3.4 Thickness measurements taken mainly to evaluate the extent of corrosion, which may affect the hull girder strength, should be carried out in a systematic manner such that all longitudinal structural members are gauged, as required.

3.5 Where thickness measurements indicate substantial corrosion or wastage in excess of allowable diminution, the surveyor should direct locations for additional thickness measurements in order to delineate areas of substantial corrosion and to identify structural members for repairs/renewals.

3.6 Thickness measurements of structures in areas where close-up surveys are required should be carried out simultaneously with close-up survey.

4 Review and verification

4.1 Upon completion of the thickness measurements, the surveyor should confirm that no further gaugings are needed, or specify additional gaugings.

4.2 Where these guidelines allow the extent of thickness measurements to be reduced after special considerations by the surveyor, these special considerations should be reported, where appropriate.

4.3 In case thickness measurements are partly carried out, the extent of remaining thickness measurements should be reported for the use of the next surveyor."

第 59/2015 號行政長官公告

中華人民共和國是國際海事組織的成員國及一九七四年十一月一日訂於倫敦的《國際海上人命安全公約》的締約國；

國際海事組織大會於一九九三年十一月四日透過第A.744（18）號決議通過了《散貨船和油輪檢驗期間的強化檢查方案指南》，有關指南自一九九九年十二月二十日起適用於澳門特別行政區；

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，命令公佈包含上指指南的第A.744（18）號決議的中文及英文文本。

二零一五年六月三日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 59/2015

Considerando que a República Popular da China é um Estado Membro da Organização Marítima Internacional e um Estado Contratante da Convenção Internacional para a Salvaguarda da Vida Humana no Mar, concluída em Londres em 1 de Novembro de 1974;

Considerando igualmente que, em 4 de Novembro de 1993, a Assembleia da Organização Marítima Internacional, através da resolução A.744(18), adoptou as Directrizes relativas ao Programa Reforçado de Inspecções no âmbito das Vistorias a Graneleiros e Petroleiros, e que tais Directrizes são aplicáveis na Região Administrativa Especial de Macau desde 20 de Dezembro de 1999;

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 A.744(18), que contém as referidas Directrizes, nos seus textos em línguas chinesa e inglesa.

Promulgado em 3 de Junho de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 A.744（18）號決議

1993 年 11 月 4 日通過

散貨船和油輪檢驗期間的強化檢查方案指南

大會，

憶及《國際海事組織公約》關於大會在海上安全和防止和控制船舶造成的海洋污染的規則和指南方面的職責的第 15（j）條，

還憶及關於運輸散裝固體貨物船舶的安全的第 A.713（17）號決議規定了為改進運輸散裝固體貨物船舶的安全而採取的臨時措施，

進一步憶及大會要求海上安全委員會的高度優先性執行關於運輸散裝固體貨物船舶安全的工作，特別是制訂這類船舶的強化檢查方案的要求，

又憶及海上環境保護委員會以第 MEPC.52(32)號決議通過《1973 年國際防止船舶造成污染公約的 1978 年議定書》附件有關新的規則第 13F 和 13G 條的修正案和《73/78 年防污公約》附件 I 的有關修正案，改進油輪的設計和建造要求，防止在碰撞和擱淺時發生油污，

注意到按照上述第 13G 條規定，應對等於和大於 20,000 載重噸的原油油輪和等於和大於 20,000 載重噸的成品油輪實施強化檢查方案，其範圍和頻率應至少符合本組織制訂的指南，

認識到為進一步促進安全和防止海洋污染，還需要提供所有油輪的強化檢驗方案的指南，

審議了海上安全委員會在其第六十二次會議和海上環境保護委員會在其第三十四次會議作出的建議，

1. 通過：

.1 載於本決議附件 A 中的《散貨船在檢驗期間的強化檢查方案指南》和

.2 載於本決議附件 B 中的《油輪檢驗期間的強化檢查方案指南》；

2. 請各國政府儘早分別對散貨船和油輪使用本指南；

3. 要求海上安全委員會和海上環境保護委員會根據應用中取得的經驗，不斷檢查本指南並作出必要更新。

附件 A

散貨船檢驗期間的強化檢查方案指南

目錄

附件 8 厚度測量的建議程序

附錄 1 一般參數

附錄 2 厚度測量報告

附錄 3 厚度測量指南

散貨船檢驗期間的檢查強化檢查方案指南

1 總則

1.1 適用範圍*

1.1.1 本指南應適用於船體結構和貨艙、隔離艙、管隧、貨船長度區域內的空處所和所有壓載水艙的管路系統的檢驗。該檢驗應在經修正的《1974 年安全公約》規定的檢驗期間進行。

1.1.2 本指南載有檢查厚度測量和液艙測試的範圍。當發現嚴重鏽蝕和／或結構性缺陷時，應擴大檢驗，在必要時檢驗應包括額外的細節檢驗。

1.2 定義

1.2.1 散貨船係指通常為單甲板結構、貨艙處所中有頂邊水艙和漏斗式邊艙、主要預定用於運輸散裝乾貨的船舶，包括礦砂運輸船和混合散裝貨船等船型。**

1.2.2 壓載水艙係指用於裝載壓載水的液艙，包括壓載水邊艙、雙層底壓載水處所、頂邊水艙、漏斗式邊艙和尖艙。

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* 本指南的目的是確保進行適當水平的計劃和文件的檢查並在應用中達到一致性。檢驗報告、檢驗方案和計劃文件等等的這類評估應在主管機關或該主管機關認可的組織的管理層進行。

** 載於本決議附件 B 中的《關於油輪檢驗期間的強化檢查方案的指南》中規定了對混裝船的補充要求。

1.2.3 處所係指單獨的艙室、包括艙和液艙。

1.2.4 全面檢驗係指旨在對船體全面狀況作出報告並確定額外細節檢驗範圍的檢驗。

1.2.5 細節檢驗係指驗船師在近距離內（最好在手可及範圍內）對構件細節的目視檢驗。

1.2.6 橫截面包括所有縱向部件，如甲板上的板材、縱材和桁材、邊和底、內底和漏斗形邊板、縱艙壁和頂翼艙中的底板。

1.2.7 代表處所係指預計能反映具有相同類型和功用並具有類似防鏽系統的處所的狀況的那些處所。在選擇代表性處所時，應考慮到在船上的維修史和能識別的關鍵區域和／或可疑區域。

1.2.8 可疑區域係指出現嚴重鏽蝕的位置和／或驗船師認為會很快耗蝕的位置。

1.2.9 大量鏽蝕係指對鏽蝕分佈的評估表明耗蝕超過 75%的許可範圍，但仍在可接受的限度內的鏽蝕程度。

1.2.10 防鏽系統通常係指下邊二種：

.1 陽極處理的全面硬塗層；

.2 全面硬塗層。

其他塗層系統（例如：軟塗層）如按製造商的規定使用和保養，可作為替代辦法接受。

1.2.11 塗層狀況規定如下：

良好 僅有少量點狀鏽斑；

中等　在加強筋和焊接處邊況塗層有局部開裂的狀況和／或在被考慮區域中輕度鏽蝕為 20%或更多的狀況，但小於規定的“不良狀況”的狀況；

不良　在考慮區域中塗層普遍破裂或更多或鏽皮佔 10%或更多狀況。

1.2.12 危險結構區域係指根據計算被確定為需要作出監測的區域或根據標的船舶或其類似船舶或姊妹船舶的維修史被確定為龜裂、起皺、鏽蝕會影響船舶結構完整性的敏感區域。

1.2.13 貨物長度區域係指包括所有貨艙和鄰近區域的船舶部分，包括燃油艙、隔離艙、壓載水艙和空處所在內。

1.2.14 中期強化檢驗係指在第二次或第三次年度檢驗時或在這二次檢驗之間進行的強化檢驗。

1.3 檢驗的範圍

1.3.1 在檢查前，驗船師應檢查船上文件的完整性及其內容，以作為檢驗的基礎。

1.3.2 在檢驗證實船舶有驗船師認為會影響其結構完整性的大量鏽蝕或嚴重結構缺陷時應與主管機關商定補救行動並在船舶繼續營運前實施。

2 定期檢驗期間進行的強化檢驗

2.1 綜述

2.1.1 強化檢驗可在第四次年度檢驗時開始，在此後一年內繼續，在第五個周年日完成。

2.1.2 作為強化檢驗準備工作的一部分，應在強化檢驗前制定厚度測量和檢驗方案。厚度測量不應在第四次年度檢驗前進行。

2.1.3 除年度檢驗的要求外，檢驗還應包括檢查、測試和核查，其範圍應足以確保船體和有關管路處於令人滿意的狀況，在作出適當保養、操作和定期檢驗的情況下，在貨船安全結構證書新的有效期間內適合其預定用途。

2.1.4 應檢查所有貨艙、壓載水艙、管隧、隔離艙和與貨艙、甲板和外殼相連的空處所，該檢查應由必要的厚度測量和測試予以補充，以確保結構完整性仍然有效。檢查應足以發現嚴重鏽蝕、嚴重變形、裂縫、損壞或其他結構損壞。

2.1.5 上述處所內的所有管路系統應予檢查並在工作條件下進行操作試驗以確保其狀況仍令人滿意。

2.1.6 壓載水／貨物混用艙的檢驗範圍應根據壓載歷史記載和提供的防鏽系統的範圍來評定。

2.1.7 改為空處所的壓載水艙檢驗範圍應根據對壓載水艙的要求予以特別考慮。

2.2 乾塢檢查

2.2.1 乾塢檢驗應是定期檢驗期間的強化檢驗的一部分。在證書的 5 年期限內應至少對船底的外部進行兩次檢查。在所有情況下，船底檢查的最大間隔期不應超過 36 個月。

2.2.2 未與定期檢驗期間的強化檢驗一起進行的船底交替檢查，可在船舶漂浮狀況時進行。對船齡為 15 年或以上的船舶，在被允許接受

此種檢查前，應給與特別注意。只有在狀況令人滿意，有合適的設備和適當的合格人員時，才應進行對漂浮船舶的檢查。

2.2.3 如果船舶檢驗不是與定期檢驗期間的強化檢驗一起完成或如果不符合 2.2.1 中所述 36 個月的最大間隔，則在乾塢檢驗完成前，《貨船安全結構証書》應失效。

2.2.4 但為了有時間過渡到強化檢查系統，在 1997 年 7 月 6 日前，檢驗周期為 4 年或更短，主管機關可不與定期檢驗期間的強化檢查在一起進行乾塢檢驗。對適用的船舶，進行定期檢驗期間的強化檢查的設施應具備能適當地進行規定的檢查和測試所必需的能力，並且應達到強化檢查指南的所有其他要求。

2.3 液艙防鏽系統

2.3.1 在裝有防鏽系統時，應對壓載水艙的防鏽系統進行檢查。對壓載水艙（不包括雙層底液艙），如發現其塗層處於 1.2.11 規定的不良狀況，而且它不能被換新或未使用塗層，則所述液艙的檢查間隔期應為一年。當在雙層底壓載水艙發現塗層有不良狀況的開裂時，或當所述液艙未用塗層時，所述液艙的檢查間隔期可為一年。如檢驗師認為必要，應進行厚度測量。

2.4 艙蓋和艙口圍板

2.4.1 應對 3.3 中所列項目進行徹底檢查。

2.4.2 應對機械操作的艙蓋的合格運作進行抽查，抽查包括：

.1 在打開狀況下的積載和繫固；

.2 在關閉狀況下密封的適當密合和有效性；

.3 液壓和電力部件、鋼絲繩、鏈和聯杆傳動裝置的操作試驗。

2.4.3 以軟管試驗或等效方法檢查所有艙蓋密封裝置的有效性。

2.4.4 應按附件 2 規定，對艙蓋、艙口圍板和加強筋進行厚度測量。

2.5 全面檢驗和細節檢驗的範圍

2.5.1 在定期檢驗時應對除燃油艙外的其他所有處所進行全面檢驗。貨艙附近的燃油艙應進行有效檢查以確保其狀況令人滿意。

2.5.2 每次定期檢查應包括一次足夠範圍的細節檢查，以確保附件 1 所示的在所有貨艙和壓載水艙中的邊肋骨及其端部附件的狀況。

2.6 厚度測量的範圍

2.6.1 附件 2 規定了定期檢驗時對厚度測量的要求。

2.6.2 應進行代表性厚度測量，以確定所有貨艙和壓載水艙中的邊肋骨及其端部附件的鏽蝕的總體和局部狀況。還應進行厚度測量，以確定橫向艙壁板的鏽蝕狀況。如通過細節檢查，驗船師認為沒有結構上的減薄，使用的塗層仍然有效，則可免除厚度測量。

2.6.3 驗船師如認為必要，可擴大厚度測量。

2.6.4 對各處所中塗層處於 1.2.11 中規定的良好狀況中的區域，附件 2 規定的厚度測量範圍可由主管機關予以特別考慮。

2.6.5 應選擇懷疑發生最大減薄或在甲板板材測量時發現有最大減薄的橫截面。

2.7 液艙壓力測試的範圍

2.7.1 對貨艙長度內的壓載水艙、深艙和用作壓載水艙的貨艙的所有邊界應進行壓力測試。對淡水、燃油和潤滑油的代表性液艙也應進行壓力測試。

2.7.2. 一般說來，壓力應相當於至壓載水艙／貨艙艙口頂部的水位或至壓載水艙或燃油艙空氣管頂部的水位。

3 在年度檢驗期間進行的強化檢驗

3.1 綜述

3.1.1 檢驗應由目的在於儘可能確保船殼／艙蓋、圍板和管路處於令人滿意的狀態的檢查構成，壓載水艙和檢驗報告卷宗內指明區域的防鏽系統的營運史、狀況和範圍應予考慮。

3.2 船殼的檢查

3.2.1 凡在可見之處，均應檢查船殼板及其關閉裝置。

3.2.2 凡可行時均應檢查水密貫穿裝置。

3.3 艙蓋和圍板的檢查

3.3.1 應證實自上次檢查以來，對艙蓋、艙口圍板及其繫固和密封裝置沒有作出過未經批准的改動。

3.3.2 當裝有機械操作的鋼蓋時，應證實下述裝置處於令人滿意狀況：

- 艙蓋；
- 縱向、橫向和居間的十字接頭的密封裝置（墊圈、墊圈凸緣、壓縮杆和排泄管路）；

- 夾具、止動杆和夾扣；

- 鏈滑車或繩滑車；

- 導向裝置；

- 導軌和履帶輪；

- 制動器，等等；

- 鋼絲、鏈、絞繩筒和張緊裝置；

- 關閉和繫固所必需的液壓系統；

- 安全鎖和鎖定裝置。

3.3.3 當裝有活動蓋、木質或銅質箱形艙蓋時，應證實下述裝置處於令人滿意狀態：

- 木艙蓋和可移動樑，可移動樑的支撐架或槽，及緊固裝置；

- 鋼箱形艙蓋；

- 艙蓋布；

- 夾扣、壓條和模；

- 艙口繫固杆及其繫固裝置；

- 裝貨板／裝貨杆和邊板的邊；

- 導板和導纜索；

- 壓縮杆、排泄管道和排水管（如有的話）。

3.3.4 如果驗船師認為必要，應證實所有艙蓋的密封裝置的有效性。

3.4 貨艙的檢查

3.4.1 對 10 年以上船齡的散貨船，應對有代表性的縱向貨艙進行全面檢驗。當這一水平的檢驗表明需要採取補救措施時，檢驗應擴大到包括對所有貨艙的全面檢驗。

3.4.2 對 15 年以上船齡的散貨船，應進行下述檢驗：

.1 所有貨艙的全面檢驗；和

.2 足夠範圍的細節檢查，以查明前貨艙的邊肋骨及其附件的下部狀況。當這一水平檢驗表明需要採取補救措施時，檢驗應擴大到包括對所有貨船作細節檢驗。

3.5 壓載水艙的檢查

3.5.1 當定期檢驗和中期強化檢驗的結果表明有必要時，應進行壓載水艙檢查。當發現大範圍鏽蝕時，應進行厚度測量。

4 中期強化檢驗

4.1 綜述

4.1.1 作為年度檢驗要求的補充者的項目可在第二次或第三次年度檢驗時進行或在這兩次檢驗間進行。

4.1.2 對船齡超過 5 年的散貨船，中期強化檢驗，除年度檢驗要求者外，還應包括對 4.2、4.3 和 4.4 中規定的項目的檢查。

4.2 壓載水艙

4.2.1 應對由驗船師選擇的代表性壓載水艙進行全面檢驗。對船齡超過 10 年的船舶，應檢查所有壓載水艙。如果這種檢查表明沒有可見的結構缺陷。檢查可局限於驗證塗層仍然有效。

4.2.2 當在壓載水艙發現 1.2.11 中規定的“不良”塗層狀況、鏽蝕或其他缺陷或當從建造以來從未使用塗層時，檢查應擴大到同類的其他壓載水艙。

4.2.3 對除雙層底艙外的壓載水艙，當發現塗層處在 1.2.11 中規定的“不良”狀況並且未予更新時或在未使用塗層時，所述艙的檢查間隔期為一年。當在雙層底壓載水艙發現塗層開裂或當未使用塗層時，所述艙的檢查間隔期為一年。在驗船師認為必要時應進行厚度測量。

