

工程分析須按本組織制定的指南準備並向主管機關提交，並須至少包含下列內容：

.1 確定船舶類型和有關救生設備與佈置；

.2 給出該救生設備與佈置將滿足不了的條文要求；

.3 給出擬議設計不滿足該條文要求的理由並以符合其他公認的工程或工業標準為證據；

.4 確定有關條文要求所闡明的關於該船舶和救生設備與佈置的性能標準：

.4.1 性能標準所達到的安全水平須不低於 B 部分中相關條文要求；及

.4.2 性能標準須能量化並能衡量；

.5 替代設計和佈置的詳細描述，包括列明設計中所使用的假設及任何建議的操作限制或條件；

.6 證明替代設計和佈置達到安全性能標準的技術證據；及

.7 查明該建議的有關潛在不足和危險後所做的風險評估。

4 替代設計與佈置的評估

4.1 主管機關須參照本組織制定的指南對第 3 款所要求的工程分析加以評估及認可。

4.2 船上須帶有經主管機關認可的證明替代設計與佈置符合本條規定的文件的副本。

5 交換資料

主管機關須向本組織通報其認可的有關替代設計與佈置的相關資料，以向所有締約政府轉發。

6 條件變化後的重新評估

如替代設計與佈置中規定的假設和操作限制出現變化，須按照變化後的條件進行工程評估，並獲得主管機關的認可。”

RESOLUTION MSC.216(82)

(adopted on 8 December 2006)

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-second session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in Annexes 1, 2 and 3 to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that:

(a) the said amendments, set out in Annex 1, shall be deemed to have been accepted on 1 January 2008;

(b) the said amendments, set out in Annex 2, shall be deemed to have been accepted on 1 July 2008; and

(c) the said amendments, set out in Annex 3, shall be deemed to have been accepted on 1 January 2010,

unless, prior to those dates, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention:

(a) the amendments, set out in Annex 1, shall enter into force on 1 July 2008;

(b) the amendments, set out in Annex 2, shall enter into force on 1 January 2009; and

(c) the amendments, set out in Annex 3, shall enter into force on 1 July 2010,

upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in Annexes 1, 2 and 3 to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annexes 1, 2 and 3 to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX 1

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A-1
STRUCTURE OF SHIPS

Regulation 3-2 – Corrosion prevention of seawater ballast tanks in oil tankers and bulk carriers

1 The existing text and the heading of regulation 3-2 are replaced by the following:

"Protective coatings of dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers

1 Paragraphs 2 and 4 of this regulation shall apply to ships of not less than 500 gross tonnage:

.1 for which the building contract is placed on or after 1 July 2008; or

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009; or

.3 the delivery of which is on or after 1 July 2012.

2 All dedicated seawater ballast tanks arranged in ships and double-side skin spaces arranged in bulk carriers of 150 m in length and upwards shall be coated during construction in accordance with the Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.215(82), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than chapter I.

3 All dedicated seawater ballast tanks arranged in oil tankers and bulk carriers constructed on or after 1 July 1998, for which paragraph 2 is not applicable, shall comply with the requirements of regulation II-1/3-2 adopted by resolution MSC.47(66).

4 Maintenance of the protective coating system shall be included in the overall ship's maintenance scheme. The effectiveness of the protective coating system shall be verified during the life of a ship by the Administration or an organization recognized by the Administration, based on the guidelines developed by the Organization."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 1 – Application

2 In paragraph 2.2.3, the second occurrence of the word "and" is deleted.

3 In paragraph 2.2.4, "." is replaced by "; and".

4 In paragraph 2.2, the following new subparagraph .5 is added after the existing subparagraph .4:

".5 regulations 5.3.1.3.2 and 5.3.4 to passenger ships not later than the date of the first survey after 1 July 2008."

Regulation 3 – Definitions

5 The following new paragraph 53 is added after the existing paragraph 52:

"53 *Cabin balcony* is an open deck space which is provided for the exclusive use of the occupants of a single cabin and has direct access from such a cabin."

Regulation 4 – Probability of ignition

6 The following text is added at the end of paragraph 5.2.3:

"except that "A-0" class standard is acceptable for windows and sidescuttles outside the limit specified in regulation 9.2.4.2.5."

7 In paragraph 4.4, the words "or if applied on cabin balconies of passenger ships constructed on or after 1 July 2008," are added between the words "stations" and "shall".

Regulation 5 – Fire growth potential

8 In paragraph 3.1.2.1, the last sentence is deleted.

9 The following new paragraph 3.1.3 is inserted:

"3.1.3 *Partial bulkheads and decks on passenger ships*

3.1.3.1 Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall be of non-combustible materials.

3.1.3.2 Linings, ceilings and partial bulkheads or decks used to screen or to separate adjacent cabin balconies shall be of non-combustible materials. Cabin balconies on passenger ships constructed before 1 July 2008 shall comply with the requirements of this paragraph by the first survey after 1 July 2008."

10 In the first sentence of paragraph 3.2.1.1, the words "and cabin balconies" are added between the words "spaces" and "which", and the following new sentence is added at the end of the paragraph:

"However, the provisions of paragraph 3.2.3 need not be applied to cabin balconies."

11 The following new subparagraph .3 is added to the existing paragraph 3.2.4.1:

".3 exposed surfaces of cabin balconies, except for natural hard wood decking systems."

12 The following new paragraph 3.4 is added after the existing paragraph 3.3:

"3.4 *Furniture and furnishings on cabin balconies of passenger ships*

On passenger ships, furniture and furnishings on cabin balconies shall comply with regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7 unless such balconies are protected by a fixed pressure water-spraying and fixed fire detection and fire alarm systems complying with regulations 7.10 and 10.6.1.3. Passenger ships constructed before 1 July 2008 shall comply with the requirements of this paragraph by the first survey after 1 July 2008."

Regulation 6 – Smoke generation potential and toxicity

13 The existing paragraph 2 is renumbered as paragraph 2.1.

14 The following new paragraph 2.2 is added after the renumbered paragraph 2.1:

"2.2 On passenger ships constructed on or after 1 July 2008, paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code."

15 The existing paragraph 3 is renumbered as paragraph 3.1.

16 The following new paragraph 3.2 is added after the renumbered paragraph 3.1:

"3.2 On passenger ships constructed on or after 1 July 2008, primary deck coverings on cabin balconies shall not give rise to smoke, toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code."

Regulation 7 – Detection and alarm

17 The following new paragraph 10 is added after the existing paragraph 9.4:

"**10 Protection of cabin balconies on passenger ships**

A fixed fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which regulation 5.3.4 applies, when furniture and furnishings on such balconies are not as defined in regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7."

Regulation 9 – Containment of fire

18 The following new paragraph 2.2.6 is added after the existing paragraph 2.2.5.2:

"2.2.6 *Arrangement of cabin balconies*

On passenger ships constructed on or after 1 July 2008, non-load bearing partial bulkheads which separate adjacent cabin balconies shall be capable of being opened by the crew from each side for the purpose of fighting fires."

Regulation 10 – Fire fighting

19 The heading of paragraph 6.1 is replaced by the following:

"6.1 *Sprinkler and water-spraying systems in passenger ships*"

20 The following new paragraph 6.1.3 is added after the existing paragraph 6.1.2:

"6.1.3 A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which regulation 5.3.4 applies, where furniture and furnishings on such balconies are not as defined in regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7."

CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

Regulation 6 – Communications

21 Paragraph 4.3 is replaced by the following:

"4.3 The general emergency alarm system shall be audible throughout all the accommodation and normal crew working spaces. On passenger ships, the system shall also be audible on all open decks."

Regulation 11 – Survival craft muster and embarkation arrangements

22 In the first sentence of paragraph 7, the word "unfavourable" is replaced by the word "all" and the unit "°" is inserted after the terms "10" and "20".

Regulation 14 – Stowage of rescue boats

23 The words ", and if the inflated type, in a fully inflated condition at all times" are added at the end of subparagraph .1.

Regulation 19 – Emergency training and drills

24 Paragraph 3.3.4 is replaced by the following:

"3.3.4 In the case of a lifeboat arranged for free-fall launching, at least once every three months during an abandon ship drill, the crew shall board the lifeboat, properly secure themselves in their seats and commence launch procedures up to, but not including, the actual release of the lifeboat (i.e., the release hook shall not be released). The lifeboat shall then either be free-fall launched with only the required operating crew on board, or lowered into the water by means of the secondary means of launching with or without the

operating crew on board. In both cases, the lifeboat shall thereafter be manoeuvred in the water by the operating crew. At intervals of not more than six months, the lifeboat shall either be launched by free-fall with only the operating crew on board, or simulated launching shall be carried out in accordance with the guidelines developed by the Organization."

Regulation 20 – Operational readiness, maintenance and inspections

25 Paragraphs 4.1 and 4.2 are replaced by the following:

"Falls used in launching shall be inspected periodically with special regard for areas passing through sheaves, and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier."

26 In the third sentence of paragraph 6.2, the words "it should be run for such period as prescribed in the manufacturer's handbook" are replaced by the words "a suitable water supply may be provided".

27 The heading of paragraph 8 is replaced by the following:

"8 Servicing of inflatable liferafts, inflatable lifejackets, marine evacuation systems and maintenance and repair of inflated rescue boats"

28 The second sentence of paragraph 11.1.3 is replaced by the following:

"The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals not exceeding five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment."