4.2.4 除上述要求外，在原先定期檢驗時按 1.2.8 發現的可疑區域，須進行全面和細節檢驗。

4.3 貨艙

4.3.1 應對所有貨艙進行全面檢驗，包括足夠範圍的細節檢驗，以確定下述狀況：

- 在前貨艙和另一選定貨艙中邊肋骨及其附件和橫向艙壁；
- 在原先定期檢驗時按 1.2.8 發現的可疑區域。

4.3.2 根據 4.3.1 規定進行全面和細節檢驗，當驗船師認為有必要時，檢驗應擴大到包括對另一代表性貨艙進行足夠範圍的細節檢驗。

4.4 厚度測量的範圍

4.4.1 如 4.2.4、4.3.1 和 4.3.2 中規定的那樣，厚度測量的範圍應足以確定細節檢查區域的全面和局部鏽蝕水平。

4.4.2 如經細節檢驗，驗船師認為沒有結構性減薄，所用塗層仍然有效，則可免除厚度測量。

5 檢驗的準備

5.1 計劃

5.1.1 在定期檢驗前，應由船舶所有人和主管機關合作制訂出具體的檢驗方案。

5.1.2 檢驗方案應根據附件 1 和 2 對細節檢驗、厚度測量和在 2.7 中規定的液艙壓力測試的要求，包括檢驗條件、出入結構物和檢驗用設備。

5.1.3 或者，在該檢驗方案中的細節檢驗也可根據附件 4 中規定的經主管機關批准的計劃文件。計劃文件應符合本組織制訂的應用風險評估的程序。

5.1.4 檢驗方案應考慮到 6.2 和 6.3 中規定的船上文件中的資料。

5.2 檢驗的條件

5.2.1 船舶所有人應提供安全進行檢驗的必要方便。

5.2.2 液艙和處所應能安全進入，即無有毒易燃氣體、進行了通風等等。

5.2.3 液艙和處所應足夠乾淨，沒有水、鏽皮、垃圾、油殘等等，以顯示嚴重鏽蝕、變形、裂縫、損壞或其他結構性惡化。這一要求特別適用於須進行厚度測量的區域。

5.2.4 應提供足夠的照明，以顯示嚴重鏽蝕、變形、裂縫、損壞或其他結構性惡化。

5.3 結構物的出入

5.3.1 對全面檢驗，應提供能使驗船師以安全和可行的方式檢查結構物的裝置。

5.3.2 對細節檢驗，應提供可為驗船師接受的下述一種或多種出入方法：

- 穿過結構物的永久性腳手架和通道
- 穿過結構物的臨時性腳手架和通道
- 電梯和移動平台
- 其他等效方法。

5.4 檢驗用設備

5.4.1 厚度測量通常使用超聲波測試設備進行。設備的精確度應被證實是符合驗船師要求的。

5.4.2 如果驗船師認為必要，可要求採用下述一種或多種裂縫探查程序：

- X 射線設備
- 超聲波設備
- 磁粉設備
- 染色滲透劑
- 其他等效手段

5.5 海上或錨地檢驗

5.5.1 只要驗船得到題船上人員的必要幫助，可接受海上或錨地檢驗。進行檢驗的必要預防措施和程序應按照 5.1、5.2、5.3 和 5.4。

5.5.2 應在處所中的檢驗方和甲板上的負責高級船員間安排通訊系統。

5.5.3 在檢驗期間，手頭應有測爆器、測氧器、呼吸面具、救生索和口哨。應提供一份安全檢查清單。

6 船上文件

6.1 綜述

6.1.1 船舶所有人應提供和保存 6.2 和 6.3 中規定的船上文件，這些文件應隨時可提供給驗船師。在 6.2 中所述的狀況評估報告應包括一份英文譯文。

6.1.2 在船舶的使用期中，這些文件應保存在船上。

6.2 檢驗報告卷宗

6.2.1 應是船上文件一部分的檢驗報告卷宗包括：

.1 結構檢驗報告（附件 6）；

.2 狀況評估報告（附件 7）；

.3 厚度測量報告（附件 8）；和

.4 按附件 4 中的原則作出的檢驗計劃文件（在提供時）。

6.2.2 船舶所有人的辦公室和主管機關辦公室中也應有檢驗報告卷宗。

6.3 證明文件

6.3.1 船上應具備下述補充文件：

.1 艙和壓載水艙的主結構圖

.2 先前的修理史

.3 貨物和壓載史

.4 船舶人員進行的下述檢查：

- 總的結構惡化；
- 艙壁和管路叉泄漏；
- 塗層狀況或防鏽系統，如有的話，

報告指南載於附件 3 中；

和任何其他有助於驗明危險結構區域和／或需檢查的可疑區域的資料。

6.4 船上文件的檢查

6.4.1 在檢查前，驗船師應檢查船上文件的完整性及其內容，作為檢驗的基礎。

7 厚度測量程序

7.1 綜述

7.1.1 厚度測量通常在驗船師監督下進行。但驗船師可接受不在他直接監督下進行的厚度測量，只要符合下述條件：

.1 由主管機關認可的組織發證的合格公司進行厚度測量；

.2 在完成第 2 節規定的定期檢驗或第 4 節規定的中期強化檢驗前的 12 個月內進行厚度測量。如認為為確保可接受的精確性的需要，驗船師應對測量結果作必要的複查。

7.2 對厚度測量公司的發證

7.2.1 厚度測量應按照附件 5 所述原則，由主管機關認可的組織發證的合格公司進行。

7.3 報告

7.3.1 應擬寫厚度測量報告並提交主管機關。該報告應提供測量的位置、所測厚度以及相應的原始厚度。此外，該報告應提供進行測量的日期、測量設備的類型、人員姓名及其資格並由操作人員簽署。厚度測量報告應遵循在附件 8 中所載的厚度測量建議程序規定的原則。

7.3.2 驗船師應驗證並會簽厚度測量報告。

8 報告檢驗的評估

8.1 檢驗報告的評估

8.1.1 在檢驗期間收集的船舶結構狀況數據和資料應作可接受性和船舶連續結構完整性評估。

8.1.2 主管機關應進行數據分析並予以簽註。分析的結論應構成狀況評估報告的一部分。

8.2 報告

8.2.1 檢驗報告的原則載於附件 6 中。

8.2.2 如附件 7 所示，檢驗的狀況評估報告和結果應發給船舶所有人並放在船上供今後的檢驗參考。狀況評估報告應由有主管機關作出簽註。

附件 I

對定期檢驗時的細節檢驗的要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
（A）-在前貨艙中代表性位置的25%肋骨。	（A）-前貨艙中代表性位置的 25%肋骨。	（A）-所有貨艙中25%的肋骨。	（A）-所有貨艙中的所有肋骨。
（A）-在其餘貨艙中經選定的肋骨。	（A）-在其餘貨艙中經選定的肋骨。	（B）-在每個壓載水艙（頂邊水艙、漏斗形邊艙或邊艙）中的所有桁材及相關板材和縱材。	（B）至（E）點參照第 3 欄。
（B）-每種類型（即頂邊艙、漏斗形邊艙或邊艙）的二個代表性壓水艙中一個橫向桁材及相關的板材和縱材。	（B）-在每個壓載水櫃（即頂邊艙、漏斗形邊艙或邊艙）中一個橫向桁材及相關的板材和縱材。	（C）-壓載水艙中所有橫向艙壁包括加強筋系統。	
（C）-兩個經選擇的貨艙橫向艙壁。	（B）-在一個壓載水邊艙中縱向橫艙壁，包括加強筋系統。	（C）-所有貨艙的橫艙壁。	
	（C）-每個貨艙中一個橫向艙壁。	（D）-所有貨艙艙蓋和圍板。	

	（D）-選定的貨船艙蓋和圍板。 （E）-在貨艙艙口間的艙口開口線之內的選定區域的甲板材。	（E）-貨艙艙口間艙口開口線之內的所有甲板板材。	

（A）－ 貨艙橫向肋骨。

（B）－ 壓載水艙中的橫桁材或水密橫艙壁。

（C）－ 貨艙橫艙壁、板材、加強筋和桁。

（D）－ 貨艙艙蓋和圍板。

（E）－ 貨艙艙口間艙口開口線之內的甲板板材。

附件 2

定期檢驗時對厚度測量的要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
1.可疑區域	1.可疑區域 2.在貨物長度區域內： .1 貨艙開口線以外甲板板材的二個橫向部分。 3.對須經按照附件 1 重點檢驗的那些結構部件進行測量，以對鏽蝕類型作出總的評估和記錄。 4.經選定的貨艙艙蓋和圍板（板材和加強筋）。	1.可疑區域 2.在貨物長度區域內： .1 貨艙開口線之外的每塊甲板板材。 .2 貨艙開口線之外的二個橫向部分其中之一應是在船中部。 3.對須經按照附件 1 重點檢驗的那些結構部件進行測量以對鏽蝕類型作出總的評估和記錄。 4.所有貨艙艙蓋和圍板（板材和加強筋）。	1.可疑區域 2.在貨物長度區域內： .1 貨艙開口線外每塊甲板板材。 .2 貨艙開口線外三個橫向部分其中之一應在船中部。 .3 每塊底部板材。 3.第 3 至第 7 點參照第 3 欄。

	5.在貨艙口間開口線之內的經選定的甲板板材區域。 6.在貨物長度區域內的所有風和水的列板。	5.貨艙艙口間開口口線內所有甲板板材。 6.在貨物長度區域內的所有風和水的列板。 7.在貨物長度區域外的選定的風和水的列板。	

附件 3

所有人的檢查報告

結構狀況

船名： .....

所有人的檢查報告 – 結構狀況

第....號液艙／艙

鋼材等級： 甲板： ..... 船側： .....

底部： ..... 縱向艙壁： .....

部件	裂縫 彎曲 鏽蝕 塗層狀況 點蝕 改裝／修理 其他
甲板：	
船底部：	
側舷：	
邊肋骨：	
縱向艙壁：	
橫向艙壁：	

因何進行修理：

進行的厚度測量（日期）：

總體結果：

過期檢驗：

分類的未完成情況：

評語：

檢查日期： .....

檢查人： .....

簽字： .....

附件 4

計劃文件的原則

1 計劃文件的目的是識別危險的結構區域和確定對於各部分和內部結構以及指定的可疑區域的細節檢驗和厚度測量的最小範圍、位置和方法。

2 文件應由所有人在檢驗前及早與主管機關合作制訂。

3 選擇1段中所述處所和區域的基礎，是在考慮可能的惡化時所作的風險評估，評估要計及船舶的下述要素：

.1 設計特性，例如高強度鋼和局部零件的範圍；

.2 在所有人和主管機關辦公室中存備的特定船舶以及類似船舶的鏽蝕、裂縫、彎曲、凹痕和修理方面的歷史；

.3 上述辦公室提供的有關貨種、使用不同液艙／艙、防鏽系統和塗層狀況的資料（如有的話）。

4 根據公認原則和做法來判斷和決定其危險程度。

5 計劃文件應包括：

.1 主要參數；

.2 液艙／艙圖；

.3 帶有關於塗層的使用、保護和狀況的資料的液艙／艙的清單；

.4 液艙鏽蝕風險的確定；

.5 結構設計風險的確定；

.6 作細節檢驗的液艙和區域的確定；

.7 厚度測量的部分和結構物的確定；和

.8 不同結構物可接受的鏽蝕餘度清單。

附件 5

對從事船殼結構物厚度測量公司發證的程序

1 適用範圍

本指南適用於對打算從事船舶船體結構物的厚度測量的公司的發證工作。

2 發證程序

提交文件

2.1 應向主管機關認可的組織提交下述文件供批准。

.1 公司的概況，例如組織和管理結構。

.2 公司在船舶船體結構物的厚度測量方面的經驗。

.3 技術人員的履歷，即作為厚度測量操作人員的技術人員的經歷、技術知識和船體結構經驗等等。操作人員的資格應符合經認可的工業無損試驗標準的。

.4 用於厚度測量的設備（例如超聲波測試機）及其保養／校準程序。

.5 厚度測量操作人員的指南。

.6 厚度測量技術人員培訓方案。

.7 符合推薦的厚度測量程序（見附件 8）的測量記錄格式。

對公司的審查

2.2 在檢查提交的文件並感到滿意時，應審查該公司，從根據提交的文件確定該公司有適當的組織和管理，因此有能力進行船舶船體結構厚度測量。

2.3 發證條件是厚度測量的船上示證以及令人滿意的報告。

3 發證

3.1 在對 2.2 所述的對公司的審查和 2.3 所述的示證試驗均感到滿意時，主管機關或主管機關認可的組織應頒發認可證書以及已對該公司的厚度測量操作系統驗證的通知。

3.2 應在每隔不超過 3 年的時間，通過驗證原有狀況得到了保持，對證書進行更新／簽註。

4 經驗證厚度測量操作系統的任何改動的報告

在對經驗證的厚度測量操作系統作出任何改動時，應將這種改動立即報告經主管機關認可的組織。主管機關認可的組織如認為必要，應作出重新審查。

5 證書的撤銷

在下述情況下，可撤銷證書：

.1 測量不正確或未對結果作正確報告；

.2 驗船師發現該公司經批准的厚度測量操作系統中有任何缺陷；

.3 該公司未按要求將 4 中所述的任何改動報告經主管機關認可的組織。

附件 6

報告的原則

報告格式應由主管機關逐一制訂。作為一項原則，對於散貨船結構，應根據檢驗視情包括下述報告內容：

1 檢驗類型（定期檢驗、中期強化檢驗、年度檢驗、其他）

1.1 日期、地點、是否在乾塢中檢驗和是否完成了檢驗。

1.2 原先進行的下述工作的日期：

- 船底檢查 .....
- 進乾塢.....

2 檢驗的範圍

2.1 指明全面檢查處所。

2.2 在每個艙中，進行細節檢查的位置和進入的方法。

2.3 指明進行厚度測量的結構物的處所和位置。

2.4 指明壓力測試處所。

3 檢驗的結果

3.1 每一處所的塗層狀況（如適用）。指明有陽極的液艙。

3.2 每一處所的結構狀況：

- 處於令人滿意狀況的註明處所。在狀況不合格時，指明應予改正或記錄的情況，例如：

- 鏽蝕：- 結構部件

  - 鏽蝕類型（點蝕、一般）

  - 範圍

- 裂縫（位置）

- 彎曲（位置）

- 凹痕（位置）

陳述報告可由損壞／修理的草圖／照片補充。

3.3 由出席的驗船師簽註厚度測量報告。

4 對可能情況的行動

4.1 在認定的處所進行的修理：

- 結構部件

- 修理方法

- 修理範圍。

4.2 被認為不必立即進行修理的記錄情況。應作出對今後檢查和厚度測量的備忘錄，例如發現的鏽蝕可疑區域（見 1.2.8）。

4.3 狀況類別／船旗國的要求。

報告內容的結構可以是不同的，視主管機關的報告系統而定。

附件 7

狀況評估報告

在完成定期檢驗時頒發

一般參數

船名：	船級／主管機關識別號： 原船級／主管機關識別號： 海事組織編號：
船籍港：	國旗： 原國旗：
載重量（公噸）：	總噸位： 國家： 國家貿易中心（1969）：
建造日期：	船級符號：
重大改建日期：	
改建類型：	所有人： 原所有人：

1 下列檢驗報告和文件已經簽署者審核並認為滿意

2 在（日期）……已按照本指南完成了定期檢驗

狀況評估報告 填寫人	姓名 簽名	職別
辦公室	日期	
狀況評估報告	姓名	職別

審核人	簽名
辦公室	日期

所附報告和文件：

1）

2）

3）

4）

5）

6）

狀況評估報告的內容

第 1 部分 - 一般參數：
- 見標題頁

第 2 部分 - 報告審查：
- 檢驗地點和方法

第 3 部分 - 細節檢驗：
- 範圍（任何液艙／艙）

第 4 部分 - 厚度測量：
- 查閱厚度測量報告
- 測量位置概況
- 註明嚴重鏽蝕處所的獨立表格和相應的：
  - 厚度減薄
  - 鏽蝕類型

第 5 部分 - 液艙防鏽系統：
- 註明下述者的獨立表格：
  - 塗層／陽極位置
  - 塗層狀況（如適用）

第 6 部分 - 修理：
- 指明處所／區域

第 7 部分 - 狀況類別／船旗國要求：

第 8 部分 - 備忘錄：
- 可接受缺陷
- 今後檢驗的任何應注意點，例如可疑區域
- 由於塗層開裂而被擴大的年度／中期強化檢驗

第 9 部分 - 結論：
- 對檢驗報告／審核的說明

厚度測量摘要

參閱厚度測量報告：

有重大鏽蝕的液艙／區域[1]的位置	厚度減薄 [%]	鏽蝕類型[2]	備註：例如有查閱號的草圖

備註

[1] 嚴重鏽蝕，即可接受的耗廢餘量的 75% - 100%。

[2] P = 點蝕
C = 總體鏽蝕

液艙／艙防鏽系統

液艙號／艙號 [1]	液艙／艙的防鏽系統 [2]	塗層狀況 [3]	備註

備註

[1] 應列出所有壓載水艙和貨艙。

[2] C = 塗層　A = 陽極　NP = 無保護

[3] 下述標準的塗層狀況。

良好　僅有少量點狀鏽斑。

中等　加强筋和焊縫連接邊緣塗層局部開裂和／或輕度鏽蝕佔考慮區域的 20%或更大，但小於對“不良狀況”所規定者。

不良　普遍開裂的塗層佔考慮區域的 20%或更大或硬質鏽皮佔考慮區域的 10%或更大。

如果塗層被定為“不良狀況”，則應採取擴大年度檢驗。這一點應在狀況評估報告內容第 7 部分中作出說明。

附件 8

厚度測量的推薦程序

綜述

1 這些程序應用於記錄附件 2 所要求的厚度測量。

2 附錄 2 所載 TM1-BC、TM2-BC、TM3-BC、TM4-BC、TM5-BC、TM6-BC 和 TM7-BC 的報告格式應用於記錄厚度測量。

3 附錄 3 載有有關報告格式和厚度測量要求的圖解和說明。

4 在合適時，應以結構草圖上標明的數據補充報告表格。

附錄 1　一般參數

附錄 2　厚度測量報告

附錄 3　厚度測量指南

附錄 1
一般參數

船名：
海事組織號：
船級／主管機關的識別號：
船籍港：
總噸位：
載重量：
建造日期：
船級社：

進行厚度測量的公司名稱：
向厚度測量公司發證者：
證書號碼：
證書有效期自：.....至.....測量地點：
第一測量日：
最後測量日：
定期檢驗／中間強化檢驗*到期日期：
測量設備詳情：
操作者的資格：

報告編號： 共....頁

操作者姓名：..... 驗船師姓名：.....
操作者簽字：..... 驗船師簽字：.....
公司正式印章：..... 主管機關：.....
正式印章：.....

---

* 視情刪去。

附錄 2　厚度測量報告

關於所有甲板板材、所有船底外殼板材或舷側船殼板材的厚度測量的報告（TM1-BC）

船名……海事組織號……船級識別號……報告號……

列板位置																		
板材位置	號碼或字符	原厚度（毫米）	前讀數						後讀數						平均減少量	
			測量		減少量左舷		減少量右舷		測量		減少量左舷		減少量右舷			
			左舷	右舷	毫米	%	毫米	%	左舷	右舷	毫米	%	毫米	%	左舷	右舷
前第 12																
第 11																
第 10																
第 9																
第 8																
第 7																
第 6																
第 5																
第 4																
第 3																
第 2																
第 1																
船舯部																
後第 1																
第 2																
第 3																
第 4																
第 5																
第 6																
第 7																
第 8																
第 9																
第 10																
第 11																
第 12																

操作人簽名……　　驗船師簽名……

註－見下頁

註釋

1 本報告應用於記錄下述者的厚度測量：

.1 在貨物長度區域內的所有強力甲板板材。

.2 在貨物長度區域內的龍骨、船底殼板和舭板。

.3 在貨物長度區域內是所有風和水列板的舷側船殼板。

.4 在貨物長度區域外被選定為風和水列板的舷側船殼板。

2 列板的位置應清楚表示如下：

.1 對強力甲板，表明縱桁板內側的列板號碼。

.2 對船底列板，表明龍骨板外側的列板號碼。

.3 對舷側船殼板提供外板展示圖所示的舷側厚板和字符下的列板號碼。

3 僅應記錄開口線外的甲板列板。

4 應在所有板材的前部和後部區域進行測量，記錄的單一測量數據應代表多次測量的平均數。

（一、二或三橫截面的）船骹和甲板板材的厚度測量報告（TM2 - BC（1））

船名……海事組織號……船級識別號……報告號……

強力甲板和舷側厚板																										
列板位置	第一橫截面所處肋骨號碼								第二橫截面所處肋骨號碼								第三橫截面所處肋骨號碼									
	號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷		號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷		號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%
舷側厚板																								
舷內側第1列板																								
第 2																								
第 3																								
第 4																								
第 5																								
第 6																								
第 7																								
第 8																								
第 9																								
第 10																								
第 11																								
第 12																								
第 13																								
第 14																								
中央列板																								
舷側厚板																								
上面合計																								

操作人簽字……　　驗船師簽字……　　註 - 見下頁

註釋

1 本報告應用於記錄強力甲板板材和舷側厚板橫截面的厚度測量：

在貨物長度區域內的二個或三個部分，由附錄 3 中表明縱向和橫向構件的典型橫截面的圖示所示的結構項目（1）、（2）和（3）組成。

2 僅應記錄開口線外的甲板板材。

3 頂邊區域由甲板板材、縱桁板和舷側厚板（包括圓弧船舷）組成。

4 應註明測量的準確肋骨位置。

5 記錄的單一測量數據應代表多次測量的平均值。

（一、二或三橫截面的）船殼和甲板板材的厚度測量報告（TM2 - BC（2））

船名……海事組織號……船級識別號……報告號……

船殼板材																									
列板位置	第一橫截面所處肋骨號碼								第二橫截面所處肋骨號碼								第三橫截面所處肋骨號碼								
	號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷		號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷		號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%
舷側厚板下第1																								
第 2																								
第 3																								
第 4																								
第 5																								
第 6																								
第 7																								
第 8																								
第 9																								
第 10																								
第 11																								
第 12																								
第 13																								
第 14																								
第 15																								
第 16																								
第 17																								
第 18																								
第 19																								
第 20																								
龍骨厚板																								
底部合計																								

操作人簽字……　　驗船師簽字……　　註 - 見下頁

註釋

1 本報告應用於記錄船殼板材橫截面的厚度測量：

貨物長度區域內一、二或三個截面，由附錄 3 中表明縱向和橫向構件的典型橫截面的圖示所示的結構物（4）、（5）、（6）和（7）組成。

2 底部區域由龍骨板、船底板和舭板構成。

3 應註明測量的準確肋骨位置。

4 記錄的單一測量數據應代表多次測量的平均值。

（一、二或三橫截面的）縱向部件的厚度測量報告（TM3 - BC）

船名……海事組織號……船級識別號……報告號……

結構部件	第一橫截面所處肋骨號碼								第二橫截面所處肋骨號碼								第三橫截面所處肋骨號碼							
	項目號碼	原厚度毫米	測量		減少量左舷		減少量右舷		項目號碼	原厚度毫米	測量		減少量左舷		減少量右舷		項目號碼	原厚度毫米	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%

操作人簽字……　　驗船師簽字……

註 - 見下頁

註釋

1 本報告應用於記錄船殼板材橫截面的厚度測量：

貨物長度區域內一、二或三個截面，由附錄 3 中表明縱向和橫向構件的典型橫截面的圖示所示的結構物（8）至（20）組成。

2 應註明測量的準確肋骨位置。

3 記錄的單一測量數據應代表多次測量的平均值。

液貨艙長度內貨艙和壓載艙中橫向結構部件厚度測量報告（TM4-BC）

船名……海事組織號……船級識別號……報告號……

液艙說明：								
結構位置：								
結構部件	項目	原厚度（毫米）	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%

操作人簽字……　　檢驗師簽名……

註－見下頁

註釋

1 本報告應用附錄 3 中表明縱向和橫向號碼的典型橫截面的圖示所示的適當的結構項目（23）至（25）組成的橫向結構部件的厚度測量。

2 附錄 3 的表 1 至表 3 表明了對測量區域的指南。

3 記錄的單一測量數據應代表多次測量的平均值。

貨船橫向艙壁厚度測量報告（TM5-BC）

船名……海事組織號……船級識別號……報告號……

液艙／艙說明：							
結構位置：							
結構部件（板材／加強肋）	原厚度（毫米）	測量		減少量左舷		減少量右舷	
		左舷	右舷	毫米	%	毫米	%

操作人簽名……　　檢驗師簽字……

註－見下頁

註釋

1 本報告格式應用於記錄貨艙橫向艙壁的厚度測量。

2 附錄 3 的表 1 至表 3 載有測量區域的指南。

3 記錄的單一測量應代表多次測量的平均值。

其他結構部件厚度測量報告（TM6-BC）

船名……海事組織號……船級識別號……報告號……

結構部件：								草圖
結構位置：								
說明	原厚度（毫米）	測量		減少量左舷		減少量右舷		
		左舷	右舷	毫米	%	毫米	%	

操作人簽名……　　檢驗師簽字……

註－見下頁

註釋

1 本報告格式應用於記錄附錄 3 中表明縱向和橫向部件的典型橫截面的圖示所示包括結構部件項目（28）、（29）、（30）和（31）的其他結構部件的厚度測量。

2 附錄 3 的表 1 至表 3 載有測量區域的指南。

3 單一測量應代表多次測量的平均值。

貨艙橫向肋骨厚度測量報告（TM7-BC）

船名……海事組織號……船級識別號……

	貨艙號																						
	原厚度(毫米)	測量		減少量左舷		減少量右舷		原厚度(毫米)	測量		減少量左舷		減少量右舷		原厚度(毫米)	測量		減少量左舷		減少量右舷	
		左舷	右舷	毫米	%	毫米	%		左舷	右舷	毫米	%	毫米	%		左舷	右舷	毫米	%	毫米	%

操作人簽名……　　檢驗師簽字……

註－見下頁

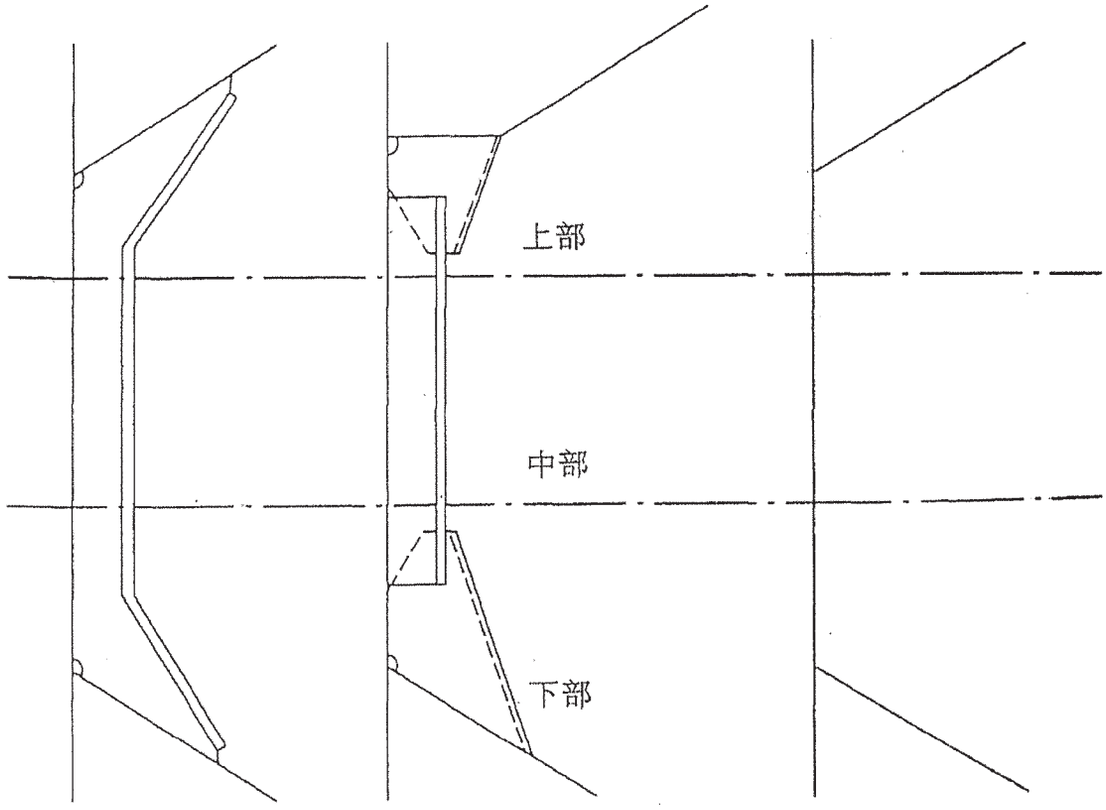
註釋

1 本報告應用於記錄下述的厚度測量：

- 貨艙橫向肋骨；和
- 附錄 3 中表明縱向和橫向部件的典型橫截面的圖示所示的結構部件第 34 號。

2 附錄 3 表 1 至表 3 載有對測量區域的指南。

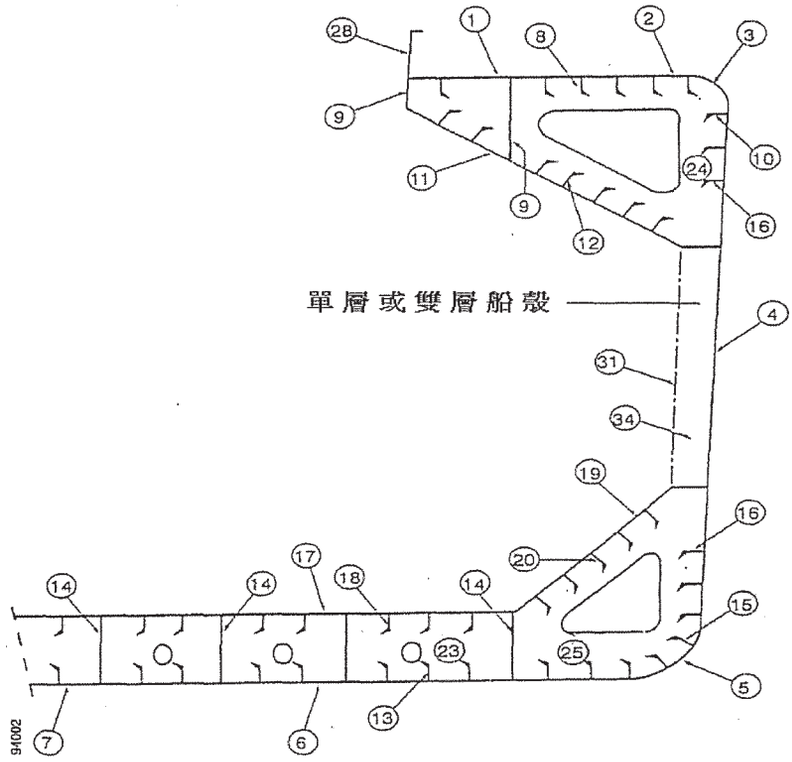
3 記錄單一測量應代表多次測量的平均值。



貨艙厚度測量區域Ⓐ中的典型橫向肋骨

貨艙厚度測量區域Ⓐ中中非典型橫向肋骨

附錄 3
厚度測量指南
表明縱向和橫向構件的典型橫截面



在 TM2-BC 上的報告
[1] 強力甲板板材
[2] 縱桁板
[3] 舷側厚板
[4] 舷側船殼板
[5] 舭板
[6] 船底外殼板材
[7] 龍骨板

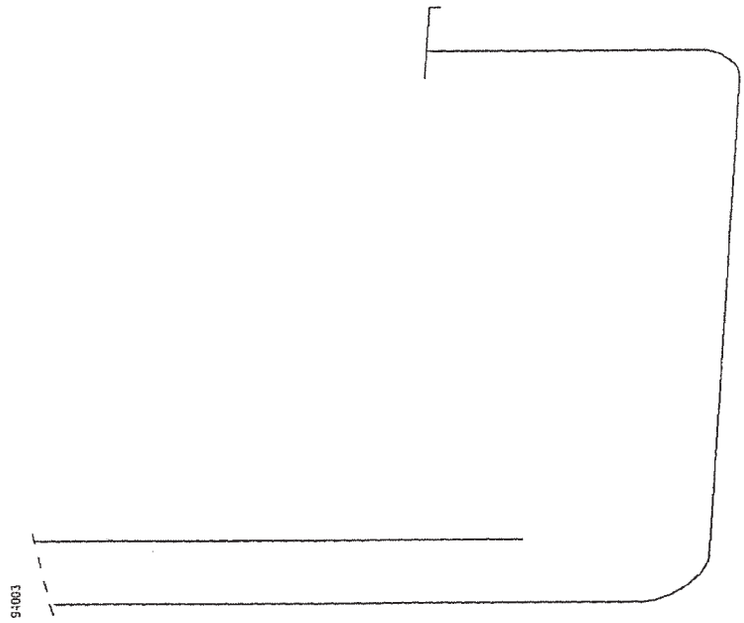
在 TM3-BC 上的報告	
[8] 甲板縱材	[15] 舭部縱材
[9] 甲板桁	[16] 舷側船殼縱材
[10] 舷側厚板縱材	[17] 內層底板材
[11] 頂邊液艙斜板	[18] 內層底縱材
[12] 頂邊液艙斜板縱材	[19] 漏斗狀邊板材
[13] 船底縱材	[20] 漏斗狀邊縱材
[14] 船底桁	[21] [22]

在 TM4-BC 上報告
[23] 雙層底液艙肋板
[24] 頂邊液艙橫材
[25] 漏斗狀邊液艙橫材
[26] [27]

在 TM6-BC 上報告
[28] 艙口圍板
[29] 艙口間甲板板材
[30] 艙口蓋
[31] 內艙壁板材
[32] [33]

在 TM7-BC 上報告
[34] 艙肋骨或圖示

橫截面輪廓
（用於典型橫截面不適用的縱向和橫向構件）



在 TM2-BC 上的報告
[1] 強力甲板板材
[2] 縱桁板
[3] 舷側厚板
[4] 舷側船殼板
[5] 舭板
[6] 船底外殼板材
[7] 龍骨板

在 TM3-BC 上報告	
[8] 甲板縱材	[15] 舭部縱材
[9] 甲板桁	[16] 舷側船殼縱材
[10] 舷側厚板縱材	[17] 內層底板材
[11] 頂邊液艙斜板	[18] 內層底縱材
[12] 頂邊液艙斜板縱材	[19] 漏斗狀邊板材
[13] 船底縱材	[20] 漏斗狀邊縱材
[14] 船底桁	[21] [22]

在 TM4-BC 上報告
[23] 雙層底液艙肋板
[24] 頂邊液艙橫材
[25] 漏斗狀邊液艙橫材
[26] [27]

在 TM6-BC 上報告
[28] 艙口圍板
[29] 艙口間甲板板材
[30] 艙口蓋
[31] 內艙壁板材
[32] [33]

在 TM7-BC 上報告
[34] 艙肋骨或圖示

表 1 – 厚度測量要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
1.可疑區域	1.可疑區域 2.在貨物長度區域內： .1 貨艙開口線以外甲板板材的二個橫截面。 .3 應按照附件 2 作細節檢驗的那些結構部件的測量，用以對鏽蝕類型作出總的評估和記錄。 4.經選定的貨艙艙蓋和圍板（板材和加強筋）。	1.可疑區域 2.在貨物長度區域內： .1 貨艙開口線之外的每塊甲板板材。 .2 貨艙開口線之外的二個橫截面，其中之一應是在船中部。 .3 對須經按照附件 2 重點檢驗的那些結構部件進行測量，以對鏽蝕類型作出總的評估和記錄。 4.所有貨艙艙蓋和圍板（板材和加強筋）。	1.可疑區域 2.在貨物長度區域內： .1 貨艙開口線外每塊甲板板材。 .2 貨艙開口線外三個橫截面，其中之一應在船中部。 .3 每塊底部板材。 3.第 3 至第 7 點參照第 3 欄。

	5.在貨艙艙口間開口線之內的經選定的甲板板材區域。 6.在貨物長度區域的所有風和水的列板。	5.貨艙艙口間開口線內所有甲板板材。 6.在貨物長度區域內的所有風和水的列板。 7.在貨物長度區域外的選定的風和水的列板。	

表 2 – 細節檢驗要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
（A）-前貨艙中代表性位置的25%的肋骨。 （A）-在其餘貨艙中經選定的肋骨。 （B）-每種類型（即頂部水艙、漏斗狀邊艙和舷側水艙）代表性壓載水艙中一個橫向桁材及有關的板材和縱材。 （C）-兩個經選擇的貨艙橫艙壁。	（A）-在代表性位置的前貨艙中25%的肋骨。 （A）-在其餘貨艙中經選定的肋骨。 （B）-在每個壓載櫃（即頂水艙、漏斗狀邊艙和舷側水艙）中一個橫向桁材及有關的板材和縱材。 （B）-在一個邊壓載艙中前、後橫艙壁，包括加強筋系統。 （C）-每個貨艙中一個橫艙壁。 （D）-選定的貨艙蓋和圍板。	（A）-所有貨艙中25%的肋骨。 （B）-在每個壓載水艙（即頂邊水艙漏斗狀邊艙和舷側水艙）中的所有桁材及有關板材和縱材。 （C）-壓載艙中所有橫艙壁，包括加強筋系統。 （C）-所有貨艙橫艙壁。 （D）-所有貨艙艙蓋和圍板。	（A）-所有貨艙中的所有肋骨。 （B）-在每個壓載水艙（即頂邊水艙、漏斗狀邊艙和舷側水艙）中所有的桁材及有關板材和縱材。 （C）-壓載艙中所有橫艙壁，包括加強筋系統。 （C）-所有貨艙橫艙壁。 （D）-所有貨艙艙蓋和圍板。