29 The chapeau of paragraph 11.2 is replaced by the following:

"11.2 Lifeboat or rescue boat on-load release gear, including free-fall lifeboat release systems, shall be:"

30 In the first sentence of paragraph 11.2.3, the word "lifeboat" is replaced by the word "boat".

31 The following new paragraph 11.3 is added to the regulation:

"11.3 Davit-launched liferaft automatic release hooks shall be:

.1 maintained in accordance with instructions for on-board maintenance as required by regulation 36;

.2 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8 by properly trained personnel familiar with the system; and

.3 operationally tested under a load of 1.1 times the total mass of the liferaft when loaded with its full complement of persons and equipment whenever the automatic release hook is overhauled. Such over-hauling and test shall be carried out at least once every five years."

Regulation 21 – Survival craft and rescue boats

32 The chapeau of paragraph 1.2 is replaced by the following:

"1.2 Passenger ships engaged on short international voyages shall carry:"

33 Paragraph 1.3 is deleted and the remaining paragraphs are renumbered accordingly.

34 In paragraph 1.4, the words "after all persons have been assembled, with lifejackets donned" are added at the end of the paragraph.

35 Paragraph 2.3 is replaced by the following:

"2.3 A lifeboat may be accepted as a rescue boat provided that it and its launching and recovery arrangements also comply with the requirements for a rescue boat."

36 In paragraph 3.2, the words "and complying with the special standards of subdivision prescribed by regulation II-1/6.5" are deleted.

Regulation 26 – Additional requirements for ro-ro passenger ships

37 In paragraph 3.1, the words "approved by the Administration having regard for the recommendations approved by the Organization" are replaced by the words "complying with section 5.1.4 of the Code".

38 In paragraph 3.2, all the words after the word "appliance" are replaced by the words "complying with section 6.1.7 of the Code".

Regulation 31 – Survival craft and rescue boats

39 Subparagraph .2 of paragraph 1.1 is replaced by the following:

".2 in addition, one or more inflatable or rigid liferafts, complying with the requirements of section 4.2 or 4.3 of the Code, of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, and of such aggregate capacity as will accommodate the total number of persons on board. If the liferaft or liferafts are not of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, the total capacity available on each side shall be sufficient to accommodate the total number of persons on board."

40 Subparagraph .2 of paragraph 1.3 is replaced by the following:

".2 unless the liferafts required by paragraph 1.3.1 are of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, additional liferafts shall be provided so that the total capacity available on each side will accommodate 150% of the total number of persons on board;"

41 Subparagraph .4 of paragraph 1.3 is replaced by the following:

".4 in the event of any one survival craft being lost or rendered unserviceable, there shall be sufficient survival craft available for use on each side, including any which are of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, to accommodate the total number of persons on board."

42 The second sentence of paragraph 2 is replaced by the following:

"A lifeboat may be accepted as a rescue boat, provided that it and its launching and recovery arrangements also comply with the requirements for a rescue boat."

Regulation 32 – Personal life-saving appliances

43 In the first sentence of paragraph 3.2, the words "of an appropriate size," are inserted between the words "suit" and "complying".

44 In paragraph 3.3, the words "including remotely located survival craft carried in accordance with regulation 31.1.4", are inserted between the words "stowed," and "additional" and the words "of an appropriate size" are inserted between the words "suits" and "shall".

Regulation 35 – Training manual and on-board training aids

45 The following new paragraph 5 is added after the existing paragraph 4:

"5 The training manual shall be written in the working language of the ship."

CHAPTER XII
ADDITIONAL SAFETY MEASURES FOR BULK CARRIERS

Regulation 6 – Structural and other requirements for bulk carriers

46 The existing paragraph 3 is deleted and the existing paragraphs 4 and 5 are renumbered as paragraphs 3 and 4.

Regulation 12 – Hold, ballast and dry space water ingress alarms

47 In paragraph 1.2, the reference to "regulation II-1/11" is replaced by the reference to "regulation II-1/12".

Regulation 13 – Availability of pumping systems

48 In paragraph 1, the reference to "regulation II-1/11.4" is replaced by the reference to "regulation II-1/12".

APPENDIX
CERTIFICATES

49 In the Passenger Ship Safety Certificate, Cargo Ship Safety Construction Certificate and Cargo Ship Safety Certificate, the phrase "Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced ....." is replaced by the following:

"Date of build:

– Date of building contract .....

– Date on which keel was laid or ship was at similar stage of construction .....

– Date of delivery .....

– Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable) .....

All applicable dates shall be completed."

Record of Equipment for the Passenger Ship Safety Certificate (Form P)

50 In the Record of Equipment for the Passenger Ship Safety Certificate (Form P), the following new item 4.2 is inserted in section 5 after item 4:

"4.2 Long-range identification and tracking system",

and item 4 (Automatic identification system (AIS)) is renumbered as item 4.1.

Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)

51 In the Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E), the following new item 4.2 is inserted in section 3 after item 4:

"4.2 Long-range identification and tracking system",

and item 4 (Automatic identification system (AIS)) is renumbered as item 4.1.

Record of Equipment for the Cargo Ship Safety Certificate (Form C)

52 In the Record of Equipment for the Cargo Ship Safety Certificate (Form C), the following new item 4.2 is inserted in section 5 after item 4:

"4.2 Long-range identification and tracking system",

and item 4 (Automatic identification system (AIS)) is renumbered as item 4.1.

Form of Safety Certificate for Nuclear Passenger Ships

53 In the table of paragraph 2.1.3, in the section commencing with the words "THIS IS TO CERTIFY:", the reference to "regulation II-1/13" is replaced by the reference to "regulation II-1/18".

ANNEX 2

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

1 The existing text of parts A, B and B-1 of the chapter is replaced by the following:

"PART A
GENERAL

Regulation 1
Application

1.1 Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009.

1.2 For the purpose of this chapter, the term *a similar stage of construction* means the stage at which:

.1 construction identifiable with a specific ship begins; and

.2 assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

1.3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *all ships* means ships constructed before, on or after 1 January 2009;

.3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences;

.4 the expression *alterations and modifications of a major character* means, in the context of cargo ship subdivision and stability, any modification to the construction which affects the level of subdivision of that ship. Where a cargo ship is subject to such modification, it shall be demonstrated that the *A*/*R* ratio calculated for the ship after such modifications is not less than the *A*/*R* ratio calculated for the ship before the modification. However, in those cases where the ship's *A*/*R* ratio before modification is equal to or greater than unity, it is only necessary that the ship after modification has an *A* value which is not less than *R*, calculated for the modified ship.

2 Unless expressly provided otherwise, for ships constructed before 1 January 2009, the Administration shall ensure that the requirements which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57), MSC.19(58), MSC.26(60), MSC.27(61), Resolution 1 of the 1995 SOLAS Conference, MSC.47(66), MSC.57(67), MSC.65(68), MSC.69(69), MSC.99(73), MSC.134(76), MSC.151(78) and MSC.170(79) are complied with.

3 All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before the date on which any relevant amendments enter into force, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after the date on which any relevant amendments enter into force, in so far as the Administration deems reasonable and practicable.

4 The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

5 In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

.1 the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and

.2 the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2
Definitions

For the purpose of this chapter, unless expressly provided otherwise:

1 *Subdivision length (L_s)* of the ship is the greatest projected moulded length of that part of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision draught.

2 *Mid-length* is the mid-point of the subdivision length of the ship.

3 *Aft terminal* is the aft limit of the subdivision length.

4 *Forward terminal* is the forward limit of the subdivision length.

5 *Length (L)* is the length as defined in the International Convention on Load Lines in force.

6 *Freeboard deck* is the deck as defined in the International Convention on Load Lines in force.

7 *Forward perpendicular* is the forward perpendicular as defined in the International Convention on Load Lines in force.

8 *Breadth (B)* is the greatest moulded breadth of the ship at or below the deepest subdivision draught.

9 *Draught (d)* is the vertical distance from the keel line at mid-length to the waterline in question.

10 *Deepest subdivision draught (d_s)* is the waterline which corresponds to the summer load line draught of the ship.

11 *Light service draught (d_l)* is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability and/or immersion. Passenger ships should include the full complement of passengers and crew on board.

12 *Partial subdivision draught (d_p)* is the light service draught plus 60% of the difference between the light service draught and the deepest subdivision draught.

13 *Trim* is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft terminals respectively, disregarding any rake of keel.

14 *Permeability (μ)* of a space is the proportion of the immersed volume of that space which can be occupied by water.

15 *Machinery spaces* are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.

16 *Weathertight* means that in any sea conditions water will not penetrate into the ship.

17 *Watertight* means having scantlings and arrangements capable of preventing the passage of water in any direction under the head of water likely to occur in intact and damaged conditions. In the damaged condition, the head of water is to be considered in the worst situation at equilibrium, including intermediate stages of flooding.

18 *Design pressure* means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand.

19 *Bulkhead deck* in a passenger ship means the uppermost deck at any point in the subdivision length (L_s) to which the main bulkheads and the ship's shell are carried watertight and the lowermost deck from which passenger and crew evacuation will not be impeded by water in any stage of flooding for damage cases defined in regulation 8 and in part B-2 of this chapter. The bulkhead deck may be a stepped deck. In a cargo ship the freeboard deck may be taken as the bulkhead deck.

20 *Deadweight* is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the draught corresponding to the assigned summer freeboard and the lightweight of the ship.

21 *Lightweight* is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

22 *Oil tanker* is the oil tanker defined in regulation 1 of Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

23 *Ro-ro passenger ship* means a passenger ship with ro-ro spaces or special category spaces as defined in regulation II-2/3.