	（E）-在貨艙艙口間艙口開口線之內的選定區域的甲板板材。	（E）-貨艙艙口間艙口開口線之內的所有甲板板材。	（E）-貨艙艙口間艙口開口線之內的所有甲板板材。

（A）- 貨艙橫向肋骨。

（B）- 壓載水艙中的橫向桁材或水密橫艙壁。

（C）- 貨艙橫艙壁、板材、加強筋和桁。

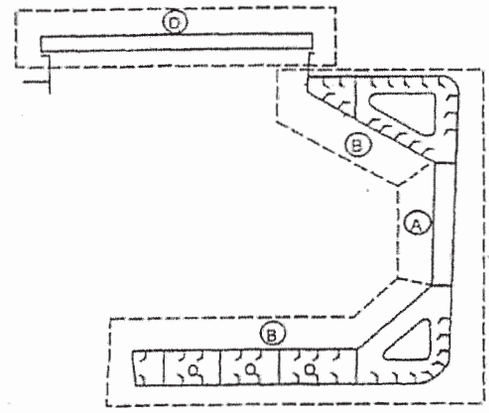
（D）- 貨艙艙蓋和圍板。

（E）- 貨艙艙口間艙口開口線之內的甲板板材。

註釋和略圖 - 見本附錄的表 3。

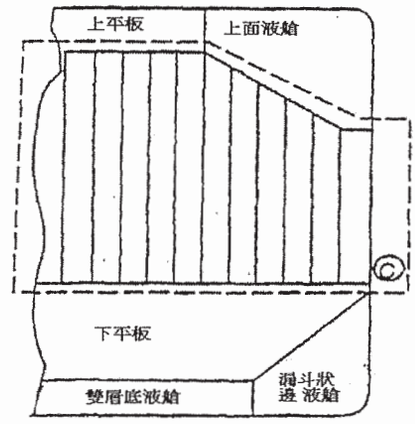
表 3 - 細節檢驗和厚度測量區域
（與細節檢驗要求相關的貨艙肋骨、結構部件和橫艙壁厚度測量的典型區域）

典型橫截面
區域Ⓐ，Ⓑ和Ⓓ



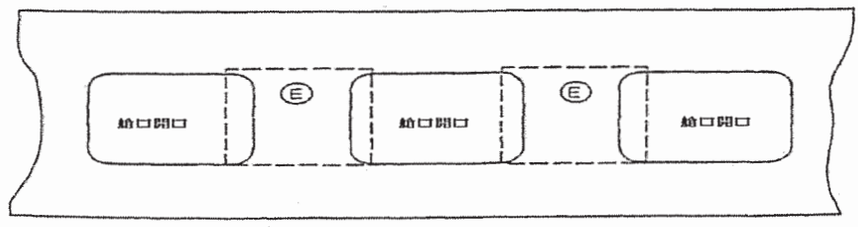
厚度視情在 TM3-BC、TM4-BC、TM6-BC 和 TM7-BC 上報告

一個貨艙的橫艙壁
區Ⓒ



在 TM5-BC 上報告厚度

貨艙艙口間艙口開口線內甲板板材的典型區域
區域Ⓔ



厚度在 TM6-BC 上報告

附件 B

油輪檢驗期間強化檢查方案指南

目錄

油輪檢驗期間的強化檢查方案指南

1 總則

1.1 適用範圍*

1.1.1 本指南應適用等於或大於 500 總噸的所有油船。

1.1.2 按照《73/78 年防污公約》附件 I 第 13G 條，對等於和大於 20,000 載重噸的原油油船和等於和大於 30,000 載重噸的成品油油輪，符合本指南是強制性的。

1.1.3 本指南應適用於船體結構和液貨艙、泵房、隔離艙、管隧、貨物區域內的空處所和所有壓載水艙的管路系統的檢驗。

1.1.4 本指南載有檢查厚度測量和液艙壓力測試的範圍。當發現嚴重鏽蝕和／或結構性缺陷時，應擴大檢驗；並在必要時包括額外的細節檢驗。

1.2 定義

1.2.1 壓載水艙係指用於裝載壓載水的液艙，包括隔離壓載水艙、雙層底壓載水處所和尖艙。

1.2.2 全面檢驗係指旨在對船體結構的全面情況作出報告和對確定額外細節檢驗範圍作出報告的檢驗。

1.2.3 細節檢驗係指在驗船師在近距離對構件細節進行目視檢查的檢驗（即最好在手可夠及範圍內）。

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* 本指南的目的是確保進行適當水平的計劃和文件的檢查並在應用中達到一致性。檢驗報告、檢驗方案和計劃文件等等的這類評估應在主管機關或主管機關認可的組織的管理層進行。

1.2.4 橫截面包括甲板、船側、船底內底和縱艙壁處的所有縱向構件的板材、縱材。

1.2.5 代表性液艙係指預計能反映具有同樣類型和功用並有相同防鏽系統的其他液艙的狀況者。在選擇代表性液艙時，應考慮到在船上的運作和修理史和可視為相同的危險區域和／或可疑區域。

1.2.6 可疑區域係指表明嚴重鏽蝕和／或被檢驗師認為易於迅速耗蝕的地方。

1.2.7 大量鏽蝕係指對鏽蝕分佈的評估表明耗蝕超過許可餘量的75%，但仍在可接受的限度內的鏽蝕程度。

1.2.8 防鏽系統通常係指下面二種：

.1 由陽極補充的全面硬塗層；

.2 全面硬塗層。

可考慮接受其他塗層系統（例如：軟塗層）作為替代辦法，但他們必須按製造商的規範使用和保養。

1.2.9 塗層狀況規定如下：

良好　僅有少量點狀鏽斑

中等　加強筋和焊縫連接邊緣的塗層有局部開裂和／或輕度鏽蝕佔考慮區域的 20%或更大，但小於對“不良狀況”所規定者；

不良　塗層全面開裂佔考慮區域的 20%或更大，或硬鏽皮佔此種區域的 10%或更大。

1.2.10 危險結構區域係指根據計算被確定為需要監測位置或根據標的船舶或類似船舶或姊妹船的維修史被確定為開裂、扭彎和鏽蝕會損害船舶結構完整性的敏感位置。

1.2.11 貨物區域係指經修正的《1974 年安全公約》第 II-2／3.32 條規定的區域。

1.2.12 中期強化檢驗係指在第二次或第三次年度檢驗或這二次檢驗之間進行的強化檢驗。

1.3 檢驗的範圍

1.3.1 在檢查前，驗船師應檢查船上文件的完整性及其內容，以作為檢驗的基礎。

1.3.2 在檢驗證實船舶有驗船師認為會損害船舶結構完整性的大量鏽蝕或嚴重結構缺陷時，在船舶繼續營運前，應與主管機關商定補救行動並予以實施。

2 定期檢驗期間進行的強化檢驗

2.1 綜述

2.1.1 加強檢驗可在第四次年度檢驗時開始，在此後一年內繼續，在第五個周年日完成。

2.1.2 作為強化檢驗準備工作的一部分，應在加強檢驗前制定厚度測量和檢驗方案。厚度測量不應在第四次年度檢驗前進行。

2.1.3 除年度檢驗的要求外，檢驗還應包括檢查、測試和審核，其範圍應足以確保船體和有關管路處於令人滿意的狀況，在作出適當的保養和操作及進行定期檢驗的情況下，在新的有效期間適合其預定用途。

2.1.4 應檢查所有液貨艙、壓載水艙、泵房、管隧、隔離艙和與液貨艙、甲板和外部船殼交界的空處所；該檢查應由必要的厚度測量和測試予以補充，以確保結構完整性仍然有效。檢查應足以發現嚴重鏽蝕、嚴重變形、裂縫、損壞和其他結構惡化。

2.1.5 上述液艙和處所內的所有管路系統應予檢查，以確保緊密性和狀況仍令人滿意。對液貨艙內的壓載水管路和在壓載水艙和空處所中的貨物管路應給與特別注意。

2.1.6 壓載水／貨物混用液艙的檢驗範圍應根據壓載史的記錄和提供的防鏽系統的範圍來評定。

2.2 乾塢檢驗

2.2.1 乾塢檢驗應是定期檢驗期間的強化檢驗的一部分。在證書的 5 年期限內，應至少對船底外部進行二次檢查。在所有情況下，船底檢查的最大間隔應不超過 36 個月。

2.2.2 未與定期檢驗期間的強化檢驗一起進行的船底交替檢查，可在船舶漂浮時進行。對船齡為 15 年或以上的船舶，在被允許接受此種檢查前，應給與特別注意。只有在狀況令人滿意，有合適的設備和適當的合格人員時，才應對漂浮船舶進行檢查。

2.2.3 如果乾塢檢驗未與定期檢驗期間的強化檢驗一起完成，或如果不符合 2.2.1 中所述 36 個月的最大間隔，則在幹塢檢驗完成前，1.1.1 款所述的頒發給油輪的“貨船安全構造證書”和／或 1.1.2 款中所述的頒發給油輪的“國際防止油污證書”應無效。

2.2.4 但為了有時間過渡到強化檢查系統，在 1997 年 7 月 6 日前，其檢驗周期為 4 年或更短的主管機關可使定期檢驗期間的強化檢查與乾塢檢驗分開進行。對於對此適用的船舶，定期檢驗期間的強化檢查

應在具備適當進行所需檢查和測試所必須的能力的設施進行，並且應達到強化檢查指南的所有其他要求。

2.3 液艙防鏽系統

2.3.1 在裝有液貨艙防鏽系統時，應檢查該系統。對防護層發現處於在 1.2.9 中規定的不良狀況並未更新的壓載水艙或未使用防護層壓載水艙，所述壓載水艙的檢查間隔期應為一年。如驗船師認為必要，應進行厚度測量。

2.4 全面和細節檢查的範圍

2.4.1 應在定期檢驗期間進行的強化檢驗中對所有構成整體的液艙和處所作全面檢驗。

2.4.2 附件 1 載有在定期檢驗期間的強化檢查時的細節檢驗要求。

2.4.3 根據被檢驗液艙的保養狀況，防鏽系統的狀況以及在下述情況下，驗船師在認為必要時，可擴大細節檢驗的範圍：

.1 特別是，按照現有資料，在其同類液艙或船舶上發現結構性裝置或零件有缺陷的液艙；

.2 其經主管機關批准的防鏽系統的結構的尺寸被減小的液艙中。

2.4.4 對其塗層處於按 1.2.9 中規定的良好狀況的液艙中區域，附件 1 規定的細節檢驗範圍可由主管機關給與特別考慮。

2.5 原度測量的範圍

2.5.1 附件 2 載有定期檢驗的厚度測量要求。

2.5.2 在發現 1.2.7 中規定的大量鏽蝕時，厚度測量的範圍應按附件 4 的要求或按附件 6 中所述計劃文件中的規定予以增加。

2.5.3. 在認為必要時，驗船師可擴大厚度測量範圍。

2.5.4 對其塗層處於 1.2.9 中規定的良好狀況的液艙中區域，附件 2 規定的厚度測量範圍可由主管機關予以特別考慮。

2.5.5 橫截面應選擇在懷疑發生最大減薄或甲板板材測量表明發生了最大減薄的地方。

2.5.6 在要測量二或三個截面時，至少一個應包括在 0.5L 船中範圍內的壓載水艙。

2.6 液艙壓力測試的範圍

2.6.1 附件 3 中載有在定期檢驗的液艙壓力測試要求。

2.6.2 在認為必要時，驗船師可擴大液艙的壓力測試範圍。

2.6.3 一般來說，壓力應相當於至液艙艙口頂部的水位，或至壓載艙空氣管頂的水位。

3 年度檢驗期間進行的強化檢驗

3.1 綜述

3.1.1 檢驗應以目的在於儘可能確保船殼和管路被保養得處於令人滿意狀態的檢驗構成並應考慮到壓載水艙和檢驗報告案卷中的指明區域的防鏽蝕系統的維修史、狀況和範圍。

3.2 船殼的檢查

3.2.1 凡可見之處均應進行船殼板及其關閉裝置的檢查。

3.2.2 凡可行時應進行水密貫穿裝置的檢查。

3.3 露天甲板的檢查

3.3.1 對液貨艙開口的檢查，包括墊圈、艙蓋、圍板和火焰屏蔽裝置。

3.3.2 對液貨艙壓力／真空閥和火焰屏蔽裝置的檢查。

3.3.3 對所有燃料艙、含油壓載水艙和含油污水艙的透氣管上的火焰屏蔽裝置的檢查。

3.3.4 對貨物管路系統、原油清洗管線系統、燃油管線系統和透氣管路系統的檢查，包括透氣管桅和通風集管的檢查。

3.4 貨泵房和管隧的檢查

3.4.1 檢查所有艙壁有無漏油或裂縫，特別是檢查所有艙壁貫穿裝置的密封裝置。

3.4.2 所有管路系統和管隧的狀況檢查。

3.5 壓載水艙的檢查

3.5.1 當定期檢驗和中期強化檢驗的結果表明需要時，應進行壓載水艙檢查。當發現大面積鏽蝕時，應進行厚度測量。

3.5.2 當發現在 1.2.7 中規定的大量鏽蝕時，應按附件 4 中要求增加厚度測量。

4 中期強化檢驗

4.1 綜述

4.1.1 年度檢驗要求外的其他項目可在第二次或第三次年度檢驗或這兩次檢驗之間進行。

4.1.2 視船齡而定的液貨艙和壓載水艙的檢驗範圍在 4.2 和 4.3 中作了規定。

4.1.3 對風雨甲板，凡適用時應檢查貨物管路系統、原油清洗管路系統、燃料管路系統、壓載水艙管路系統、蒸氣管路系統和透氣管路系統以及透氣管桅和通風集管。如根據檢查，對管路的狀況有任何懷疑，可要求對管路進行壓力測試厚度測量或兩者均進行。

4.2 船齡超過 5 年但不超過 10 年的油輪

4.2.1 對船齡超過 5 年但不超過 10 年的油船，除 4.1.3 外還應應用下述要求。

4.2.2 對壓載水艙，應對驗船師選定的代表液艙進行全面檢驗。如果這種檢查未發現可見的結構性缺陷，則檢查可限於驗證防鏽系統仍然有效。

4.2.3 當在壓載水艙中發現 1.2.9 中規定的不良塗層狀況、鏽蝕或其他缺陷時或當未使用塗層時，檢查應擴大到同類型的其他壓載水艙。

4.2.4 對於發現其塗層 1.2.9 中規定的不良狀況並未予更新的壓載水艙，或未使用塗層的壓載水艙，所述液艙的檢驗間隔期應為一年。在驗船師認為必要時，應進行厚度測量。

4.3 超過 10 年船齡的油輪

4.3.1 綜述

4.3.1.1 對於超過 10 年船齡的油輪，除 4.2 外還應應用下述要求。

4.3.1.2 應對至少二個代表性液貨艙進行全面檢查。

4.3.1.3 應對所有壓載水艙和貨物／壓載水混用艙進行全面檢驗。如果這種檢驗未發現可見結構性缺陷，檢驗可局限於驗證防鏽系統仍然有效。

4.3.2 重點檢查的範圍

4.3.2.1 應按下範圍進行細節檢查：

.1 對壓載水艙：

- 在第二次定期檢驗後：與前一次定期檢驗的範圍相同；

.2 對液貨艙：

- 在第二次定期檢驗後：至少二個貨物／壓載水兩用液艙。檢驗的範圍應根據原先定期檢驗的記錄和這些液艙的修理史；
- 在第三次定期檢驗後：至少增加一個液貨艙。檢驗範圍應根據原先定期檢驗的記錄和這些液艙的修理史。

4.3.2.2 細節檢驗的範圍可按 2.4.3 中所述予以擴大。

4.3.2.3 對發現塗層處於 1.2.9 中規定的良好狀況的液艙中區域，細節檢驗的範圍可由主管機關予以特別考慮。

4.4 厚度測量的範圍

4.4.1 在中期強化檢驗時，應對在原先定期檢驗時發現的 1.2.6 中規定可疑區域進行厚度測量。

4.4.2 當發現 1.2.7 規定的嚴重鏽蝕時，應按附件 4 的要求增加厚度測量。

5 檢驗的準備工作

5.1 計劃

5.1.1 在定期檢驗前，應由船舶所有人和主管機關合作制訂出具體的檢驗方案。

5.1.2 檢驗方案應考慮到附件 1、2 和 3 對細節檢驗、厚度測量和 2.6 中規定的液艙壓力測試的要求，包括檢驗條件、結構物的出入和檢驗的試備。

5.1.3 或者該方案細節檢驗可根據附件 6 中規定的、經主管機關批准的計劃文件。計劃文件應符合本組織制訂的進行風險評估的程序。

5.1.4 檢驗方案應考慮到按在 6.2 和 6.3 中規定的船上文件包括的資料。

5.2 檢驗的條件

5.2.1 船舶所有人應提供必要設施供檢驗的安全進行。*

5.2.2 液艙和處所應能安全出入，即已排氣、通風等等。

5.2.3 液艙和處所應足夠乾淨和沒有水、鏽皮、灰塵、油殘等等，以能顯示嚴重鏽蝕、變形、裂縫、損壞或其他結構性惡化。這特別適用於須進行厚度測量的區域。

5.2.4 應提供足夠的照明以能顯示嚴重鏽蝕、變形、裂縫、損壞或其他結構性惡化。

5.3 結構物的出入

5.3.1 對全面檢驗，應提供裝置具使驗船師能以安全和可行的方式檢查結構物。

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* 參照《國際油船和碼頭安全指南(ISGOTT)》第 10 章—進入圍蔽處所和在其中工作。

5.3.2 對細節檢驗，應提供驗船師接受的下述一種或多種出入方法：

- 貫穿結構物的永久性腳手架和通道
- 貫穿結構物的暫時性腳手架和通道
- 電梯和移動平台
- 艇或筏
- 其他等效裝置。

5.4 檢驗用設備

5.4.1 通常應以超聲波測試試備進行厚度測量。設備的精確度應被證實是符合驗船師要求的。

5.4.2 如果驗船師認為必要，可要求下述一種或多種裂縫探查程序：

- X 射線設備
- 超聲波設備
- 磁粉設備
- 染色滲透
- 其他等效方法

5.5 在海上或錨地檢驗

5.5.1 只要驗船師得到船上人員的必要幫助，可接受在海上或錨地檢驗。進行檢驗的必要預防措施和程序應符合 5.1、5.2、5.3 和 5.4。

5.5.2 在液艙中的檢驗方和甲板上的負責高級船員間應安排通訊系統。如果使用艇或筏該系統還應包括負責操作壓載泵的人員。

5.5.3 在檢驗期間，手頭應有測爆器、測氧器、呼吸面具、救生索和口哨。

當使用艇或筏時，應為所有參與者配備合適的救生衣。艇或筏即使在一個浮力艙破裂的情況下仍應有令人滿意的殘餘浮力和穩性。應提供安全檢查清單。

5.5.4 使用艇或筏對液艙進行的檢驗，僅可以在驗船師同意的情況下進行，檢驗師應考慮到提供的安全安排，包括天氣預報和在合理海況中船舶的反應。

6 船上文件

6.1 綜述

6.1.1 船舶所有人應提供和保管 6.2 和 6.3 中規定的船上文件，這些文件應隨時可向檢驗師提供。在 6.2 中所述的狀況評估報告應包括一份英文譯文。

6.1.2 在船舶使用期中，這些文件應保留在船上。

6.2 檢驗報告卷宗

6.2.1 卷宗應是船上文件的一個部分，由下列者組成：

.1 結構檢驗報告（附件 8）

.2 評估報告（附件 9）

.3 厚度測量報告（附件 10）

.4 按照附件 6 原則制定的檢驗計劃文件，如提供的話。

6.2.2 船舶所有人辦公室和主管機關辦公室也應備有檢驗報告卷宗。

6.3 證明文件

6.3.1 船上應具備下述額外文件：

.1 液貨艙和壓載水艙的主結構圖

.2 原先的修理史

.3 貨物和壓載史

.4 使用惰性氣體裝置和液艙清洗程序的範圍

.5 船舶人員對下述者作出的檢查：

- 總體的結構性惡化
- 艙壁和管路的泄漏
- 塗層或防鏽系統（如有的話）的狀況，報告指南載於附件 5 中；

任何其他有助於驗明要求檢查的危險結構區域和／或可疑區域的資料。

6.4 船上文件的檢查

6.4.1 在檢查前，驗船師應檢查船上文件的完整性及其內容，以作為檢驗的一個基礎。

7 厚度測量程序

7.1 綜述

7.1.1 厚度測量通常在驗船師監督下進行。但驗船師可接受不在他直接監督下進行的厚度測量，只要符合下述條件：

.1 由主管機關認可的一個組織發給證書的合格公司進行厚度測量；

.2 在完成第 2 節規定的定期檢驗或第 4 節規定的中期強化檢驗前的 12 個月內進行厚度測量。

驗船師應對測量結構作必要複查，以確保可接受的準確性。

7.2 對厚度測量公司的發證

7.2.1 厚度測量應按照附件 7 所述原則，由主管機關認可的一個組織發給證書的合格公司進行。

7.3 報告

7.3.1 應擬寫厚度測量報告並提交主管機關。該報告應提供測量的位置、所測厚度以及相應的原始厚度。此外，該報告應提供進行測量的日期、測量設備的類型、人員姓名及其資格並由操作人簽名。厚度測量報告應遵循在附件 10 中所載厚度測量建議程序規定的原則。

7.3.2 驗船師應驗證和會簽厚度測量報告。

8 報告和檢驗評估

8.1 檢驗報告的評估

8.1.1 應對在檢驗期間收集的船舶結構狀況的數據和資料作出評估，以確定船舶的可接受性和連續結構完整性。

8.1.2 主管機關應對數據作出分析和簽註，分析的結論應構成狀況評估報告的一部分。

8.2 報告

8.2.1 檢驗報告的原則載於附件 8 中。

8.2.2 如附件 9 所示，檢驗的狀況評估報告和結果應發給船舶所有人並放在船上供今後檢驗參考。狀況評估報告應由主管機關簽註。

附件 1

定期檢驗的細節檢驗要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
（A）一個寬板肋骨框架 - 在翼壓載水艙內（如有的話），或主要用於壓載水的翼液貨艙內 （B）一個甲板橫材 - 在液貨艙中 （D）一個橫向艙壁 - 在翼液貨艙中 （D）一個橫向艙壁 - 在中央液貨艙中	（A）所有寬板肋骨框架 - 在翼壓載水艙內(如有的話)，或主要用於壓載水的翼液貨艙內 （B）一個甲板橫材 - 在每一個餘下的壓載水艙內（如有的話） （B）一個甲板橫材 - 在翼液貨艙內 （B）一個甲板橫材 - 在二個中央液貨艙內 （C）兩個橫向艙壁，在翼壓載水艙內（如有的話）或主要用於壓載水的翼液貨艙內	（A)所有寬板肋骨框架 - 在所有壓載水艙內 （A)所有寬板肋骨框架 - 在翼液貨艙內 （A)一個寬板肋骨框架 - 在每個餘下的翼液貨艙內 （C）所有橫向艙壁 - 在所有液貨艙和壓載水艙內 （E)一個甲板和底部橫材 - 在每個中央液貨艙內 （F)主管機關認為必要者	同第 3 欄所述船舶一樣 如主管機關認為必要，包括補充的橫材

	（D）一個橫向艙壁 - 在每個餘下的壓載水艙內 （D）一個橫向艙壁 - 在翼液貨艙內 （D）一個橫向艙壁 - 在二個中央液貨艙內		

（A） 包括鄰近結構部件的完整橫向寬板肋骨框架

（B） 包括鄰近甲板結構部件的甲板橫材

（C） 完整的橫向艙壁 - 包括桁和鄰近部件

（D） 橫向艙壁下部 - 包括桁系統和鄰近結構部件

（E） 包括鄰近結構部件的甲板和底部橫材

（F） 額外的完整橫向寬板肋骨框架

附件 2

定期檢驗的厚度測量要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
1.貨物區域內船舶全寬的甲板板材一個截面（對於壓載水艙（如有的話）或在主要用於壓載水的液貨艙）	1.在貨物區域內 .1 每塊甲板板材 .2 一個橫截面	1.在貨物區域內 .1 每塊甲板板材 .2 二個橫截面	1.在貨物區域內 .1 每塊甲板板材 .2 三個橫截面 .3 每塊船底列板
2.應接受附件 1 規定的細節檢驗的結構性部件的測量，供對鏽蝕分佈作一般評估和記錄使用	2.應接受附件 1 規定的細節檢驗的結構性部件的測量，供對鏽蝕分佈作一般評估和記錄使用	2.應接受附件 1 規定的細節檢驗的結構性部件的測量，供對鏽蝕分佈作一般評估和記錄使用	2.應接受附件 1 規定的細節檢驗的結構性部件的測量，供對鏽蝕分佈作一般評估和記錄使用
3.可疑區域	3.可疑區域 4.在貨物區域外，有選擇的風和水的列板	3.可疑區域 4.在貨物區域外，有選擇的風和水的列板 5.在貨物區域內所有風和水的列板	3.可疑區域 4.貨物區域外，有選擇的風和水的列板 5.貨物區域內，所有風和水的列板

附件 3

定期檢驗時對液艙壓力測量的要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
1.面對壓載艙空餘場所、管隧、燃油艙、泵房或隔離艙的液貨艙邊界。	1.面對壓載艙、空餘場所、管隧、燃油艙、泵房或隔離艙的液貨艙邊界。	1.面對壓載艙、空餘場所、管隧、燃油艙、泵房或隔離艙的液貨艙邊界。	1.面對壓載艙、空餘場所、管隧、燃油艙、泵房或隔離艙的液貨艙的邊界。
2.裝淡水、燃油和潤滑油的有代表性的液艙。	2.構成隔離貨物邊界的所有液貨艙艙壁。	2.所有餘下的液貨艙艙壁。	2.所有餘下的液貨艙艙壁。
	3.裝淡水、燃油和滑潤油的有代表性的液艙。	3.裝淡水、燃油和滑潤油的有代表性的液艙。	3.所有淡水、燃油和滑潤油艙。

附件 4

對嚴重鏽蝕區域厚度測量範圍的要求

貨物區域內的定期檢驗

船底結構

結構性部件	測量範圍	測量方式
1.船底列板	至少橫越液艙的三個分段，包括船尾分段。在所有喇叭口周圍和下方測量。	在縱材和桁材間每塊板 5 點型。
2.船底縱板	在測量船底板材處每個分段上至少三個縱材。	在橫越法欄線上測三次和在垂直桁上測三次。
3.船底桁和肘板	在前和後橫向艙壁肘板下端和在液艙中央。	在每塊面板的加強筋之間單次測量，同時在桁材板材上的垂直線上測一次，或至少測量三次通過表面扁條測二次。在桁／艙壁肘板上 5 點型。
4.船底橫向桁材	在兩端和中間測量過船底列板的分段處的 3 個桁材。	在 2 平方米區域上的 5 點型在表面扁上。
5.面板加強材	在安裝處。	單次測量。

甲板結構

結構性部件	測量範圍	測量方式
1.甲板板材	跨越液艙的二條帶狀。	每條帶上每塊板材至少測量三次。
2.甲板縱材	二個分段上每塊至少三個縱材。	在垂直於桁材上測三次在法欄上測二次（如裝有的話）。
3.甲板桁和肘板	在前和後橫向艙壁肘板和在液艙中央。	每塊面板的加強材之間測量一次，同時在桁材板材上的垂直線上測一次，或至少測量三次通過表面扁條測二次。在桁／艙壁肘板上 5 點型。
4.甲板橫向桁材	間隔中央和兩端測量過的至少二個桁材。	在 2 平方米上 5 點型。在表面扁條上單次測量。
5.面板加強材	在具備處。	單次測量。

船殼和縱向艙壁

結構性部件	測量範圍	測量方式
1.艙頂甲板和船底列板和在縱桁平台附近的列板	至少 3 個分段上的每對縱材之間的板材	單次測量
2.所有其他列板	在同樣 3 個分段上每第 3 對縱材之間的板材	單次測量
3.縱材 – 艙頂甲板和船底列板	在同樣 3 個分段上的每個縱材	跨橫桁材三次測量，在法蘭上單次測量
4.縱材 – 所有其他者	在同樣 3 個分段上的每 3 個縱材	跨橫桁材三次測量和在法蘭上單次測量
5.縱材-肘板	在同樣 3 個分段上，在液艙頂部、中間和底部至少三處	在肘板區域上 5 點型
6.寬板肋骨和橫撐材	3 個桁材，每個桁材上至少 3 個位置，包括在橫撐材接頭附近的桁材	在 2 平方米區域上 5 點型加上在寬板肋骨和橫撐材表面扁條上單次測量

橫向艙壁和防晃縱隔艙

結構性部件	測量範圍	測量方式
1.艙頂甲板和船底列板和縱桁平台附近的列板	大約在液艙 1／4、1／2、和 3／4 寬度處三個位置的各對加強筋間的板材	在 1 米長度上加強筋間 5 點型
2.所有其他列板	在中間位置的一對加強筋間的板材	一次測量
3.在波形艙壁中的外板	在面板中央和在法蘭或預製接頭處尺寸的每一改變的板材	在板材 1 平方米上 5 點型
4.加強筋	至少三根典型加強筋	對桁材，在肘板連接間間隔上 5 點型（在每個肘板連接處跨越的桁材二次測量，和在間隔中央一次測量）。對法蘭，在每個肘板下部和間隔中央一次測量
5.肘板	在液艙頂部、中間和底部至少三處	在肘板區域上 5 點類型
6.深桁材和桁	在肘板下部和間距中央測量	對桁材，在 1 平方米區域上 5 點型。跨越表面的扁條 3 次測量

7.縱桁平台	所有縱桁均在兩端和中間測量	在 1 平方米區域上 5 點型加上在肘板下部附近和在表面扁條上單次測量

附件 5

所有人的檢查報告

結構狀況

船名： .....

所有人的檢查報告 – 結構狀況

對第.....號液艙／艙

鋼材等級： 甲板： ..... 舷側： .....

底部： ..... 縱向艙壁： .....

部位	裂縫 彎曲 鏽蝕 塗層狀況 點蝕 改裝／修理 其他
甲板： 船底部： 側舷： 邊肋骨： 橫向艙壁：	

因何進行修理：

進行厚度測量（日期）：

總體結果：

過期檢驗：

入級的未完成條件：

評語：

檢查日期： .....

檢查人： .....

簽字： .....

附件 6

計劃文件的原則

1 計劃文件的目的是識別危險的結構區域和確定對於各部分和內部結構以及指定的可疑區域的細節檢驗和厚度測量的最小範圍、位置和方法。

2 文件應由所有人在檢驗前及早與主管機關合作制訂。

3 選擇 1 段中所述處所和區域的基礎，是在考慮可能的惡化時所作的風險評估，評估要計及船舶的下述要素：

.1 設計特性，例如高強度鋼和局部零件的範圍；

.2 在所有人和主管機關辦公室中存備的特定船舶以及類似船舶的鏽蝕、裂縫、彎曲、凹痕和合理方面的歷史；

.3 上述辦公室提供的有關貨種、使用不同液艙／艙、防鏽系統和塗層狀況的資料（如有的話）。

4 根據公認原則和做法來判斷和決定其危險程度。

5 計劃文件應包括：

.1 主要參數；

.2 液艙／艙圖；

.3 帶有關於塗層的使用、保護和狀的資料的液艙／艙的清單；

.4 液艙鏽蝕風險的確定；

.5 結構設計風險的確定；

.6 作細節檢驗的液艙和區域的確定；

.7 厚度測量的部分和結構物的確定；和

.8 不同結構物可接受的鏽蝕餘度清單。

附件 7

對從事船殼結構物厚度測量公司發證的程序

1 適用範圍

本指南適用於對打算從事船舶船體結構物的厚度測量的公司的發證工作。

2 發證程序

提交文件

2.1 應向主管機關認可的組織提交下述文件供批准。

.1 公司的概況，例如組織和管理結構。

.2 公司在船舶船體結構物的厚度測量方面的經驗。

.3 技術人員的履歷，即作為厚度測量操作人員的技術人員的經歷、技術知識和船體結構經驗等等。操作人員的資格應符合經認可的工業無損試驗標準的。

.4 用於厚度測量的設備（例如超聲波測試機）及其保養／校準程序。

.5 厚度測量操作人員的指南。

.6 厚度測量技術人員培訓方案。

.7 符合推薦的厚度測量程序（見附件 10）的測量記錄格式。

對公司的審查

2.2 在檢查提交的文件並感到滿意時，應審查該公司，從根據提交的文件確定該公司有適當的組織和管理，因此有能力進行船舶船體結構厚度測量。

2.3 發證條件是厚度測量的船上示證以及令人滿意的報告。

3 發證

3.1 在對 2.2 所述的對公司的審查和 2.3 所述的示證試驗均感到滿意時，主管機關或主管機關認可的組織應頒發認可證書以及已對該公司的厚度測量操作系統驗證的通知。

3.2 應在每隔不超過 3 年的時間，通過驗證原有狀況得到了保持，對證書進行更新／簽註。

4 經驗證厚度測量操作系統的任何改動的報告

在對經驗證的厚度測量操作系統作出任何改動時，應將這種改動立即報告經主管機關認可的組織。主管機關認可的組織如認為必要，應作出重新審查。

5 證書的撤銷

在下述情況下，可撤銷證書：

.1 測量不正確或未對結果作正確報告；

.2 驗船師發現該公司經批准的厚度測量操作系統中有任何缺陷；

.3 該公司未按要求將 4 中所述的任何改動報告經主管機關認可的組織。

附件 8

報告的原則

報告格式應由主管機關逐一制訂。作為一項原則，對於油輪結構，應根據檢驗視情包括下述報告內容：

1 檢驗類型（定期檢驗、中期強化檢驗、年度檢驗、其他）

1.1 日期、地點、是否在乾塢中檢驗和是否完成了檢驗。

1.2 原先進行的下述工作的日期：

- 船底檢查 .....
- 進乾塢 .....

2 檢驗範圍

2.1 指明全面檢查處。

2.2 在每個液艙中，進行細節檢查的位置和進入的方法。

2.3 指明進行厚度測量的液艙和結構物的位置。

2.4 指明壓力測試液艙。

3 檢驗的結果

3.1 每一液艙的塗層狀況（如適用）。指明有陽極的液艙。

3.2 每一液艙的結構狀況：

- 處於令人滿意狀況的註明處所。在狀況不合格時，指明應予改正或記錄的情況，例如：

- 鏽蝕： - 結構部件
  - 鏽蝕類型（點蝕、一般）
  - 範圍
- 裂縫（位置）
- 彎曲（位置）
- 凹痕（位置）

陳述報告可由損壞／修理的草圖／照片補充。

3.3 由出席的驗船師簽註厚度測量報告。

4 對可能情況的行動

4.1 在認定的液艙進行的修理：

- 結構部件
- 修理方法
- 修理範圍

4.2 被認為不必立即進行修理的記錄情況。應作出對今後檢查和厚度測量的備忘錄，例如發現的鏽蝕可疑區域（見 1.2.6）。

4.3 狀況類別／船旗國的要求。

報告內容的結構可以是不同的，視主管機關的報告系統而定。

附件 9

狀況評估報告

在完成定期檢驗時頒發

一般參數

船名：

船級／主管機關識別號：
原船級／主管機關識別號：
海事組織編號：

船籍港：

國旗：
原國旗：

載重量（噸）：

總噸位：
國家：
國際貿易中心（1969）：

建造日期：

船級符號：

重大改建日期：

改建類型：

所有人：
原所有人：

1 下列檢驗報告和文件已經簽署者審核認為滿意

2 在（日期）……已按照本指南完成了定期檢驗

狀況評估報告 填寫人	姓名 簽名	職別
辦公室	日期	
狀況評估報告 審核人	姓名 簽名	職別
辦公室	日期	

所附報告和文件：

1）

2）

3）

4）

5）

6）

狀況評估報告的內容

第 1 部分 - 一般參數： - 見標題頁

第 2 部分 - 報告審查： - 檢驗地點和方法

第 3 部分 - 細節檢驗： - 範圍（任何液艙）

第 4 部分 - 厚度測量： - 查閱厚度測量報告
- 測量位置概況
- 註明嚴重鏽蝕液艙的獨立表格和相應的：
  - 厚度減薄
  - 鏽蝕類型

第 5 部分 - 液艙防鏽系統： - 註明下述者的獨立表格：
- 塗層／陽極位置
- 塗層狀況（如適用）

第 6 部分 - 修理： - 指明液艙／區域

第 7 部分 - 狀況類別／船旗國要求：

第 8 部分 - 備忘錄： - 可接受缺陷
- 今後檢驗的任何應注意點，例如可疑區域
- 由於塗層開裂而被擴大的年度／中 期強化檢驗

第 9 部分 - 結論： - 對檢驗報告／審核的說明

厚度測量摘要

參閱厚度測量報告：

有重大鏽蝕的液艙區域的位置 [1]	厚度減薄 [%]	鏽蝕類型 [2]	備註：例如有查閱號的草圖

備註

1 嚴重鏽蝕，即可接受的耗廢餘量的 75% - 100%。

2 P = 點蝕

C = 總體鏽蝕

液艙／艙防鏽系統

液艙號／艙號 [1]	液艙／艙的防鏽系統 [2]	塗層狀況 [3]	備註

備註

1. 應列出所有隔離壓載水艙和貨物／壓載兩用艙。
2. C = 塗層　A = 陽極　NP = 無保護
3. 下述標準的塗層狀況。

良好　僅有少量點狀鏽斑。

中等　加強筋和焊縫連接邊緣塗層局部開裂和／或輕度鏽蝕佔考慮區域的 20%或更大，但小於對“不良狀況”所規定者。

不良　普遍開裂的塗層佔考慮區域的 20%或更大或硬質鏽皮佔考慮區域的 10%或更大。

如果塗層被定為“不良狀況”，則應採取擴大年度檢驗。這一點應在狀況評估報告內容第 7 部分中作出說明。

附件 10

厚度測量的推薦程序

綜述

1 這些程序應用於記錄附件 2 所要求的厚度測量。

2 附錄 2 所載 TM1、TM2-T、TM3-T、TM4-T、TM5-T、TM6-T 的報告格式應用於記錄厚度測量。

3 附錄 3 載有有關報告格式和厚度測量要求的圖解和說明。

4 在合適時，應以結構草圖上標明的數據補充報告表格。

附錄 1　一般參數

附錄 2　厚度測量報告

附錄 3　厚度測量指南

附錄 1

一般參數

船名：

海事組織號：

船級／主管機關的識別號：

船籍港：

總噸位：

載重量：

建造日期：

船級社：

進行厚度測量的公司名稱：

向厚度測量公司發證者：

證書號碼：

證書有效期自：.....至.....