24 *Bulk carrier* means a bulk carrier as defined in regulation XII/1.1.

25 *Keel line* is a line parallel to the slope of the keel passing amidships through:

.1 the top of the keel at centreline or line of intersection of the inside of shell plating with the keel if a bar keel extends below that line, on a ship with a metal shell; or

.2 in wood and composite ships, the distance is measured from the lower edge of the keel rabbet. When the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inward intersects the centreline amidships.

26 *Amidship* is at the middle of the length (*L*).

Regulation 3
Definitions relating to parts C, D and E

For the purpose of parts C, D and E, unless expressly provided otherwise:

1 *Steering gear control system* is the equipment by which orders are transmitted from the navigating bridge to the steering gear power units. Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

2 *Main steering gear* is the machinery, rudder actuators, steering gear, power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g., tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions.

3 *Steering gear power unit* is:

.1 in the case of electric steering gear, an electric motor and its associated electrical equipment;

.2 in the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump; or

.3 in the case of other hydraulic steering gear, a driving engine and connected pump.

4 *Auxiliary steering gear* is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose.

5 *Normal operational and habitable condition* is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally.

6 *Emergency condition* is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electrical power.

7 *Main source of electrical power* is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions.

8 *Dead ship condition* is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power.

9 *Main generating station* is the space in which the main source of electrical power is situated.

10 *Main switchboard* is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services.

11 *Emergency switchboard* is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services.

12 *Emergency source of electrical power* is a source of electrical power, intended to supply the emergency switchboard in the event of a failure of the supply from the main source of electrical power.

13 *Power actuating system* is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator. The power actuating systems may share common mechanical components (i.e. tiller, quadrant and rudder stock) or components serving the same purpose.

14 *Maximum ahead service speed* is the greatest speed which the ship is designed to maintain in service at sea at the deepest seagoing draught.

15 *Maximum astern speed* is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest seagoing draught.

16 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

17 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain:

.1 internal combustion machinery used for main propulsion;

.2 internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

.3 any oil-fired boiler or oil fuel unit.

18 *Control stations* are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.

19 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either:

.1 chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee by resolution MSC.4(48), hereinafter referred to as "the International Bulk Chemical Code", as may be amended by the Organization; or

.2 chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Assembly of the Organization by resolution A.212(VII), hereinafter referred to as "the Bulk Chemical Code", as has been or may be amended by the Organization,

whichever is applicable.

20 *Gas carrier* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either:

.1 chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Maritime Safety Committee by resolution MSC.5(48), hereinafter referred to as "the International Gas Carrier Code", as may be amended by the Organization; or

.2 chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organization by resolution A.328(IX), hereinafter referred to as "the Gas Carrier Code", as has been or may be amended by the Organization,

whichever is applicable.

PART B
SUBDIVISION AND STABILITY

Regulation 4
General

1 The damage stability requirements in parts B-1 through B-4 shall apply to cargo ships of 80 m in length (L) and upwards and to all passenger ships regardless of length but shall exclude those cargo ships which are shown to comply with subdivision and damage stability regulations in other instruments developed by the Organization.

2 The Administration may, for a particular ship or group of ships, accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by these regulations is achieved. Any Administration which allows such alternative methodologies shall communicate to the Organization particulars thereof.

3 Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the subdivision length (L_s) of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest subdivision length (L_s), primarily engaged in the carriage of passengers.

4 Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Administration shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.

PART B-1
STABILITY

Regulation 5
Intact stability information

1 Every passenger ship regardless of size and every cargo ship having a length (L) of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined.

2 The Administration may allow the inclining test of an individual cargo ship to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Administration that reliable stability information for the exempted ship can be obtained from such basic data, as required by regulation 5-1. A weight survey shall be carried out upon completion and the ship shall be inclined whenever in comparison with the data derived from the sister ship, a deviation from the lightship displacement exceeding 1% for ships of 160 m or more in length and 2% for ships of 50 m or less in length and as determined by linear interpolation for intermediate lengths or a deviation from the lightship longitudinal centre of gravity exceeding 0.5% of L_s is found.

3 The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.

4 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined. The ship shall be re-inclined if anticipated deviations exceed one of the values specified in paragraph 5.

5 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L_s is found or anticipated.

6 Every ship shall have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.

Regulation 5-1
Stability information to be supplied to the master

1 The master shall be supplied with such information satisfactory to the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration.

2 The information should include:

.1 curves or tables of minimum operational metacentric height (*GM*) versus draught which assures compliance with the relevant intact and damage stability requirements, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (*KG*) versus draught, or with the equivalents of either of these curves;

.2 instructions concerning the operation of cross-flooding arrangements; and

.3 all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

3 The stability information shall show the influence of various trims in cases where the operational trim range exceeds +/- 0.5% of L_s.

4 For ships which have to fulfil the stability requirements of part B-1, information referred to in paragraph 2 are determined from considerations related to the subdivision index, in the following manner: Minimum required *GM* (or maximum permissible vertical position of centre of gravity *KG*) for the three draughts d_s, d_p and d_l are equal to the *GM* (or *KG* values) of corresponding loading cases used for the calculation of survival factor s_l. For intermediate draughts, values to be used shall be obtained by linear interpolation applied to the *GM* value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively. Intact stability criteria will also be taken into account by retaining for each draft the maximum among minimum required *GM* values or the minimum of maximum permissible *KG* values for both criteria. If the subdivision index is calculated for different trims, several required *GM* curves will be established in the same way.

5 When curves or tables of minimum operational metacentric height (*GM*) versus draught are not appropriate, the master should ensure that the operating condition does not deviate from a studied loading condition, or verify by calculation that the stability criteria are satisfied for this loading condition.

Regulation 6
Required subdivision index *R*

1 The subdivision of a ship is considered sufficient if the attained subdivision index A, determined in accordance with regulation 7, is not less than the required subdivision index R calculated in accordance with this regulation and if, in addition, the partial indices A_s, A_p and A_l are not less than $0.9R$ for passenger ships and $0.5R$ for cargo ships.

2 For all ships to which the damage stability requirements of this chapter apply, the degree of subdivision to be provided shall be determined by the required subdivision index R, as follows:

.1 In the case of cargo ships greater than 100 m in length (L_s):

$$R = 1 - \frac{128}{L_s + 152}$$

.2 In the case of cargo ships not less than 80 m in length (L_s) and not greater than 100 m in length (L_s):

$$R = 1 - [1/(1 + \frac{L_s}{100} \times \frac{R_o}{1 - R_o})]$$

where R_o is the value R as calculated in accordance with the formula in subparagraph .1.

.3 In the case of passenger ships:

$$R = 1 - \frac{5{,}000}{L_s + 2.5N + 15{,}225}$$

where:

$N = N_1 + 2N_2$
N_1 = number of persons for whom lifeboats are provided
N_2 = number of persons (including officers and crew) the ship is permitted to carry in excess of N_1.

.4 Where the conditions of service are such that compliance with paragraph 2.3 of this regulation on the basis of $N = N_1 + 2N_2$ is impracticable and where the Administration considers that a suitably reduced degree of hazard exists, a lesser value of N may be taken but in no case less than $N = N_1 + N_2$.

Regulation 7
Attained subdivision index *A*

1 The attained subdivision index A is obtained by the summation of the partial indices A_s, A_p and A_l, (weighted as shown) calculated for the draughts d_s, d_p and d_l defined in regulation 2 in accordance with the following formula:

$$A = 0.4A_s + 0.4A_p + 0.2A_l$$

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$$A = \Sigma p_i s_i$$

where:

i represents each compartment or group of compartments under consideration,

p_i accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision, as defined in regulation 7-1,

s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in regulation 7-2.

2 In the calculation of A, the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of L_s, one or more additional calculations of A are to be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation will be less than 0.5% of L_s.

3 When determining the positive righting lever (GZ) of the residual stability curve, the displacement used should be that of the intact condition. That is, the constant displacement method of calculation should be used.

4 The summation indicated by the above formula shall be taken over the ship's subdivision length (L_s) for all cases of flooding in which a single compartment or two or more adjacent compartments are involved. In the case of unsymmetrical arrangements, the calculated A value should be the mean value obtained from calculations involving both sides. Alternatively, it should be taken as that corresponding to the side which evidently gives the least favourable result.

5 Wherever wing compartments are fitted, contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing compartments are involved. Additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth B, may be added. For the purpose of this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.

6 In the flooding calculations carried out according to the regulations, only one breach of the hull and only one free surface need to be assumed. The assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher. However, if a lesser extent of damage will give a more severe result, such extent is to be assumed.

7 If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the Administration may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.

Regulation 7-1
Calculation of the factor p_i

1 The factor p_i for a compartment or group of compartments shall be calculated in accordance with paragraphs 1.1 and 1.2 using the following notations:

j = the aftmost damage zone number involved in the damage starting with No.1 at the stern;

n = the number of adjacent damage zones involved in the damage;

k = is the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line. The shell has $k = 0$;

$x1$ = the distance from the aft terminal of L_s to the aft end of the zone in question;

$x2$ = the distance from the aft terminal of L_s to the forward end of the zone in question;

b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision loadline between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor p_i and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. This vertical plane shall be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. If the upper part of a longitudinal bulkhead is below the deepest subdivision loadline the vertical plane used for determination of b is assumed to extend upwards to the deepest subdivision waterline. In any case, b is not to be taken greater than $B/2$.