測量地點：

第一測量日：

最後測量日：

定期檢驗／中間強化檢驗到期日期*：

---

* 視情刪去。

測量設備詳情：

操作者的資格：

報告編號： 共……頁

操作者姓名：…… 驗船師姓名……

操作者簽字：…… 驗船師簽字. . ……

公司正式印章：…… 主管機關：……

正式印章：……

附錄 2

厚度測量報告

關於所有甲板板材、所有船底外殼板材或舷側船殼板材的厚度測量的報告（TM1-T）

船名……海事組織號……船級識別號……報告號……

列板位置																		
板材位置	號碼或字符	原厚度（毫米）	前讀數						後讀數						平均減少量	
			測量		減少量左舷		減少量右舷		測量		減少量左舷		減少量右舷			
			左舷	右舷	毫米	%	毫米	%	左舷	右舷	毫米	%	毫米	%	左舷	右舷
前第 12																
第 11																
第 10																
第 9																
第 8																
第 7																
第 6																
第 5																
第 4																
第 3																
第 2																
第 1																
船舯部																
後第 1																
第 2																
第 3																
第 4																
第 5																
第 6																
第 7																
第 8																
第 9																
第 10																
第 11																
第 12																

操作人簽名……　　驗船師簽字……　　註－見下頁

註釋

1 本報告應用於記錄下述者的厚度測量：

.1 在貨物區域內的所有強力甲板板材。

.2 在貨物區域內的龍骨、船底殼板和舭板。

.3 在貨物區域外被選定為風和水列板的舷側船殼板。

2 列板的位置應清楚表示如下：

.1 對強力甲板，表明縱桁板內側的列板號碼。

.2 對船底列板，表明龍骨板外側的列板號碼。

.3 對舷側船殼板提供外板展示圖所示的舷側厚板和字符下的列板號碼。

3 對油船，應記錄所有甲板列板，對礦砂／油類兩用船，僅記錄開口線外的甲板列板。

4 應在所有板材的前部和後部區域和在板材與壓載水艙／液貨艙邊界交界進行測量，對在每個類型液艙附近的板材區域的單獨測量應予記錄。

5 記錄的單一測量數據應代表多次測量的平均值。

（一、二或三橫截面的）船殼和甲板板材的厚度測量報告（TM2 - T（1））

船名.....海事組織號.....船級識別號.....報告號.....

強力甲板和舷側厚板																								
列板位置	第一橫截面所處肋骨號碼								第二橫截面所處肋骨號碼								第三橫截面所處肋骨號碼							
	號碼或字符	原厚度（毫米）	測量		減少量左舷		減少量右舷		號碼或字符	原厚度（毫米）	測量		減少量左舷		減少量右舷		號碼或字符	原厚度（毫米）	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%
舷側厚板																								
第1列板																								
第 2																								
第 3																								
第 4																								
第 5																								
第 6																								
第 7																								
第 8																								
第 9																								
第 10																								
第 11																								
第 12																								
第 13																								
第 14																								
中央列板																								
舷側厚板																								
上面合計																								

操作人簽字.....　　驗船師簽字.....

註 - 見下頁

註釋

1 本報告應用於記錄強力甲板板材和舷側厚板橫截面的厚度測量：

在貨物長度區域內的二個或三個部分，由附錄 3 中表明縱向和橫向構件的典型橫截面的圖示所示的結構項目（1）、（2）和（3）組成。

2 對油輪，應記錄所有甲板列板，對礦砂／油類兩用船僅應記錄開口線外的甲板列板。

3 頂邊區域由甲板板材、縱桁板和舷側厚板（包括圓弧船舷）組成。

4 應註明測量的準確肋骨位置。

5 記錄的單一測量數據應代表多次測量的平均值。

（一、二或三橫截面的）船殼和甲板板材的厚度測量報告（TM2 - T（2））

船名……海事組織號……船級識別號……報告號……

船殼板材																								
	第一橫截面所處肋骨號碼								第二橫截面所處肋骨號碼								第三橫截面所處肋骨號碼							
列板位置	號碼或字符	原厚度（毫米）	測量		減少量左舷		減少量右舷		號碼或字符	原厚度毫米	測量		減少量左舷		減少量右舷		號碼或字符	原厚度（毫米）	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%
舷側厚板下第1																								
第 2																								
第 3																								
第 4																								
第 5																								
第 6																								
第 7																								
第 8																								
第 9																								
第 10																								
第 11																								
第 12																								
第 13																								
第 14																								
第 15																								
第 16																								
第 17																								
第 18																								
第 19																								
第 20																								
龍骨厚板																								
底部合計																								

操作人簽字……　　驗船師簽字……

註 - 見下頁

註釋

1 本報告應用於記錄船殼板材橫截面的厚度測量：

貨物長度區域內一、二或三個截面，由附錄 3 中表明縱向和橫向構件的典型橫截面的圖示所示的結構物（4）、（5）、（6）和（7）組成。

2 底部區域由龍骨板、船底板和舭板構成。

3 應註明測量的準確肋骨位置。

4 記錄的單一測量數據應代表多次測量的平均值。

（一、二或三橫截面的）縱向部件的厚度測量報告（TM3 - T）

船名.....海事組織號.....船級識別號.....報告號.....

	第一橫截面所處肋骨號碼								第二橫截面所處肋骨號碼								第三橫截面所處肋骨號碼							
結構部件	項目號碼	原厚度（毫米）	測量		減少量左舷		減少量右舷		項目號碼	原厚度（毫米）	測量		減少量左舷		減少量右舷		項目號碼	原厚度（毫米）	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%			左舷	右舷	毫米	%	毫米	%

操作人簽字.....　　驗船師簽字.....　　註 - 見下頁

註釋

1 本報告應用於記錄船殼板材橫截面的厚度測量：

貨物區域內一、二或三個截面，由附錄 3 中表明縱向和橫向構件的典型橫截面的圖示所示的結構物（8）至（20）組成。

2 應註明測量的準確肋骨位置。

3 記錄的單一測量數據應代表多次測量的平均值。

貨物區域內液貨艙和壓載水艙橫向構件的厚度測量報告（TM4-T）

船名……海事組織號……船級識別號……報告號……

液艙說明：								
結構位置：								
結構部件	項目	原厚度（毫米）	測量		減少量左舷		減少量右舷	
			左舷	右舷	毫米	%	毫米	%

操作人簽字……　　檢驗師簽名……　　註－見下頁

註釋

1 本報告應用於記錄橫向構件的厚度測量，其中包括附錄 3 中（25）至（32）的適當結構項目（見指示縱向和橫向構件的典型橫截面圖）。

2 附錄 3 的表 1 至表 3 載明對測量區域的指南。

3 記錄的單一測量數據應代表多次測量的平均值。

液貨艙或貨艙處所內水密／油密橫向艙壁的厚度測量報告（TM5-T）

船名……海事組織號……船級識別號……報告號……

液艙／艙說明：							
結構位置：							
結構部件（板材／加強肋）	原厚度（毫米）	測量		減少量左舷		減少量右舷	
		左舷	右舷	毫米	%	毫米	%

操作人簽名……　　驗船師簽字……

註 - 見下頁

註釋

1 本報告應用於記錄水密／油密貨艙橫向艙壁的厚度測量。

2 附錄 3 的表 1 至表 3 載有測量區域的指南。

3 記錄的單一測量應代表多次測量的平均值。

其他結構部件厚度測量報告（TM6-T）

船名……海事組織號……船級識別號……報告號……

結構部件：								草圖
結構位置：								
說明	原厚度（毫米）	測量		減少量左舷		減少量右舷		
		左舷	右舷	毫米	%	毫米	%	

操作人簽名……　　檢驗師簽字……

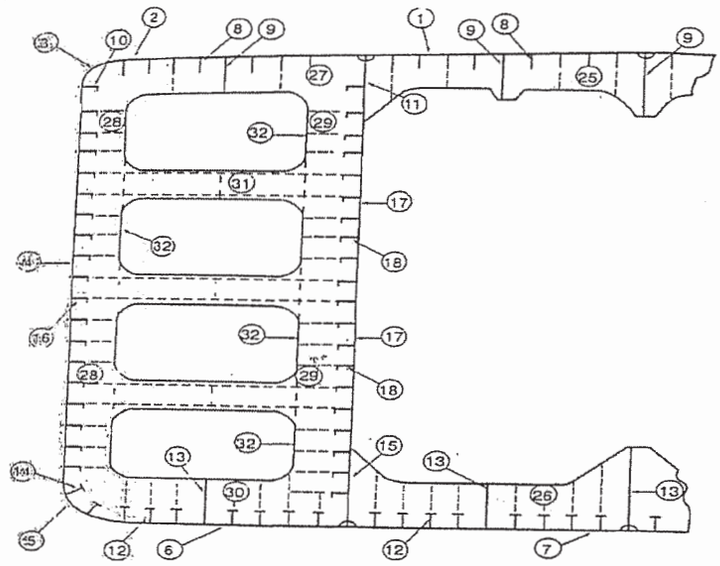
註－見下頁

註釋

1 本報告格式應用於記錄附錄 3 中包括結構部件項目（36）、（37）和（38）的其他結構部件的厚度測量。

2 單一測量應代表多次測量的平均值。

附錄 3
厚度測量指南
表明縱向和橫向構件的典型橫截面



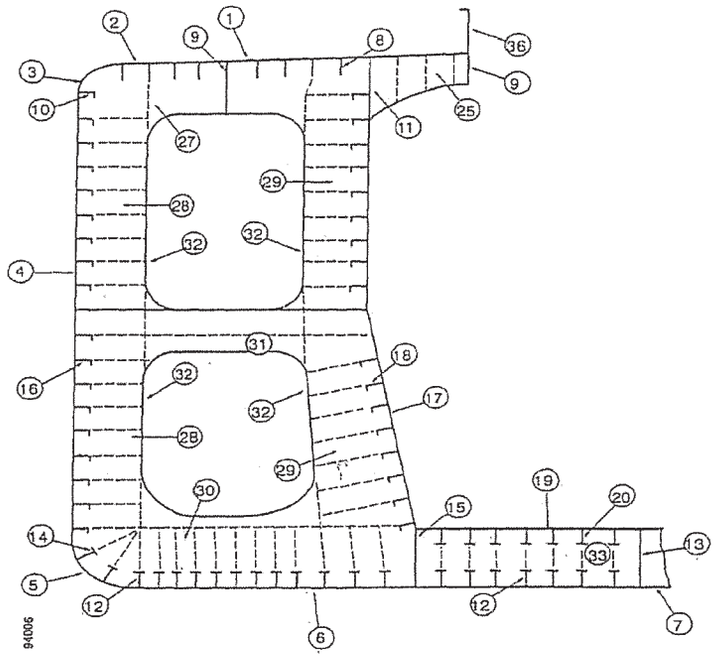
在 TM2-T（1）和（2）上報告
[1] 強力甲板板材
[2] 縱桁板
[3] 舷側厚板
[4] 舷側船殼板
[5] 舭板
[6] 船底外殼板材
[7] 龍骨板

在 TM3-T 上報告
[8] 甲板縱材
[9] 甲板桁
[10] 舷側厚板縱材
[11] 縱向艙壁底部外板
[12] 船底縱材
[13] 船底桁
[14] 舭部縱材
[15] 縱向艙壁下外板
[16] 舷側外殼縱材
[17] 縱向艙壁板材（剩餘）
[18] 縱向艙壁縱材
[19] 內底板材
[20] 內底縱材
[21]
[22]
[23]
[24]

在 TM4-T 的報告
[25] 甲板橫向中央液艙
[26] 底部橫向中央液艙
[27] 甲板橫向翼液艙
[28] 舷側外殼垂直桁材
[29] 縱向艙壁垂直桁材
[30] 底部橫向翼液艙
[31] 支柱
[32] 橫向桁材面板
[33] 雙層底肋板
[34]
[35]

TM6-T 上報告
[36] 艙口圍板
[37] 艙口間甲板板材
[38] 艙口蓋
[39]
[40]

礦砂／油類船的典型橫截面表明縱向和橫向部件



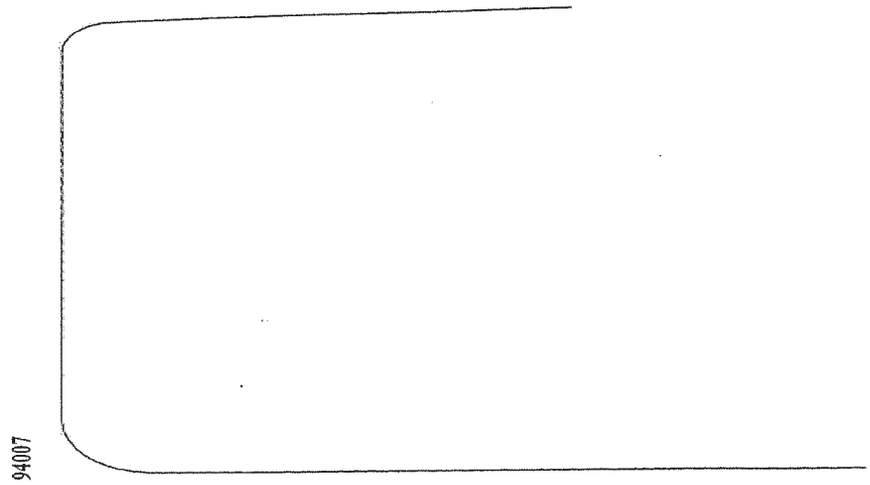
在 TM2-T（1）和（2）上報告
[1] 強力甲板板材
[2] 縱桁板
[3] 舷側厚板
[4] 舷側船殼板
[5] 舭板
[6] 船底外殼板材
[7] 龍骨板

在 TM3-T 上報告
[8] 甲板縱材
[9] 甲板桁
[10] 舷側厚板縱材
[11] 縱向艙壁底部外板
[12] 船底縱材
[13] 船底桁
[14] 舭部縱材
[15] 縱向艙壁下外板
[16] 舷側外殼縱材
[17] 縱向艙壁板材（剩餘）
[18] 縱向艙壁縱材
[19] 內底板材
[20] 內底縱材
[21]
[22]
[23]
[24]

在 TM4-T 的報告
[25] 甲板橫向中央液艙
[26] 底部橫向中央液艙
[27] 甲板橫向翼液艙
[28] 舷側外殼垂直桁材
[29] 縱向艙壁垂直桁材
[30] 底部橫向翼液艙
[31] 支柱
[32] 橫向桁材面板
[33] 雙層底肋板
[34]
[35]

在 TM6-T 上報告
[36] 艙口圍板
[37] 艙口間甲板板材
[38] 艙口蓋
[39]
[40]

橫截面輪廓
（用於縱向和橫向部件不適用於典型的油船或油船／礦砂船橫截面）



在 TM2-T（1）和（2）上報告
[1] 強力甲板板材
[2] 縱桁板
[3] 舷側厚板
[4] 舷側船殼板
[5] 舭板
[6] 船底外殼板材
[7] 龍骨板

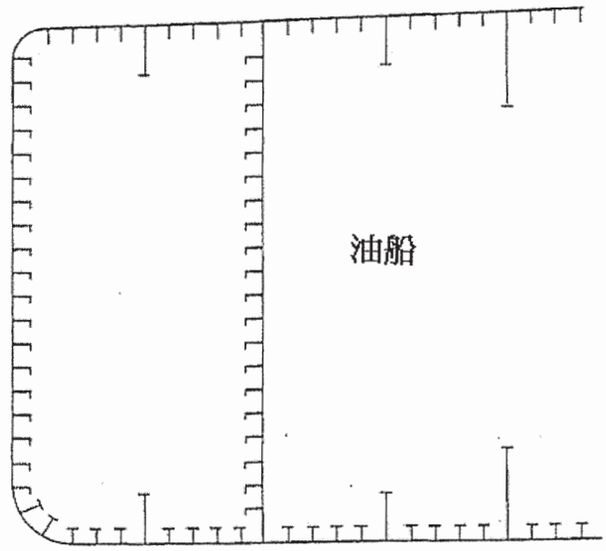
在 TM3-BC 上報告
[8] 甲板縱材
[9] 甲板桁
[10] 舷側厚板縱材
[11] 縱向艙壁底部外板
[12] 船底縱材
[13] 船底桁
[14] 舭部縱材
[15] 縱向艙壁下外板
[16] 舷側外殼縱材
[17] 縱向艙壁板材（剩餘）
[18] 縱向艙壁縱材
[19] 內底板材
[20] 內底縱材
[21]
[22]
[23]
[24]

在 TM4-T 的報告
[25] 甲板橫向中央液艙
[26] 底部橫向中央液艙
[27] 甲板橫向翼液艙
[28] 舷側外殼垂直桁材
[29] 縱向艙壁垂直桁材
[30] 底部橫向翼液艙
[31] 支柱
[32] 橫向桁材面板
[33] 雙層底肋板
[34]
[35]

在 TM4-BC 上報告
[36] 艙口圍板
[37] 艙口間甲板板材
[38] 艙口蓋
[39]
[40]

典型橫截面

表明要在 **TM2-T** 和 **TM3-T** 上報告的所有縱向部件



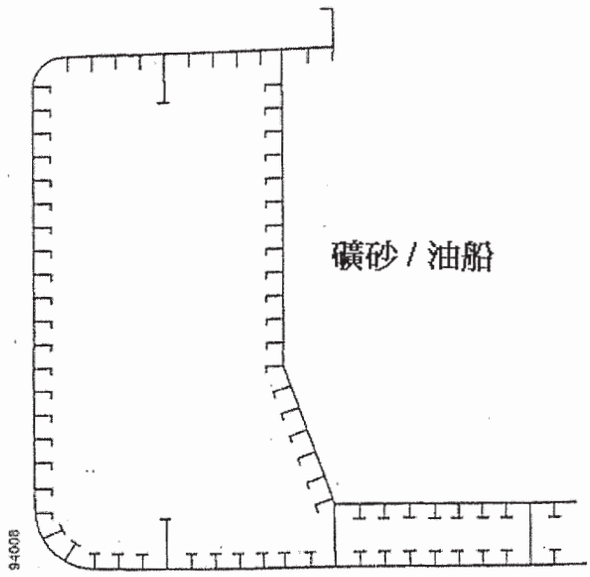


表 1 - 厚度測量要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
1. 在貨物區域內，在船舶整根梁上的甲板板材的一分段（在壓載艙附近，如有的話，或在主要用於壓載水的液貨艙附近）	1.在貨物區域內 .1 每塊甲板板材域內： .2 一個橫截面	1.在貨物區域內 .1 每塊甲板板材 .2 二個橫截面	1.在貨物區域內 .1 每塊甲板板材 .2 三個橫截面 .3 每個底板
2.為總體評估和記錄鏽蝕類型，根據按照本附錄 2 表和表 3 的細節檢驗，須進行的結構性部件的測量	2.為總體評估和記錄鏽蝕類型，根據按照本附錄表 2 和表 3 的細節檢驗，須進行的結構性部件的測量	2.為總體評估和記錄鏽蝕類型，根據按照本附錄表 2 和表 3 的細節檢查，須進行的結構性部件的測量	2.為總體評估和記錄鏽蝕類型，根據按照本附錄表 2 和表 3 的重點檢查，須進行的結構性部件的測量
3.可疑區域	3.可疑區域 4.可疑區域外，經選擇的風和水列板	3.可疑區域 4.貨物區域外，經選擇的風和水外板 5.在貨物區域內所有的風和水列板	3.可疑區域 4.貨物區域外，經選擇的風和水列板 5.在貨物區域內所有的風和水列板

表 2 - 細節檢驗要求

船齡≤5	5<船齡≤10	10<船齡≤15	船齡>15
1	2	3	4
（A）一個框架肋骨圈 - 在壓載翼艙中，如有的話，或在一個主要用於壓載水的翼液貨艙中	（A）所有框架肋骨圈-在一個壓載翼艙中，如有的話，或在一個主要用於壓載水的翼液貨艙中	（A）所有框架肋骨圈-在所有壓載艙中 （A）所有寬板肋骨圈-在一個翼液貨艙中 （A）一個寬板肋骨圈-在每個餘下的翼液貨艙中	對於船舶參見第 3 欄 按主管機關視為必要的補充橫材在內
（B）一個甲板橫材 - 在一個液貨艙中	（B）一個甲板橫材-在每個餘下的壓載艙中，如有的話	（C）所有橫向艙壁-在所有液貨艙和壓載艙中	
（D）一個橫向艙壁-在一個壓載艙中	（B）一個甲板橫材-在一個翼液貨艙中	（E）一個甲板和船底橫材-在每個中央液貨艙中	
（D）一個橫向艙壁-在一個翼液貨艙中	（B）一個甲板橫材-在二個中央液貨艙中	（F）按主管機關認為必要者	

（D）一個橫向艙壁-在一個中央液貨艙中	（C）兩個橫向艙壁，在翼壓載艙中，如有的話，或在主要用於壓載水的一個翼液貨艙中 （D）一個橫向艙壁-在每個翼液貨艙中 （D）一個橫向艙壁-在一個翼液貨艙中 （D）一個橫向艙壁-在二個中央液貨艙中		

（A） 包括鄰近結構性部件的完整橫向框架肋骨圈

（B） 包括鄰近甲板結構性部件的甲板橫材

（C） 完整橫向艙壁－包括桁系統和鄰近部件

（D） 橫向艙壁下部－包括桁系統和鄰近結構性部件

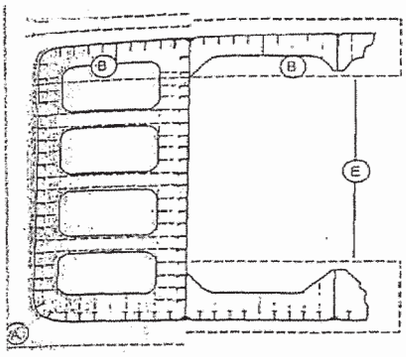
（E） 包括鄰近結構性部件*的甲板和船底橫材

（F） 補充的完整橫向的框架肋骨圈

*註：對礦砂／油類兩用船僅適用甲板橫材

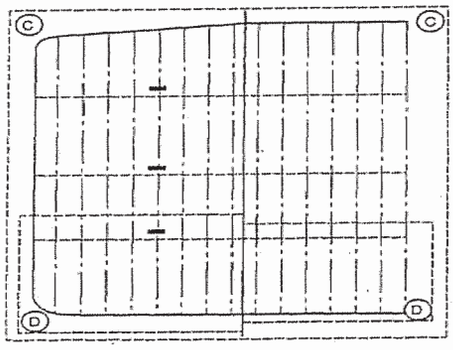
細節檢驗要求
（與細節檢驗相結合表明典型區域的油船和礦砂／油類混散船的橫截面）

油輪典型橫截面



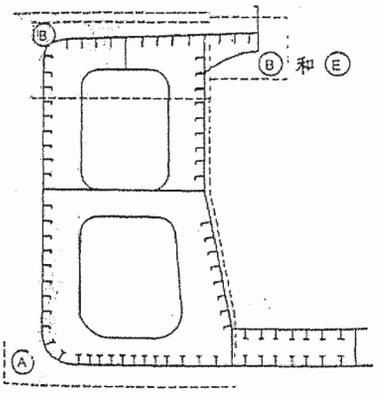
視情在 TM3-T 和 TM4-T 上報告厚度

油輪典型橫向艙壁



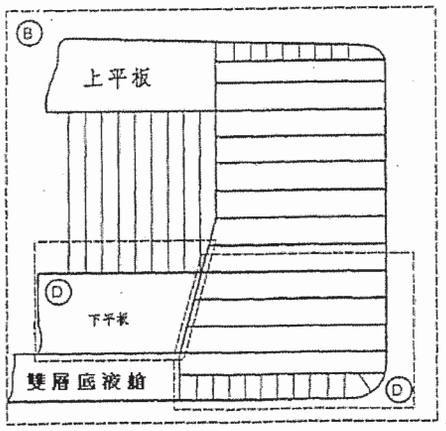
在 TM5-T 上報告厚度

礦砂／油類混裝船
細節檢查典型橫截面



視情在 TM3-T 和 TM4-T 報告厚度

礦砂／油類船
典型橫截面艙壁



在 TM5-T 上報告厚度

細節
檢驗區

厚度測量的範圍和類型型的建議見附件 4 所示

RESOLUTION A.744(18)
adopted on 4 November 1993

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS
DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING ALSO resolution A.713(17) on Safety of ships carrying solid bulk cargoes, by which it specified interim measures to be taken to improve the safety of ships carrying solid bulk cargoes,

RECALLING FURTHER its request to the Maritime Safety Committee to carry out its work on the safety of ships carrying solid bulk cargoes with high priority and to develop, inter alia, requirements for the enhanced programme of survey of such ships,

RECALLING ALSO that by resolution MEPC.52(32) the Marine Environment Protection Committee adopted amendments to the Annex to the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 regarding new regulations 13F and 13G and related amendments to Annex I of MARPOL 73/78 to improve the requirements for the design and construction of oil tankers to prevent oil pollution in the event of collision or stranding,

NOTING that in accordance with the above regulation 13G, crude oil tankers of 20,000 tons deadweight and above and product carriers of 30,000 tons deadweight and above shall be subject to the enhanced programme of inspections, the scope and frequency of which shall at least comply with the guidelines developed by the Organization,

RECOGNIZING the need to also provide the guidelines on the enhanced programme of inspections for all oil tankers in order to further promote safety and marine pollution prevention,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its sixty-second session and the Marine Environment Protection Committee at its thirty-fourth session,

1. ADOPTS:

.1 the Guidelines on the Enhanced Programme of Inspections During Surveys of Bulk Carriers, set out in Annex A to the present resolution, and

.2 the Guidelines on the Enhanced Programme of Inspections During Surveys of Oil Tankers, set out in Annex B to the present resolution;

2. INVITES Governments to apply the Guidelines as soon as possible to all bulk carriers and oil tankers respectively;

3. REQUESTS the Maritime Safety Committee and the Marine Environment Protection Committee to keep the Guidelines under review and update them as necessary, in the light of experience gained in their application.

ANNEX A

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS

Contents

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS

1 GENERAL

1.1 Application*

1.1.1 The Guidelines should apply to surveys of hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, void spaces within the cargo length area and all ballast tanks. The surveys should be carried out during the surveys prescribed by the 1974 SOLAS Convention, as amended.

1.1.2 The Guidelines contain the extent of examination, thickness measurements and tank testing. The survey should be extended when substantial corrosion and/or structural defects are found and include additional close-up survey when necessary.

1.2 Definitions

1.2.1 Bulk carrier is a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk and includes such types as ore carriers and combination carriers**.

1.2.2 Ballast tank is a tank which is used for water ballast and includes side ballast tanks, ballast double bottom spaces, top-side tanks, hopper side tanks and peak tanks.

1.2.3 Spaces are separate compartments including holds and tanks.

1.2.4 Overall survey is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

1.2.5 Close-up survey is a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e. preferably within reach of hand.

1.2.6 Transverse section includes all longitudinal members such as plating, longitudinals and girders at the deck, side and bottom, inner bottom and hopper side plating, longitudinal bulkheads, and bottom plating in top wing tanks.

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* The intention of these Guidelines is to ensure that an appropriate level of review of plans and documents is conducted and consistency in application is attained. Such evaluation of survey reports, survey programmes, planning documents, etc., should be carried out at the managerial level of the Administration or organization recognized by the Administration.

** For combination carriers additional requirements are specified in the Guidelines on the Enhanced Programme of Inspections During Surveys for Oil Tankers set out in Annex B to the present resolution.

1.2.7 Representative spaces are those which are expected to reflect the condition of other spaces of similar type and service and with similar corrosion prevention systems. When selecting representative spaces account should be taken of the service and repair history on board and identifiable critical and/or suspect areas.

1.2.8 Suspect areas are locations showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage.

1.2.9 Substantial corrosion is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

1.2.10 Corrosion prevention system is normally considered either:

.1 a full hard coating supplemented by anodes;

.2 a full hard coating.

Other coating systems (e.g. soft coating) may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturers specification.

1.2.11 Coating condition is defined as follows:

GOOD condition with only minor spot rusting;

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition;

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

1.2.12 Critical structural areas are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

1.2.13 Cargo length area is that part of the ship which includes all cargo holds and adjacent areas including fuel tanks, cofferdams, ballast tanks and void spaces.

1.2.14 Intermediate enhanced survey is an enhanced survey carried out either at the second or third annual survey or between these surveys.

1.3 Scope of surveys

1.3.1 Prior to inspection the surveyor should examine the completeness of documentation on board, and its contents as a basis for the survey.

1.3.2 When a survey results in the identification of significant corrosion or of significant structural defects which, in the opinion of the surveyor, will impair the structural integrity of the ship, then remedial action, in consultation with the Administration should be agreed and implemented before the ship continues in service.

2 ENHANCED SURVEY CARRIED OUT DURING PERIODICAL SURVEY

2.1 General

2.1.1 The enhanced survey may be commenced at the fourth annual survey and be progressed during the succeeding year with a view to completion by the fifth anniversary date.

2.1.2 As part of the preparation for the enhanced survey, the thickness measurement and survey programme should be dealt with, in advance of the enhanced survey. The thickness measurement should not be held before the fourth annual survey.

2.1.3 The survey should include, in addition to the requirements of the annual survey, examination, tests and checks of sufficient extent to ensure that the hull and related piping is in a satisfactory condition and is fit for its intended purpose for the new period of validity of the Cargo Ship Safety Construction Certificate, subject to proper maintenance and operation and to periodical surveys being carried out.

2.1.4 All cargo holds, ballast tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull should be examined, and this examination should be supplemented by thickness measurement and testing as deemed necessary, to ensure that the structural integrity remains effective. The examination should be sufficient to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration.

2.1.5 All piping systems within the above spaces should be examined and operationally tested under working conditions to ensure that the condition remains satisfactory.

2.1.6 The survey extent of combined ballast/cargo holds should be evaluated based on the records of ballast history and extent of the corrosion prevention system provided.

2.1.7 The survey extent of ballast tanks converted to void spaces should be specially considered in relation to the requirements for ballast tanks.

2.2 Dry-dock survey

2.2.1 A survey in dry-dock should be a part of the enhanced survey during periodical survey. There should be a minimum of two inspections of the outside of the ship's bottom during the 5-year period of the certificate. In all cases, the maximum interval between bottom inspections should not exceed 36 months.

2.2.2 Alternate inspections of the ship's bottom not conducted in conjunction with the enhanced survey during periodical survey may be carried out with the ship afloat. Special consideration should be given to ships of 15 years of age or over before being permitted to have such inspections. Inspections of the ship afloat should only be carried out when the conditions are satisfactory and the proper equipment and suitably qualified staff are available.

2.2.3 If a survey in dry-dock is not completed in conjunction with the enhanced survey during periodical survey or if the 36 month maximum interval referred to in 2.2.1 is not complied with, the Cargo Ship Safety Construction Certificate should cease to be valid until a survey in dry-dock is completed.

2.2.4 However, in order to allow time for transition to the enhanced inspection system, until 6 July 1997, the Administration with a survey cycle of 4 years or less may carry out dry-dock surveys separately from the enhanced inspections during periodical survey. For ships to which this applies, the enhanced inspections during periodical survey should be conducted at facilities which possess the capabilities necessary to properly conduct the examinations and testing required, and all other requirements of the enhanced inspection guidelines should be met.

2.3 Tank corrosion prevention system

2.3.1 Where provided, the condition of the corrosion prevention system of ballast tanks should be examined. For ballast tanks, excluding double bottom tanks, where a coating is found in POOR condition as defined in 1.2.11, and it is not renewed, or where a coating has not been applied, the tanks in question should be examined at annual intervals. When such breakdown of coating is found in ballast double bottom tanks, or where a coating has not been applied the tanks in question may be examined at annual intervals. Thickness measurement should be carried out as considered necessary by the surveyor.

2.4 Hatch covers and coamings

2.4.1 A thorough inspection of the items listed in 3.3 should be carried out.

2.4.2 Random checking of the satisfactory operation of mechanically operated hatch covers should be made, including:

.1 stowage and securing in open condition;

.2 proper fit and efficiency of sealing in closed condition;

.3 operational testing of hydraulic and power components, wires, chains, and link drives;

2.4.3 The effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent should be checked.

2.4.4 Thickness measurement of the hatch cover and coaming plating and stiffeners should be carried out as given in annex 2.

2.5 Extent of overall and close-up surveys

2.5.1 An overall survey of all spaces excluding fuel oil tanks should be carried out at the periodical survey. Fuel oil tanks in way of cargo holds should be sufficiently examined to ensure that their condition is satisfactory.

2.5.2 Each periodical survey should include a close-up examination of sufficient extent to establish the condition of the shell frames and their end attachments in all cargo holds and ballast tanks as indicated in annex 1.

2.6 Extent of thickness measurements

2.6.1 The requirements for thickness measurements at the periodical survey are given in annex 2.

2.6.2 Representative thickness measurements to determine both general and local levels of corrosion in the shell frames and their end attachments in all cargo holds and ballast tanks should be carried out. Thickness measurement should also be carried out to determine the corrosion levels on the transverse bulkhead plating. The thickness measurements may be dispensed with provided the surveyor is satisfied by the close-up examination, that there is no structural diminution, and the coating where applied remains efficient.

2.6.3 The surveyor may extend the thickness measurements as deemed necessary.

2.6.4 For areas in spaces where coatings are found to be in GOOD condition as defined in 1.2.11, the extent of thickness measurements according to annex 2 may be specially considered by the Administration.

2.6.5 Transverse sections should be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

2.7 Extent of tank pressure testing

2.7.1 All boundaries of ballast tanks, deep tanks and cargo holds used for ballast within the cargo hold length should be pressure tested. Representative tanks for fresh water, fuel oil and lubrication oil should also be pressure tested.

2.7.2 Generally, the pressure should correspond to a water level to the top of hatches for ballast/cargo holds, or top of air pipes for ballast tanks or fuel tanks.

3 ENHANCED SURVEY CARRIED OUT DURING ANNUAL SURVEY

3.1 General

3.1.1 The survey should consist of an examination for the purpose of ensuring, as far as practicable, that the hull hatch covers, coamings and piping are maintained in a satisfactory condition and should take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

3.2 Examination of the hull

3.2.1 Examination of the hull plating and its closing appliances should be carried out as far as can be seen.

3.2.2 Examination of watertight penetrations should be carried out as far as practicable.

3.3 Examination of hatch covers and coamings

3.3.1 It should be confirmed that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

3.3.2 Where mechanically operated steel covers are fitted, the satisfactory condition of the following should be confirmed:

- hatch covers;
- tightness devices of longitudinal, transverse and intermediate cross junctions (gaskets, gasket lips, compression bars, drainage channels);
- clamping devices, retaining bars, cleating;
- chain or rope pulleys;
- guides;
- guide rails and track wheels;
- stoppers, etc;
- wires, chains, gypsies, tensioning devices;
- hydraulic system essential to closing and securing;
- safety locks and retaining devices.

3.3.3 Where portable covers, wooden or steel pontoons are fitted, the satisfactory condition of the following should be confirmed:

- wooden covers and portable beams, carriers or sockets for the portable beam, and their securing devices;
- steel pontoons;
- tarpaulins;
- cleats, battens and wedges;
- hatch securing bars and their securing devices;
- loading pads/bars and the side plate edge;
- guide plates and chocks;
- compression bars, drainage channels and drain pipes (if any).

3.3.4 If considered necessary by the surveyor the effectiveness of sealing arrangements of all hatch covers should be confirmed.

3.4 Examination of cargo holds

3.4.1 For bulk carriers over 10 years of age, an overall survey of a representative forward and after cargo hold should be carried out. Where this level of survey reveals the need for remedial measures, the survey should be extended to include an overall survey of all cargo holds.