If the damage involves a single zone only:

$$p_i = p(x1_j,x2_j) \cdot [r(x1_j,x2_j,b_k) - r(x1_j,x2_j,b_{k-1})]$$

If the damage involves two adjacent zones:

$$\begin{aligned} p_i = \; & p(x1_j,x2_{j+1}) \cdot [r(x1_j,x2_{j+1},b_k) - r(x1_j,x2_{j+1},b_{k-1})] \\ & - p(x1_j,x2_j) \cdot [r(x1_j,x2_j,b_k) - r(x1_j,x2_j,b_{k-1})] \\ & - p(x1_{j+1},x2_{j+1}) \cdot [r(x1_{j+1},x2_{j+1},b_k) - r(x1_{j+1},x2_{j+1},b_{k-1})] \end{aligned}$$

If the damage involves three or more adjacent zones:

$$\begin{aligned} p_i = \; & p(x1_j,x2_{j+n-1}) \cdot [r(x1_j,x2_{j+n-1},b_k) - r(x1_j,x2_{j+n-1},b_{k-1})] \\ & - p(x1_j,x2_{j+n-2}) \cdot [r(x1_j,x2_{j+n-2},b_k) - r(x1_j,x2_{j+n-2},b_{k-1})] \\ & - p(x1_{j+1},x2_{j+n-1}) \cdot [r(x1_{j+1},x2_{j+n-1},b_k) - r(x1_{j+1},x2_{j+n-1},b_{k-1})] \\ & + p(x1_{j+1},x2_{j+n-2}) \cdot [r(x1_{j+1},x2_{j+n-2},b_k) - r(x1_{j+1},x2_{j+n-2},b_{k-1})] \end{aligned}$$

and where $r(x1, x2, b_0) = 0$

1.1 The factor $p(x1, x2)$ is to be calculated according to the following formulae:

Overall normalized max damage length:	$J_{\max}$	=	10/33
Knuckle point in the distribution:	J_{kn}	=	5/33
Cumulative probability at J_{kn}:	p_k	=	11/12
Maximum absolute damage length:	$l_{\max}$	=	60 m
Length where normalized distribution ends:	L^*	=	260 m

Probability density at $J = 0$:

$$b_0 = 2\left(\frac{p_k}{J_{kn}} - \frac{1-p_k}{J_{\max} - J_{kn}}\right)$$

When $L_s \le L^*$:

$$J_m = \min\left\{J_{\max}, \frac{l_{\max}}{L_s}\right\}$$

$$J_k = \frac{J_m}{2} + \frac{1 - \sqrt{1 + (1-2p_k)b_0 J_m + \frac{1}{4}{b_0}^2 {J_m}^2}}{b_0}$$

$$b_{12} = b_0$$

When $L_s > L^*$:

$${J_m}^* = \min\left\{J_{\max}, \frac{l_{\max}}{L^*}\right\}$$

$${J_k}^* = \frac{{J_m}^*}{2} + \frac{1 - \sqrt{1 + (1-2p_k)b_0 {J_m}^* + \frac{1}{4}{b_0}^2 {J_m}^{*2}}}{b_0}$$

$$J_m = \frac{{J_m}^* \cdot L^*}{L_s}$$

$$J_k = \frac{J_k^* \cdot L^*}{L_s}$$

$$b_{12} = 2\left(\frac{p_k}{J_k} - \frac{1-p_k}{J_m - J_k}\right)$$

$$b_{11} = 4\frac{1-p_k}{(J_m - J_k)J_k} - 2\frac{p_k}{J_k^2}$$

$$b_{21} = -2\frac{1-p_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21}J_m$$

The non-dimensional damage length:

$$J = \frac{(x2 - x1)}{L_s}$$

The normalized length of a compartment or group of compartments:

J_n is to be taken as the lesser of J and J_m

1.1.1 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$J \le J_k$:

$$p(x1,x2) = p_1 = \frac{1}{6}\mathrm{J}^2(\mathrm{b}_{11}\mathrm{J} + 3\mathrm{b}_{12})$$

$J > J_k$:

$$p(x1,x2) = p_2 = -\frac{1}{3}b_{11}J_k^3 + \frac{1}{2}(b_{11}J - b_{12})J_k^2 + b_{12}JJ_k - \frac{1}{3}b_{21}(J_n^3 - J_k^3) + \frac{1}{2}(b_{21}J - b_{22})(J_n^2 - J_k^2) + b_{22}J(J_n - J_k)$$

1.1.2 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$J \le J_k$:

$$p(x1,x2) = \frac{1}{2}(p_1 + J)$$

$J > J_k$:

$$p(x1,x2) = \frac{1}{2}(p_2 + J)$$

1.1.3 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$p(x1, x2) = 1$$

1.2 The factor $r(x1, x2, b)$ shall be determined by the following formulae:

$$r(x1,x2,b) = 1-(1-C)\cdot\left[1-\frac{G}{p(x1,x2)}\right]$$

where:

$$C = 12\cdot J_b\cdot\left(-45\cdot J_b+4\right), \text{ where}$$

$$J_b = \frac{b}{15\cdot B}$$

1.2.1 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$G = G_1 = \frac{1}{2}b_{11}J_b{}^2 + b_{12}J_b$$

1.2.2 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$$G = G_2 = -\frac{1}{3}b_{11}J_0{}^3 + \frac{1}{2}\left(b_{11}J - b_{12}\right)J_0{}^2 + b_{12}JJ_0 \text{ , where}$$
$$J_0 = \min\left(J, J_b\right)$$

1.2.3 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$$G = \frac{1}{2}\cdot\left(G_2 + G_1\cdot J\right)$$

Regulation 7-2
Calculation of the factor s_i

1 The factor s_i shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this regulation.

θ_e is the equilibrium heel angle in any stage of flooding, in degrees;

θ_v is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;

GZ_{max} is the maximum positive righting lever, in metres, up to the angle θ_v;

Range is the range of positive righting levers, in degrees, measured from the angle θ_e. The positive range is to be taken up to the angle θ_v;

Flooding stage is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached.

1.1 The factor s_i, for any damage case at any initial loading condition, d_i, shall be obtained from the formula:

$$s_i = \text{minimum } \{ s_{\text{intermediate,i}} \text{ or } s_{\text{final,i}} \cdot s_{\text{mom,i}} \}$$

where:

$s_{\text{intermediate,i}}$ is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with paragraph 2;

$s_{\text{final,i}}$ is the probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with paragraph 3;

$s_{\text{mom,i}}$ is the probability to survive heeling moments, and is calculated in accordance with paragraph 4.

2 The factor $s_{\text{intermediate,i}}$ is applicable only to passenger ships (for cargo ships $s_{\text{intermediate,i}}$ should be taken as unity) and shall be taken as the least of the s-factors obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows:

$$s_{\text{intermediate,i}} = \left[\frac{GZ_{\max}}{0.05} \cdot \frac{Range}{7} \right]^{\frac{1}{4}}$$

where $GZ_{\max}$ is not to be taken as more than 0.05 m and *Range* as not more than 7°. $s_{\text{intermediate}} = 0$, if the intermediate heel angle exceeds 15°. Where cross-flooding fittings are required, the time for equalization shall not exceed 10 min.

3 The factor $s_{\text{final,i}}$ shall be obtained from the formula:

$$s_{\text{final,i}} = K \cdot \left[\frac{GZ_{\max}}{0.12} \cdot \frac{Range}{16} \right]^{\frac{1}{4}}$$

where:

$GZ_{\max}$ is not to be taken as more than 0.12 m;

Range is not to be taken as more than 16°;

$K = 1$ if $\theta_e \leq \theta_{\min}$

$K = 0$ if $\theta_e \geq \theta_{\max}$

$$K = \sqrt{\frac{\theta_{max} - \theta_e}{\theta_{max} - \theta_{min}}} \quad \text{otherwise,}$$

where:

θ_{min} is 7° for passenger ships and 25° for cargo ships; and

θ_{max} is 15° for passenger ships and 30° for cargo ships.

4 The factor $s_{mom,i}$ is applicable only to passenger ships (for cargo ships $s_{mom,i}$ shall be taken as unity) and shall be calculated at the final equilibrium from the formula:

$$s_{mom,i} = \frac{(GZ_{max} - 0.04) \cdot Displacement}{M_{heel}}$$

where:

Displacement is the intact displacement at the subdivision draught;

M_{heel} is the maximum assumed heeling moment as calculated in accordance with paragraph 4.1; and

$s_{mom,i} \leq 1$

4.1 The heeling moment M_{heel} is to be calculated as follows:

M_{heel} = maximum $\{M_{passenger}$ or M_{wind} or $M_{Survivalcraft}\}$

4.1.1 $M_{passenger}$ is the maximum assumed heeling moment resulting from movement of passengers, and is to be obtained as follows:

$M_{passenger} = (0.075 \cdot N_p) \cdot (0.45 \cdot B)$ (tm)

where:

N_p is the maximum number of passengers permitted to be on board in the service condition corresponding to the deepest subdivision draught under consideration; and

B is the beam of the ship.

Alternatively, the heeling moment may be calculated assuming the passengers are distributed with 4 persons per square metre on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment. In doing so, a weight of 75 kg per passenger is to be assumed.

4.1.2 M_{wind} is the maximum assumed wind force acting in a damage situation:

$M_{wind} = (P \cdot A \cdot Z) / 9{,}806$ (tm)

where:

P = 120 N/m^2;

A = projected lateral area above waterline;

Z = distance from centre of lateral projected area above waterline to $T/2$; and

T = ship's draught, d_i.

4.1.3 $M_{Survivalcraft}$ is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship. It shall be calculated using the following assumptions:

.1 all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;

.2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

.3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;

.4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and

.5 life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position.

5 Unsymmetrical flooding is to be kept to a minimum consistent with the efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to equalization devices are provided they shall be operable from above the bulkhead deck. These fittings together with their controls shall be acceptable to the Administration. Suitable information concerning the use of equalization devices shall be supplied to the master of the ship.

5.1 Tanks and compartments taking part in such equalization shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalization compartments is not delayed.

5.2 In all cases, s_i is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses:

.1 the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor s_i. Such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and

.2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with chapter II-2.

5.3 The factor s_i is to be taken as zero if, taking into account sinkage, heel and trim, any of the following occur in any intermediate stage or in the final stage of flooding:

.1 immersion of any vertical escape hatch in the bulkhead deck intended for compliance with chapter II-2;

.2 any controls intended for the operation of watertight doors, equalization devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck become inaccessible or inoperable;

.3 immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index *A*, if not fitted with watertight means of closure at each boundary.

5.4 However, where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of $s_{\text{intermediate,i}}$ may be calculated assuming equalization in additional flooding phases.

5.5 Except as provided in paragraph 5.3.1, openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers, remotely operated sliding watertight doors, side scuttles of the non-opening type as well as watertight access doors and hatch covers required to be kept closed at sea need not be considered.

6 Where horizontal watertight boundaries are fitted above the waterline under consideration the s-value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in paragraph 1.1 by the reduction factor v_m according to paragraph 6.1, which represents the probability that the spaces above the horizontal subdivision will not be flooded.

6.1 The factor v_m shall be obtained from the formula:

$$v_m = v(H_{j,\ n,\ m},\ d) - v(H_{j,\ n,\ m\text{-}1},\ d)$$

where:

$H_{j,\ n,\ m}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the m^{th} horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

$H_{j,\ n,\ m\text{-}1}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the $(m\text{-}1)^{\text{th}}$ horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

j signifies the aft terminal of the damaged compartments under consideration;

m represents each horizontal boundary counted upwards from the waterline under consideration;

d is the draught in question as defined in regulation 2; and

x_1 and x_2 represent the terminals of the compartment or group of compartments considered in regulation 7-1.

6.1.1 The factors $v(H_j, n, m, d)$ and $v(H_j, n, m\text{-}1, d)$ shall be obtained from the formulae:

$$v(H,d) = 0.8\frac{(H-d)}{7.8} \quad \text{, if } (H_m\text{-}d) \text{ is less than, or equal to, 7.8 m;}$$

$$v(H,d) = 0.8 + 0.2\left[\frac{(H-d)-7.8}{4.7}\right] \quad \text{in all other cases,}$$

where:

$v(H_j, n, m, d)$ is to be taken as 1, if H_m coincides with the uppermost watertight boundary of the ship within the range $(x1_{(j)}...x2_{(j+n-1)})$, and

$v(H_j, n, 0, d)$ is to be taken as 0.

In no case is v_m to be taken as less than zero or more than 1.

6.2 In general, each contribution dA to the index A in the case of horizontal subdivisions is obtained from the formula:

$$dA = p_i \cdot \left[v_1 \cdot s_{\min 1} + (v_2 - v_1) \cdot s_{\min 2} + \cdots + (1 - v_{m-1}) \cdot s_{\min m}\right]$$

where:

v_m = the v-value calculated in accordance with paragraph 6.1;
$s_{\min}$ = the least s-factor for all combinations of damages obtained when the assumed damage extends from the assumed damage height H_m downwards.

Regulation 7-3
Permeability

1 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each general compartment or part of a compartment shall be as follows:

Spaces	Permeability
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Void spaces	0.95
Intended for liquids	0 or 0.95[1]

[1] Whichever results in the more severe requirement.

2 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each cargo compartment or part of a compartment shall be as follows:

Spaces	**Permeability at draught d_s**	**Permeability at draught d_p**	**Permeability at draught d_l**
Dry cargo spaces	0.70	0.80	0.95
Container spaces	0.70	0.80	0.95
Ro-ro spaces	0.90	0.90	0.95
Cargo liquids	0.70	0.80	0.95

3 Other figures for permeability may be used if substantiated by calculations.

Regulation 8
Special requirements concerning passenger ship stability

1 A passenger ship intended to carry 400 or more persons shall have watertight subdivision abaft the collision bulkhead so that $s_i = 1$ for the three loading conditions on which is based the calculation of the subdivision index and for a damage involving all the compartments within $0.08L$ measured from the forward perpendicular.

2 A passenger ship intended to carry 36 or more persons is to be capable of withstanding damage along the side shell to an extent specified in paragraph 3. Compliance with this regulation is to be achieved by demonstrating that s_i, as defined in regulation 7-2, is not less than 0.9 for the three loading conditions on which is based the calculation of the subdivision index.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2, is to be dependent on both N as defined in regulation 6, and L_s as defined in regulation 2, such that:

.1 the vertical extent of damage is to extend from the ship's moulded baseline to a position up to 12.5 m above the position of the deepest subdivision draught as defined in regulation 2, unless a lesser vertical extent of damage were to give a lower value of s_i, in which case this reduced extent is to be used;

.2 where 400 or more persons are to be carried, a damage length of $0.03L_s$ but not less than 3 m is to be assumed at any position along the side shell, in conjunction with a penetration inboard of $0.1B$ but not less than 0.75 m measured inboard from the ship side, at right angle to the centreline at the level of the deepest subdivision draught;

.3 where less than 400 persons are carried, damage length is to be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length. If the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with paragraph 2;

.4 where 36 persons are carried, a damage length of $0.015L_s$ but not less than 3 m is to be assumed, in conjunction with a penetration inboard of $0.05B$ but not less than 0.75 m; and

.5 where more than 36, but fewer than 400 persons are carried the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, are to be obtained by linear interpolation between the values of damage length and penetration which apply for ships carrying 36 persons and 400 persons as specified in subparagraphs .4 and .2.

Regulation 8-1
System capabilities after a flooding casualty on passenger ships

1 Application

This regulation applies to passenger ships constructed on or after 1 July 2010 to which regulation II-2/21 applies.

2 Availability of essential systems in case of flooding damage

A passenger ship shall be designed so that the systems specified in regulation II-2/21.4 remain operational when the ship is subject to flooding of any single watertight compartment.

PART B-2
SUBDIVISION, WATERTIGHT AND WEATHERTIGHT INTEGRITY

Regulation 9
Double bottoms in passenger ships and cargo ships other than tankers

1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship.

2 Where a double bottom is required to be fitted the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection will be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance h measured from the keel line, as calculated by the formula:

$$h = B/20$$

However, in no case is the value of h to be less than 760 mm, and need not be taken as more than 2,000 mm.

3 Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. Other wells (e.g., for lubricating oil under main engines) may be permitted by the Administration if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation. In no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 mm.

4 A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.

5 In the case of passenger ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in regulation III/3.22, the Administration may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

6 Any part of a passenger ship or a cargo ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5 shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship.

7 In the case of unusual bottom arrangements in a passenger ship or a cargo ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8.

8 Compliance with paragraphs 6 or 7 is to be achieved by demonstrating that s_i, when calculated in accordance with regulation 7-2, is not less than 1 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom and with an extent specified in subparagraph .2 for the affected part of the ship:

.1 Flooding of such spaces shall not render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.

.2 Assumed extent of damage shall be as follows:

	For 0.3 L from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ or 14.5 m, whichever is less
Transverse extent	*B*/6 or 10 m, whichever is less	*B*/6 or 5 m, whichever is less
Vertical extent, measured from the keel line	*B*/20 or 2 m, whichever is less	*B*/20 or 2 m, whichever is less

.3 If any damage of a lesser extent than the maximum damage specified in subparagraph .2 would result in a more severe condition, such damage should be considered.

9 In case of large lower holds in passenger ships, the Administration may require an increased double bottom height of not more than *B*/10 or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph 8, but assuming an increased vertical extent.

Regulation 10
Construction of watertight bulkheads

1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed having scantlings as specified in regulation 2.17. In all cases, watertight subdivision bulkheads shall be capable of supporting at least the pressure due to a head of water up to the bulkhead deck.

2 Steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

Regulation 11
Initial testing of watertight bulkheads, etc.

1 Testing watertight spaces not intended to hold liquids and cargo holds intended to hold ballast by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test shall be carried out where practicable. This test shall be carried out in the most advanced stage of the fitting out of the ship. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test. In any case a thorough inspection of the watertight bulkheads shall be carried out.

2 The forepeak, double bottom (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of regulation 10.1.

3 Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure. The water head is in no case to be less than the top of the air pipes or to a level of 2.4 m above the top of the tank, whichever is the greater.

4 The tests referred to in paragraphs 2 and 3 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

Regulation 12
Peak and machinery space bulkheads, shaft tunnels, etc.

1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than $0.05L$ or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than $0.08L$ or $0.05L + 3$ m, whichever is the greater.

2 Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g., a bulbous bow, the distances stipulated in paragraph 1 shall be measured from a point either:

.1 at the mid-length of such extension;

.2 at a distance $0.015L$ forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

3 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 2.

4 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.

5.1 Except as provided in paragraph 5.2, the collision bulkhead may be pierced below the bulkhead deck by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead. The Administration may, however, authorize the fitting of this valve on the after side of the collision bulkhead provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

5.2 If the forepeak is divided to hold two different kinds of liquids the Administration may allow the collision bulkhead to be pierced below the bulkhead deck by two pipes, each of which is fitted as required by paragraph 5.1, provided the Administration is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.

6 Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 1 or 2 with the exception permitted by paragraph 7 and that the part of the deck which forms the step is made effectively weathertight. The extension shall be so arranged as to preclude the possibility of the bow door causing damage to it in the case of damage to, or detachment of, a bow door.

7 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck the ramp shall be weathertight over its complete length. In cargo ships the part of the ramp which is more than 2.3 m above the bulkhead deck may extend forward of the limit specified in paragraph 1 or 2. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

8 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship. All such openings shall be capable of being closed weathertight.

9 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck. In passenger ships an afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

10 In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. In passenger ships the stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the bulkhead deck will not be immersed. In cargo ships other measures to minimize the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Administration.

Regulation 13
Openings in watertight bulkheads below the bulkhead deck in passenger ships

1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship, satisfactory means shall be provided for closing these openings.

2.1 Where pipes, scuppers, electric cables, etc., are carried through watertight bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.

2.2 Valves not forming part of a piping system shall not be permitted in watertight bulkheads.

2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

3 No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in paragraph 9.1 and in regulation 14.

4 Subject to paragraph 10, not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion. Where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.

5.1 Watertight doors, except as provided in paragraph 9.1 or regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph 7 capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 s with the ship in the upright position.

5.2 The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15° either way. Consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.

5.3 Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimize the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6 All power-operated sliding watertight doors shall be provided with means of indication which will show at all remote operating positions whether the doors are open or closed. Remote operating positions shall only be at the navigation bridge as required by paragraph 7.1.5 and at the location where hand operation above the bulkhead deck is required by paragraph 7.1.4.

7.1 Each power-operated sliding watertight door:

.1 shall have a vertical or horizontal motion;

.2 shall, subject to paragraph 10, be normally limited to a maximum clear opening width of 1.2 m. The Administration may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration:

.1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and

.2 the door shall be located inboard the damage zone *B*/5;

.3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Administration;

.4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the Administration. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position;

.5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;

.6 shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to

sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door; and

.7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position, shall in no case be less than 20 s or more than 40 s with the ship in the upright position.

7.2 The electrical power required for power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by regulation 42.3.1.3 in the event of failure of either the main or emergency source of electrical power.

7.3 Power-operated sliding watertight doors shall have either:

.1 a centralized hydraulic system with two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power operating system shall be designed to minimize the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console at the navigation bridge; or

.2 an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console on the navigation bridge. Loss of stored energy indication at each local operating position shall also be provided; or

.3 an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by

regulation 42.4.2 – in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°.

For the systems specified in paragraphs 7.3.1, 7.3.2 and 7.3.3, provision should be made as follows: Power systems for power-operated watertight sliding doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

7.4 Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 m above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in operation accidentally. The direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated.

7.5 As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

7.6 The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.

7.7 Electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit will not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door. Arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck will not cause the door to open.

7.8 A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph 7.3. Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

8.1 The central operating console at the navigation bridge shall have a "master mode" switch with two modes of control: a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure, and a "doors closed" mode which shall automatically close any door that is open. The "doors closed" mode shall automatically close any door that is open. The "doors closed" mode shall permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism. The "master mode" switch shall normally be in the "local control" mode. The "doors closed" mode shall only be used in an emergency or for testing purposes. Special consideration shall be given to the reliability of the "master mode" switch.

8.2 The central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

8.3 It shall not be possible to remotely open any door from the central operating console.

9.1 If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo between deck spaces. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.

9.2 Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.

10 Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door in each watertight bulkhead larger than those specified in paragraph 7.1.2 to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 7.1.4 regarding complete closure by hand-operated gear in 90 s.

11.1 Where trunkways or tunnels for access from crew accommodation to the stokehold, for piping, or for any other purpose are carried through watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 16-1. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the bulkhead deck. The access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead.

11.2 Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Administration.

11.3 Where trunkways in connection with refrigerated cargo and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck.

Regulation 13-1
Openings in watertight bulkheads and internal decks in cargo ships

1 The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables, etc., arrangements are to be made to maintain the watertight integrity. The Administration may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.

2 Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of main power failure. Particular attention is to be paid to minimizing the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides.

3 Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open.

4 Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled. Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

5 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of internal openings shall be provided with a notice which is to be affixed to each such closing appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 14
Passenger ships carrying goods vehicles and accompanying personnel

1 This regulation applies to passenger ships designed or adapted for the carriage of goods vehicles and accompanying personnel.

2 If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $12 + A_d/25$, where A_d = total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the stowage position and at the entrance to such spaces is not less than 4 m, the provisions of regulations 13.9.1 and 13.9.2 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigation bridge to show automatically when each door is closed and all door fastenings are secured.

3 The ship may not be certified for a higher number of passengers than assumed in paragraph 2, if a watertight door has been fitted in accordance with this regulation.

Regulation 15
Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships

1 The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

2 The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.

3.1 Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision draught, or 500 mm, whichever is the greater.

3.2 All sidescuttles the sills of which are below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, as permitted by paragraph 3.1, shall be of such construction as will effectively prevent any person opening them without the consent of the master of the ship.

4 Efficient hinged inside deadlights so arranged that they can be easily and effectively closed and secured watertight, shall be fitted to all sidescuttles except that abaft one eighth of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 m plus 2.5% of the breadth of the ship above the deepest subdivision draught, the deadlights may be portable in passenger accommodation other than that for steerage passengers, unless the deadlights are required by the International Convention on Load Lines in force to be permanently attached in their proper positions. Such portable deadlights shall be stowed adjacent to the sidescuttles they serve.

5.1 No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo or coal.

5.2 Sidescuttles may, however, be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master.

6 Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Administration.

7 The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

8.1 All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

8.2.1 Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph 8.3, each separate discharge led through the shell plating from spaces below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck or with two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision draught and is always accessible for examination under service conditions. Where a valve with positive means of closing is fitted, the operating position above the bulkhead deck shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

8.2.2 The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

8.3 Machinery space, main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. In manned machinery spaces the valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

8.4 Moving parts penetrating the shell plating below the deepest subdivision draught shall be fitted with a watertight sealing arrangement acceptable to the Administration. The inboard gland shall be located within a watertight space of such volume that, if flooded, the bulkhead deck will not be submerged. The Administration may require that if such compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices must remain available in other parts of the ship.

8.5 All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.

9 Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught.

10.1 The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.

10.2 If the inboard opening is situated below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the cover shall be watertight and, in addition, an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision draught.

Regulation 15-1
External openings in cargo ships

1 All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage waterline, are required to be watertight.

2 External openings required to be watertight in accordance with paragraph 1 shall, except for cargo hatch covers, be fitted with indicators on the bridge.

3 Openings in the shell plating below the deck limiting the vertical extent of damage shall be fitted with a device that prevents unauthorized opening if they are accessible during the voyage.

4 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of external openings shall be provided with a notice affixed to each appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 16
Construction and initial tests of watertight doors, sidescuttles, etc.

1 In all ships:

.1 the design, materials and construction of all watertight doors, sidescuttles, gangway and cargo ports, valves, pipes, ash-chutes and rubbish-chutes referred to in these regulations shall be to the satisfaction of the Administration;

.2 such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and

.3 the frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

2 In passenger ships and cargo ships watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding. Where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location. The prototype test shall be carried out before the door is fitted. The installation method and procedure for fitting the door on board shall correspond to that of the prototype test. When fitted on board, each door shall be checked for proper seating between the bulkhead, the frame and the door.

Regulation 16-1
Construction and initial tests of watertight decks, trunks, etc.

1 Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.

2 Where a ventilation trunk passing through a structure penetrates the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle allowable during intermediate stages of flooding, in accordance with regulation 7-2.

3 Where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk shall be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck.

4 After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 17
Internal watertight integrity of passenger ships above the bulkhead deck

1 The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are

fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.

2 All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

3 The open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to an angle of 15°, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this paragraph are without prejudice to the provisions of the International Convention on Load Lines in force.

4 Sidescuttles, gangway, cargo and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision draught.

5 Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

Regulation 17-1
Integrity of the hull and superstructure, damage prevention and control on ro-ro passenger ships

1.1 Subject to the provisions of paragraphs 1.2 and 1.3, all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck.

1.2 Where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below, alarmed and indicated to the navigation bridge.

1.3 The Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g., the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.

2 Indicators shall be provided on the navigation bridge for all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space. The indicator system shall be designed on the fail-safe principle and shall show by visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if such door or closing appliances become

open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function "harbour/sea voyage" so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors.

3 Television surveillance and a water leakage detection system shall be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through inner and outer bow doors, stern doors or any other shell doors which could lead to flooding of special category spaces or ro-ro spaces.

PART B-3
SUBDIVISION LOAD LINE ASSIGNMENT FOR PASSENGER SHIPS

Regulation 18
Assigning, marking and recording of subdivision load lines for passenger ships

1 In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service configurations. Each service configuration so approved shall comply with part B-1 of this chapter independently of the results obtained for other modes of operation.

2 The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative configurations. The principal passenger configuration shall be taken as the mode of operation in which the required subdivision index *R* will have the highest value.

3 The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines in force.

4 The freeboard corresponding to each approved subdivision load line and the service configuration, for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

5 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

6 Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

7 A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and service configuration is submerged.

PART B-4
STABILITY MANAGEMENT

Regulation 19
Damage control information

1 There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.

2 Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.

3 General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.

4 Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship, passengers and crew.

5 In case of ships to which damage stability requirements of part B-1 apply, damage stability information shall provide the master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments.

Regulation 20
Loading of passenger ships

1 On completion of loading of the ship and prior to its departure, the master shall determine the ship's trim and stability and also ascertain and record that the ship is in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose.

2 Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.

3 The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Regulation 21
Periodical operation and inspection of watertight doors, etc., in passenger ships

1 Drills for the operating of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-chutes and rubbish-chutes shall take place weekly. In ships in which the voyage exceeds one week in duration a complete drill shall be held before leaving port, and others thereafter at least once a week during the voyage.

2 All watertight doors, both hinged and power-operated, in watertight bulkheads, in use at sea, shall be operated daily.

3 The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.

4 A record of all drills and inspections required by this regulation shall be entered in the log-book with an explicit record of any defects which may be disclosed.

Regulation 22
Prevention and control of water ingress, etc.

1 All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs 3 and 4. Watertight doors of a width of more than 1.2 m in machinery spaces as permitted by regulation 13.10 may only be opened in the circumstances detailed in that regulation. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.

2 Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 m shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Administration.

3 A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished.

4 Certain watertight doors may be permitted to remain open during navigation only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Administration only after careful consideration of the impact on ship operations and survivability. A watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

5 Portable plates on bulkheads shall always be in place before the ship leaves port, and shall not be removed during navigation except in case of urgent necessity at the discretion of the master. The necessary precautions shall be taken in replacing them to ensure that the joints are watertight. Power-operated sliding watertight doors permitted in machinery spaces in accordance with regulation 13.10 shall be closed before the ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

6 Watertight doors fitted in watertight bulkheads dividing cargo between deck spaces in accordance with regulation 13.9.1 shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the logbook.

7 Gangway, cargo and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

8 The following doors, located above the bulkhead deck, shall be closed and locked before the ship proceeds on any voyage and shall remain closed and locked until the ship is at its next berth:

.1 cargo loading doors in the shell or the boundaries of enclosed superstructures;

.2 bow visors fitted in positions as indicated in paragraph 8.1;

.3 cargo loading doors in the collision bulkhead; and

.4 ramps forming an alternative closure to those defined in paragraphs 8.1 to 8.3 inclusive.

9 Provided that where a door cannot be opened or closed while the ship is at the berth such a door may be opened or left open while the ship approaches or draws away from the berth, but only so far as may be necessary to enable the door to be immediately operated. In any case, the inner bow door must be kept closed.

10 Notwithstanding the requirements of paragraphs 8.1 and 8.4, the Administration may authorize that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers when the ship is at safe anchorage and provided that the safety of the ship is not impaired.

11 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 8 is implemented.

12 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book is made of the time of the last closing of the doors specified in paragraph 13 and the time of any opening of particular doors in accordance with paragraph 14.

13 Hinged doors, portable plates, sidescuttles, gangway, cargo and bunkering ports and other openings, which are required by these regulations to be kept closed during navigation, shall be closed before the ship leaves port. The time of closing and the time of opening (if permissible under these regulations) shall be recorded in such log-book as may be prescribed by the Administration.

14 Where in a between-decks, the sills of any of the sidescuttles referred to in regulation 15.3.2 are below a line drawn parallel to the bulkhead deck at side and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port, and they shall not be opened before the ship

arrives at the next port. In the application of this paragraph the appropriate allowance for fresh water may be made when applicable.

.1 The time of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in such log-book as may be prescribed by the Administration.

.2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 14 would apply when it was floating at its deepest subdivision draught, the Administration may indicate the limiting mean draught at which these sidescuttles will have their sills above the line drawn parallel to the bulkhead deck at side, and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

15 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

16 If cargo is carried in spaces referred to in regulation 15.5.2, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and such closing and locking shall be recorded in such log-book as may be prescribed by the Administration.

17 When a rubbish-chute, etc., is not in use, both the cover and the valve required by regulation 15.10.2 shall be kept closed and secured.

Regulation 22-1
Flooding detection systems for passenger ships carrying 36 or more persons constructed on or after 1 July 2010

A flooding detection system for watertight spaces below the bulkhead deck shall be provided based on the guidelines developed by the Organization.

Regulation 23
Special requirements for ro-ro passenger ships

1 Special category spaces and ro-ro spaces shall be continuously patrolled or monitored by effective means, such as television surveillance, so that any movement of vehicles in adverse weather conditions and unauthorized access by passengers thereto can be detected whilst the ship is underway.

2 Documented operating procedures for closing and securing all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space, shall be kept on board and posted at an appropriate place.

3 All accesses from the ro-ro deck and vehicle ramps that lead to spaces below the bulkhead deck shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth.

4 The master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in paragraph 3 is implemented.

5 The master shall ensure, before the ship leaves the berth on any voyage, that an entry in the log-book, as required by regulation 22.13, is made of the time of the last closing of the accesses referred to in paragraph 3.

6 Notwithstanding the requirements of paragraph 3, the Administration may permit some accesses to be opened during the voyage, but only for a period sufficient to permit through passage and, if required, for the essential working of the ship.

7 All transverse or longitudinal bulkheads which are taken into account as effective to confine the seawater accumulated on the ro-ro deck shall be in place and secured before the ship leaves the berth and remain in place and secured until the ship is at its next berth.

8 Notwithstanding the requirements of paragraph 7, the Administration may permit some accesses within such bulkheads to be opened during the voyage but only for sufficient time to permit through passage and, if required, for the essential working of the ship.

9 In all ro-ro passenger ships, the master or the designated officer shall ensure that, without the expressed consent of the master or the designated officer, no passengers are allowed access to an enclosed ro-ro deck when the ship is under way.

Regulation 24
Prevention and control of water ingress, etc., in cargo ships

1 Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed while at sea.

2 Notwithstanding the requirements of paragraph 3, the Administration may authorize that particular doors may be opened at the discretion of the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.

3 Watertight doors or ramps fitted to internally subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the logbook.

4 The use of access doors and hatch covers intended to ensure the watertight integrity of internal openings shall be authorized by the officer of the watch.

Regulation 25
Water level detectors on single hold cargo ships other than bulk carriers

1 Single hold cargo ships other than bulk carriers constructed before 1 January 2007 shall comply with the requirements of this regulation not later than 31 December 2009.

2 Ships having a length (*L*) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors.

3 The water level detectors required by paragraph 2 shall:

.1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

.2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.

4 The water level detectors required by paragraph 2 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck."

ANNEX 3

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART D
ELECTRICAL INSTALLATIONS

Regulation 41 – Main source of electrical power and lighting systems

1 The following new paragraph 6 is added after the existing paragraph 5:

"6 In passenger ships, supplementary lighting shall be provided in all cabins to clearly indicate the exit so that occupants will be able to find their way to the door. Such lighting, which may be connected to an emergency source of power or have a self-contained source of electrical power in each cabin, shall automatically illuminate when power to the normal cabin lighting is lost and remain on for a minimum of 30 min."

2 The following new part F is added after the existing regulation 54:

"PART F
ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 55
Alternative design and arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for machinery and electrical installations.

2 General

2.1 Machinery and electrical installation design and arrangements may deviate from the requirements set out in parts C, D and E, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this chapter.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of parts C, D and E, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization and shall include, as a minimum, the following elements:

.1 determination of the ship type, machinery, electrical installations and space(s) concerned;

.2 identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;

.3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

.4 determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):

.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in parts C, D and E; and

.2 performance criteria shall be quantifiable and measurable;

.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;

.6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

.7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

4 Evaluation of the alternative design and arrangements

4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration, taking into account the guidelines developed by the Organization.

4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation, shall be carried on board the ship.

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 3 – Definitions

3 The following new paragraphs 51 and 52 are added after the existing paragraph 50:

"51 *Safe area in the context of a casualty* is, from the perspective of habitability, any area(s) which is not flooded or which is outside the main vertical zone(s) in which a fire has occurred such that it can safely accommodate all persons onboard to protect them from hazards to life or health and provide them with basic services.

52 *Safety centre* is a control station dedicated to the management of emergency situations. Safety systems' operation, control and/or monitoring are an integral part of the safety centre."

Regulation 7 – Detection and alarm

4 The following new paragraph 2.4 is added after the existing paragraph 2.3:

"2.4 A fixed fire detection and fire alarm system for passenger ships shall be capable of remotely and individually identifying each detector and manually operated call point."

5 In paragraphs 5.2 and 5.3.1, the following new text is added at the end of the paragraphs:

"Detectors fitted in cabins, when activated, shall also be capable of emitting, or cause to be emitted, an audible alarm within the space where they are located."

Regulation 8 – Control of smoke spread

6 In paragraph 2, the following new sentence is added at the end of the paragraph:

"The ventilation system serving safety centres may be derived from the ventilation system serving the navigation bridge, unless located in an adjacent main vertical zone."

Regulation 9 – Containment of fire

7 In paragraph 2.2.3.2.2 (7), the words "Sale shops" are deleted.

8 In paragraph 2.2.3.2.2 (8), the words "Sale shops" are added.

9 In the notes for tables 9.3 and 9.4, the following sentence is added at the end of subscript "c":

"No fire rating is required for those partitions separating the navigation bridge and the safety centre when the latter is within the navigation bridge."

10 The following new paragraph 2.2.7 is added after paragraph 2.2.6:

"2.2.7 *Protection of atriums*

2.2.7.1 Atriums shall be within enclosures formed of "A" class divisions having a fire rating determined in accordance with tables 9.2 and 9.4, as applicable.

2.2.7.2 Decks separating spaces within atriums shall have a fire rating determined in accordance with tables 9.2 and 9.4, as applicable."

11 The existing paragraph 7.5.1 is renumbered as paragraph 7.5.1.1 and the following new paragraph 7.5.1.2 is added thereafter:

"7.5.1.2 Exhaust ducts from ranges for cooking equipment installed on open decks shall conform to paragraph 7.5.1.1, as applicable, when passing through accommodation spaces or spaces containing combustible materials."

12 The following new paragraph 7.6 is added after the existing paragraph 7.5.2.1:

"7.6 *Ventilation systems for main laundries in ships carrying more than 36 passengers*

Exhaust ducts from main laundries shall be fitted with:

.1 filters readily removable for cleaning purposes;

.2 a fire damper located in the lower end of the duct which is automatically and remotely operated;

.3 remote-control arrangements for shutting off the exhaust fans and supply fans from within the space and for operating the fire damper mentioned in paragraph 7.6.2; and

.4 suitably located hatches for inspection and cleaning."

Regulation 10 – Fire fighting

13 In the first sentence of paragraph 6.4, between the words "equipment" and "shall", the words "installed in enclosed spaces or on open decks" are added.

Regulation 13 – Means of escape

14 In paragraph 3.2.3, the words "public spaces" in the third sentence are deleted and the following new sentence is added before the fourth sentence:

"Public spaces may also have direct access to stairway enclosures except for the backstage of a theatre."

15 The following new paragraph 3.2.5.3 is added after the existing paragraph 3.2.5.2:

"3.2.5.3 In lieu of the escape route lighting system required by paragraph 3.2.5.1, alternative evacuation guidance systems may be accepted if approved by the Administration based on the guidelines developed by the Organization."

16 The following new regulations 21, 22 and 23 are added after the existing regulation 20:

"Regulation 21
Casualty threshold, safe return to port and safe areas

1 Application

Passenger ships constructed on or after 1 July 2010 having a length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones shall comply with the provisions of this regulation.

2 Purpose

The purpose of this regulation is to establish design criteria for a ship's safe return to port under its own propulsion after a casualty that does not exceed the casualty threshold stipulated in paragraph 3 and also provides functional requirements and performance standards for safe areas.

3 Casualty threshold

The casualty threshold, in the context of a fire, includes:

.1 loss of space of origin up to the nearest "A" class boundaries, which may be a part of the space of origin, if the space of origin is protected by a fixed fire-extinguishing system; or

.2 loss of the space of origin and adjacent spaces up to the nearest "A" class boundaries, which are not part of the space of origin.

4 Safe return to port

When fire damage does not exceed the casualty threshold indicated in paragraph 3, the ship shall be capable of returning to port while providing a safe area as defined in regulation 3.51. To be deemed capable of returning to port, the following systems shall remain operational in the remaining part of the ship not affected by fire:

.1 propulsion;

.2 steering systems and steering-control systems;

.3 navigational systems;

.4 systems for fill, transfer and service of fuel oil;

.5 internal communication between the bridge, engineering spaces, safety centre, fire-fighting and damage control teams, and as required for passenger and crew notification and mustering;

.6 external communication;

.7 fire main system;

.8 fixed fire-extinguishing systems;

.9 fire and smoke detection system;

.10 bilge and ballast system;

.11 power-operated watertight and semi-watertight doors;

.12 systems intended to support "safe areas" as indicated in paragraph 5.1.2;

.13 flooding detection systems; and

.14 other systems determined by the Administration to be vital to damage control efforts.

5 Safe area(s)

5.1 *Functional requirements:*

.1 the safe area(s) shall generally be an internal space(s); however, the use of an external space as a safe area may be allowed by the Administration taking into account any restriction due to the area of operation and relevant expected environmental conditions;

.2 the safe area(s) shall provide all occupants with the following basic services to ensure that the health of passengers and crew is maintained:

.1 sanitation;

.2 water;

.3 food;

.4 alternate space for medical care;

.5 shelter from the weather;

.6 means of preventing heat stress and hypothermia;

.7 light; and

.8 ventilation;

.3 ventilation design shall reduce the risk of smoke and hot gases that could affect the use of the safe area(s); and

.4 means of access to life-saving appliances shall be provided from each area identified or used as a safe area, taking into account that a main vertical zone may not be available for internal transit.

5.2 *Alternate space for medical care*

Alternate space for medical care shall conform to a standard acceptable to the Administration.

Regulation 22
Design criteria for systems to remain operational after a fire casualty

1 Application

Passenger ships constructed on or after 1 July 2010 having a length, as defined in regulation II-1/2.2, of 120 m or more or having three or more main vertical zones shall comply with the provisions of this regulation.

2 Purpose

The purpose of this regulation is to provide design criteria for systems required to remain operational for supporting the orderly evacuation and abandonment of a ship, if the casualty threshold, as defined in regulation 21.3, is exceeded.

3 Systems

3.1 In case any one main vertical zone is unserviceable due to fire, the following systems shall be so arranged and segregated as to remain operational:

.1 fire main;

.2 internal communications (in support of fire-fighting as required for passenger and crew notification and evacuation);

.3 means of external communications;

.4 bilge systems for removal of fire-fighting water;

.5 lighting along escape routes, at assembly stations and at embarkation stations of life-saving appliances; and

.6 guidance systems for evacuation shall be available.

3.2 The above systems shall be capable of operation for at least 3 h based on the assumption of no damage outside the unserviceable main vertical zone. These systems are not required to remain operational within the unserviceable main vertical zones.

3.3 Cabling and piping within a trunk constructed to an "A-60" standard shall be deemed to remain intact and serviceable while passing through the unserviceable main vertical zone for the purposes of paragraph 3.1. An equivalent degree of protection for cabling and piping may be approved by the Administration.

Regulation 23
Safety centre on passenger ships

1 Application

Passenger ships constructed on or after 1 July 2010 shall have on board a safety centre complying with the requirements of this regulation.

2 Purpose

The purpose of this regulation is to provide a space to assist with the management of emergency situations.

3 Location and arrangement

The safety centre shall either be a part of the navigation bridge or be located in a separate space adjacent, but having direct access, to the navigation bridge, so that the management of emergencies can be performed without distracting watch officers from their navigational duties.

4 Layout and ergonomic design

The layout and ergonomic design of the safety centre shall take into account the guidelines developed by the Organization, as appropriate.

5 Communications

Means of communication between the safety centre, the central control station, the navigation bridge, the engine control room, the storage room(s) for fire-extinguishing system(s) and fire equipment lockers shall be provided.

6 Control and monitoring of safety systems

Notwithstanding the requirements set out elsewhere in the Convention, the full functionality (operation, control, monitoring or any combination thereof, as required) of the safety systems listed below shall be available from the safety centre:

.1 all powered ventilation systems;

.2 fire doors;

.3 general emergency alarm system;

.4 public address system;

.5 electrically powered evacuation guidance systems;

.6 watertight and semi-watertight doors;

.7 indicators for shell doors, loading doors and other closing appliances;

.8 water leakage of inner/outer bow doors, stern doors and any other shell door;

.9 television surveillance system;

.10 fire detection and alarm system;

.11 fixed fire-fighting local application system(s);

.12 sprinkler and equivalent systems;

.13 water-based fire-extinguishing systems for machinery spaces;

.14 alarm to summon the crew;

.15 atrium smoke extraction system;

.16 flooding detection systems; and

.17 fire pumps and emergency fire pumps."

CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

Regulation 4 – Evaluation, testing and approval of life-saving appliances and arrangements

17 Paragraph 3 is replaced by the following:

"3 Before giving approval to novel life-saving appliances or arrangements, the Administration shall ensure that such:

.1 appliances provide safety standards at least equivalent to the requirements of this chapter and the Code and have been evaluated and tested based on the guidelines developed by the Organization; or

.2 arrangements have successfully undergone an engineering analysis, evaluation and approval in accordance with regulation 38."

18 The following new part C is added after the existing regulation 37:

"PART C
ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 38
Alternative design and arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for life-saving appliances and arrangements.

2 General

2.1 Life-saving appliances and arrangements may deviate from the requirements set out in part B, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this chapter.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of part B, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization and shall include, as a minimum, the following elements:

.1 determination of the ship type and the life-saving appliance and arrangements concerned;

.2 identification of the prescriptive requirement(s) with which the life-saving appliance and arrangements will not comply;

.3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

.4 determination of the performance criteria for the ship and the life-saving appliance and arrangements concerned addressed by the relevant prescriptive requirement(s):

.4.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in part B; and

.4.2 performance criteria shall be quantifiable and measurable;

.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;

.6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

.7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

4 Evaluation of the alternative design and arrangements

4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration, taking into account the guidelines developed by the Organization.

4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation, shall be carried on board the ship.

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration."

二零一五年十一月十八日於行政長官辦公室

辦公室主任　柯嵐

Gabinete do Chefe do Executivo, aos 18 de Novembro de 2015. — A Chefe do Gabinete, *O Lam*.

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