3.4.2 For bulk carriers over 15 years of age, the following should be carried out:

.1 overall survey of all cargo holds; and

.2 close-up examination of sufficient extent to establish the condition of the lower region of the shell frames and their end attachments in a forward cargo hold. Where this level of survey reveals the need for remedial measures, the survey should be extended to include a close-up survey of all cargo holds.

3.5 Examination of ballast tanks

3.5.1 Examination of ballast tanks should be carried out when required as a consequence of the results of the periodical survey and intermediate enhanced survey. When extensive corrosion is found, thickness measurements should be carried out.

4 INTERMEDIATE ENHANCED SURVEY

4.1 General

4.1.1 Those items which are additional to the requirements of the annual survey may be surveyed either at the second or third annual survey or between these surveys.

4.1.2 In the case of bulk carriers over 5 years of age the intermediate enhanced survey should include, in addition to the requirements of the annual surveys, an examination of the items specified in 4.2, 4.3 and 4.4.

4.2 Ballast tanks

4.2.1 An overall survey of representative ballast tanks selected by the surveyor should be carried out. For ships over 10 years of age, all ballast tanks should be examined. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the coating remains efficient.

4.2.2 Where POOR coating condition as defined in 1.2.11, corrosion or other defects are found in ballast tanks or where a coating has not been applied from the time of construction, the examination should be extended to other ballast tanks of the same type.

4.2.3 For ballast tanks excluding double bottom tanks, where a coating is found in POOR condition as defined in 1.2.11, and it is not renewed or where a coating has not been applied, the tanks in question should be examined at annual intervals. When such breakdown of coating is found in ballast double bottom tanks, or where a coating has not been applied the tanks in question may be examined at annual intervals. Thickness measurements should be carried out as considered necessary by the surveyor.

4.2.4 In addition to the requirements above, areas found suspect according to 1.2.8 at the previous periodical survey should be subject to overall and close-up surveys.

4.3 Cargo holds

4.3.1 An overall survey of all cargo holds, including a close-up survey of sufficient extent, should be carried out to establish the condition of:

- shell frames and their end attachments and transverse bulkheads in the forward cargo hold and one other selected cargo hold;

- areas found suspect according to 1.2.8 at the previous periodical survey.

4.3.2 Where considered necessary by the surveyor as a result of the overall and close-up surveys as described in 4.3.1, the survey should be extended to include a close-up survey of sufficient extent of other representative cargo holds.

4.4 Extent of thickness measurements

4.4.1 Thickness measurements should be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey, as described in 4.2.4, 4.3.1 and 4.3.2.

4.4.2 The thickness measurements may be dispensed with provided the surveyor is satisfied by the close-up survey, that there is no structural diminution and the coating where applied remains effective.

5 PREPARATIONS FOR SURVEY

5.1 Planning

5.1.1 A specific survey programme should be worked out in advance of the periodical survey by the owner in co-operation with the Administration.

5.1.2 The survey programme should include conditions for survey, access to structures and equipment for surveys, taking into account the requirements of annexes 1 and 2 for close-up survey and thickness measurements and tank pressure testing as described in 2.7.

5.1.3 Alternatively the close-up survey in this survey programme may be based on a planning document, approved by the Administration, as described in annex 4. The planning document should comply with a procedure for the application of risk assessment developed by the Organization.

5.1.4 The survey programme should take into account the information included in the documentation on board, as described in 6.2 and 6.3.

5.2 Conditions for survey

5.2.1 The owner should provide the necessary facilities for a safe execution of the survey.

5.2.2 Tanks and spaces should be safe for access, i.e. gas freed, ventilated, etc.

5.2.3 Tanks and spaces should be sufficiently clean and free from water, scale, dirt, oil residues, etc., to reveal significant corrosion, deformation, fractures, damages or other structural deterioration. In particular this applies to areas which are subject to thickness measurement.

5.2.4 Sufficient illumination should be provided to reveal significant corrosion, deformation, fractures, damages or other structural deterioration.

5.3 Access to structures

5.3.1 For overall survey, means should be provided to enable the surveyor to examine the structure in a safe and practical way.

5.3.2 For close-up survey, one or more of the following means for access, acceptable to the surveyor, should be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- lifts and moveable platforms
- other equivalent means.

5.4 Equipment for survey

5.4.1 Thickness measurements should normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment should be proven to the surveyor as required.

5.4.2 One or more of the following fracture detection procedures may be required if deemed necessary by the surveyor:

- radiographic equipment
- ultrasonic equipment
- magnetic particle equipment
- dye penetrant
- other equivalent means

5.5 Survey at sea or at anchorage

5.5.1 Survey at sea or at anchorage may be accepted provided the surveyor is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey should be in accordance with 5.1, 5.2, 5.3 and 5.4.

5.5.2 A communication system should be arranged between the survey party in the spaces and the responsible officer on deck.

5.5.3 Explosimeter, oxygen-meter, breathing apparatus, lifeline and whistles should be at hand during the survey. A safety checklist should be provided.

6 DOCUMENTATION ON BOARD

6.1 General

6.1.1 The owner should supply and maintain on-board documentation as specified in 6.2 and 6.3, which should be readily available for the surveyor. The condition evaluation report referred to in 6.2 should include a translation into English.

6.1.2 The documentation should be kept on board for the lifetime of the ship.

6.2 Survey report file

6.2.1 A survey report file should be a part of the documentation on board consisting of:

.1 reports of structural surveys (annex 6);

.2 condition evaluation report (annex 7);

.3 thickness measurement reports (annex 8); and

.4 survey planning document according to principles in annex 4, where provided.

6.2.2 The survey report file should be available also in the owner's and the Administration offices.

6.3 Supporting documents

6.3.1 The following additional documentation should be available on board:

.1 main structural plans of holds and ballast tanks

.2 previous repair history

.3 cargo and ballast history

.4 inspections by ship's personnel with reference to:

- structural deterioration in general;

- leakages in bulkheads and piping;

- condition of coating or corrosion prevention system, if any,

a guidance for reporting is shown in annex 3;

and any other information that would help to identify critical structural areas and/or suspect areas requiring inspection.

6.4 Review of documentation on board

6.4.1 Prior to inspection, the surveyor should examine the completeness of the documentation on board, and its contents as a basis for the survey.

7 PROCEDURES FOR THICKNESS MEASUREMENTS

7.1 General

7.1.1 Thickness measurements should normally be carried out under the supervision of the surveyor. However, the surveyor may accept thickness measurements not carried out under his direct supervision provided that:

.1 the thickness measurements are carried out by a qualified company certified by an organization recognized by the Administration,

.2 the thickness measurements are carried out within 12 months prior to completion of the periodical survey specified in section 2 or intermediate enhanced survey specified in section 4.

The surveyor should recheck the measurements as deemed necessary to ensure acceptable accuracy.

7.2 Certification of thickness measurement company

7.2.1 The thickness measurements should be carried out by a qualified company certified by an organization recognized by the Administration according to principles stated in annex 5.

7.3 Reporting

7.3.1 A thickness measurement report should be prepared and submitted to the Administration. The report should give the location of measurements, the thickness measured as well as corresponding original thickness. Furthermore, the report should give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications and be signed by the operator. The thickness measurement report should follow the principles as specified in the recommended procedures for thickness measurements set out in annex 8.

7.3.2 The surveyor should verify and countersign the thickness measurement reports.

8 REPORTING AND EVALUATION OF SURVEY

8.1 Evaluation of survey report

8.1.1 The data and information on the structural condition of the ship collected during the survey should be evaluated for acceptability and continued structural integrity of the ship.

8.1.2 The analysis of data should be carried out and endorsed by the Administration and the conclusions of the analysis should form a part of the condition evaluation report.

8.2 Reporting

8.2.1 Principles for survey reporting are shown in annex 6.

8.2.2 A condition evaluation report of the survey and results should be issued to the owner as shown in annex 7 and placed on board the ship for reference at future surveys. The condition evaluation report should be endorsed by the Administration.

ANNEX 1

REQUIREMENTS FOR CLOSE-UP SURVEY AT PERIODICAL SURVEYS

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
(A) - 25% of frames in the forward cargo hold at representative positions. (A) - Selected frames in remaining cargo holds. (B) - One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type (i.e. topside, hopper side or side tank). (C) - Two selected cargo hold transverse bulkheads.	(A) - 25% of frames in the forward cargo hold at representative positions. (A) - Selected frames in remaining cargo holds. (B) - One transverse web with associated plating and longitudinals in each water ballast tank (i.e. topside, hopper side or side tank). (B) - Forward and aft transverse bulkhead in one side ballast tank, including stiffening system. (C) - One transverse bulkhead in each cargo hold. (D) - Selected cargo hold hatch covers and coamings. (E) - Selected areas of deck plating inside line of hatch openings between cargo hold hatches.	(A) - 25% of frames in all cargo holds. (B) - All transverse webs with associated plating and longitudinals in each water ballast tank (i.e. topside, hopper side or side tank). (C) - All transverse bulkheads in ballast tanks, including stiffening system. (C) - All cargo hold transverse bulkheads. (D) - All cargo hold hatch covers and coamings. (E) - All deck plating inside line of hatch openings between cargo hold hatches.	(A) - All frames in all cargo holds Points (B) to (E) referred to in column 3

(A) - Cargo hold transverse frames.

(B) - Transverse web or watertight transverse bulkhead in water ballast tanks.

(C) - Cargo hold transverse bulkheads, platings, stiffeners and girders.

(D) - Cargo hold hatch covers and coamings.

(E) - Deck plating inside line of hatch openings between cargo hold hatches.

ANNEX 2

REQUIREMENTS FOR THICKNESS MEASUREMENTS AT PERIODICAL SURVEYS

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
1. Suspect areas	1. Suspect areas 2. Within the cargo length area: .1 Two transverse sections of deck plating outside line of cargo hatch openings. 3. Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1. 4. Selected cargo hold hatch covers and coamings (plating and stiffeners). 5. Selected areas of deck plating inside line of openings between cargo hold hatches. 6. All wind and water strakes within the cargo length area.	1. Suspect areas 2. Within the cargo length area: .1 Each deck plate outside line of cargo hatch openings .2 Two transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings. 3. Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1. 4. All cargo hold hatch covers and coamings (plating and stiffeners). 5. All deck plating inside line of openings between cargo hold hatches. 6. All wind and water strakes within the cargo length area. 7. Selected wind and water strakes outside the cargo length area.	1. Suspect areas 2. Within the cargo length area: .1 Each deck plate outside line of cargo hatch openings .2 Three transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings .3 Each bottom plate 3. Points 3 to 7 referred to in column 3

ANNEX 3

OWNER'S INSPECTION REPORT

Structural condition

Ship's name: .....

OWNERS'S INSPECTION REPORT - Structural condition

For tank/hold No.: .....

Grade of steel: Deck :..... Side :.....
Bottom :..... Longitudinal bulkhead :.....

Elements	Cracks	Buckles	Corrosion	Coating condition	Pitting	Modification/ repair	Other
Deck:							
Bottom:							
Side:							
Side framing:							
Longitudinal bulkheads:							
Transverse bulkheads:							

Repairs carried out due to:

Thickness measurements carried out (dates):

Results in general:

Overdue surveys:

Outstanding conditions of class:

Comments:

Date of inspection: .....
Inspected by: .....
Signature: .....

ANNEX 4

PRINCIPLES FOR PLANNING DOCUMENT

1 A planning document is intended to identify critical structural areas and to stipulate the minimum extent, locations and means for close-up survey and thickness measurements with respect to sections and internal structures as well as nominate suspect areas.

2 The document should be worked out by the owner in co-operation with the Administration well in advance of the survey.

3 The basis for nomination of spaces and areas referred to in 1 is a risk assessment in consideration of possible deteriorations where the following elements on the particular ship are taken into account:

.1 design features such as extent of high tensile steel and local details;

.2 former history available at owner's and Administration offices with respect to corrosion, cracking, buckling, indents and repairs for the particular ship as well as similar ships;

.3 information from same offices with respect to type of cargo, use of different tanks/holds, corrosion prevention system and condition of coating, if any.

4 The degree of criticality should be judged and decided on the basis of recognized principles and practice.

5 The planning document should contain:

.1 main particulars;

.2 plan of tanks/holds;

.3 list of tanks/holds with information on use, protection and condition of coating;

.4 corrosion risk nomination of tanks;

.5 design risk nomination of structures;

.6 nomination of tanks and areas for close-up survey;

.7 nomination of sections and structures for thickness measurements; and

.8 list of acceptable corrosion allowance of different structures.

ANNEX 5

PROCEDURES FOR CERTIFICATION OF A COMPANY ENGAGED IN THICKNESS MEASUREMENT OF HULL STRUCTURES

1 Application

This guidance applies for certification of the company which intends to engage in the thickness measurement of hull structures of ships.

2 Procedures for certification

Submission of documents

2.1 The following documents should be submitted to an organization recognized by the Administration for approval.

.1 Outline of the company, e.g. organization and management structure.

.2 Experience of the company on thickness measurement of hull structures of ships.

.3 Technicians careers, i.e. experience of technicians as thickness measurement operators, technical knowledge and experience of hull structure, etc. Operators should be qualified according to a recognized industrial NDT Standard.

.4 Equipment used for thickness measurement such as ultra-sonic testing machines and their maintenance/calibration procedures.

.5 A guide for thickness measurement operators.

.6 Training programmes for technicians for thickness measurement.

.7 Measurement record format in accordance with recommended procedures for thickness measurements (see annex 8).

Auditing of the company

2.2 Upon reviewing the documents submitted with satisfactory results, the company should be audited in order to ascertain that the company is duly organized and managed in accordance with the documents submitted, and eventually is capable of conducting thickness measurement of the hull structure of ships.

2.3 Certification is conditional upon an on-board demonstration of thickness measurement as well as satisfactory reporting.

3 Certification

3.1 Upon satisfactory results of both the audit of the company referred to in 2.2 and the demonstration tests referred to in 2.3, the Administration or organization recognized by the Administration should issue a Certificate of Approval as well as a notice to the effect that the thickness measurement operation system of the company has been certified.

3.2 Renewal/endorsement of the certificate should be made at intervals not exceeding 3 years by verification that original conditions are maintained.

4 Report of any alteration to the certified thickness measurement operation system

In case where any alteration to the certified thickness measurement operation system of the company is made, such an alteration should be immediately reported to the organization recognized by the Administration. Re-audit should be made where deemed necessary by the organization recognized by the Administration.

5 Withdrawal of the certification

The certification may be withdrawn in the following cases:

.1 where the measurements were improperly carried out or the results were improperly reported;

.2 where the surveyor found any deficiencies in the approved thickness measurement operation systems of the company;

.3 where the company failed to report any alteration referred to in 4 to the organization recognized by the Administration as required.

ANNEX 6

REPORTING PRINCIPLES

Reporting formats should be worked out individually by the Administration. As a principle the following contents of reports for bulk carrier structures should be included as applicable for the survey:

1 Type of survey (periodical survey, intermediate enhanced survey, annual survey, other)

1.1 Date, location, whether or not the survey was in dry-dock and whether or not the survey was completed.

1.2 Date of the previous:

- bottom inspection .....
- dry-docking .....

2 Extent of the survey

2.1 Identification of overall surveyed spaces.

2.2 Where in each hold close-up survey has been carried out, and means of access.

2.3 Identification of spaces and location of structures to be given with respect to the thickness measurements carried out.

2.4 Identification of pressure tested spaces.

3 Results of the survey

3.1 Coating condition of each space (if applicable). Identification of tanks with anodes.

3.2 Structural condition of each space:

- identified space found in satisfactory condition. Otherwise identification of findings which should be corrected or recorded, such as:
- corrosion:
  - structure members
  - type of corrosion (pitting, general)
  - extent
- cracks (location)
- buckling (location)
- indents (location)

The narrative report may be supplemented by sketches/photos of damages/repairs.

3.3 Thickness measurement report endorsed by the attending surveyor.

4 Actions to possible findings

4.1 Repair in identified spaces:

- structural member
- repair method
- repair extent.

4.2 Recorded findings considered not to necessitate immediate repairs. Memoranda for future inspections and thickness measurements should be given, e.g. for areas found as suspect with respect to corrosion (see 1.2.8).

4.3 Condition of class/flag State requirements.

The structure of the reporting contents may be different, depending on the report system for the Administration.

ANNEX 7

CONDITION EVALUATION REPORT
Issued upon completion of periodical survey

General particulars

Ship's name:	Class/Administration identity number: Previous class/Administration identity number(s): IMO number:
Port of registry:	National flag: Previous national flag(s):
Deadweight (metric tonnes):	Gross tonnage: National: ITC (1969):
Date of build:	Classification notation:
Date of major conversion:	
Type of conversion:	Owner: Previous owner(s):

1 The survey reports and documents listed below have been reviewed by the undersigned and found to be satisfactory

2 The periodical survey has been completed in accordance with the present Guidelines on (date) .....

Condition evaluation report completed by	Name Signature	Title
Office	Date	
Condition evaluation report verified by	Name Signature	Title
Office	Date	

Attached reports and documents:

1)
2)
3)
4)
5)
6)

Contents of condition evaluation report

Part 1	-	General particulars:	- See front page
Part 2	-	Report review:	- Where and how survey was done
Part 3	-	Close-up survey:	- Extent (which tanks/holds)
Part 4	-	Thickness measurements:	- Reference to thickness measurement report
			- Summary of where measured
			- Separate form indicating the spaces with substantial corrosion, and corresponding:
			- thickness diminution
			- corrosion pattern
Part 5	-	Tank corrosion prevention system:	- Separate form indicating:
			- location of coating/anodes
			- condition of coating (if applicable)
Part 6	-	Repairs:	- Identification of spaces/areas
Part 7	-	Condition of class/flag State requirements:	
Part 8	-	Memoranda:	- Acceptable defects
			- Any points of attention for future surveys, e.g. for suspect areas
			- Extended annual/intermediate enhanced survey due to coating breakdown
Part 9	-	Conclusion:	- Statement on evaluation/verification of survey report

Extract of thickness measurements

Reference is made to the thickness measurement report:

Position of substantially corroded tanks/areas 1/	Thickness diminution [%]	Corrosion pattern 2/	Remarks: e.g. Ref. attached sketches

Remarks

1/ Substantial corrosion, i.e. 75% - 100% of acceptable margins wasted.

2/ P = Pitting
C = Corrosion in general

Tank/hold corrosion prevention system

Tank/hold 1/ Nos.	Tank/hold corrosion prevention system 2/	Coating condition 3/	Remarks

Remarks

1/ All ballast tanks and cargo holds should be listed.

2/ C = Coating A = Anodes NP = No protection

3/ Coating condition according to the following standard.

GOOD condition with only minor spot rusting.

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

If coating condition "POOR" is given, extended annual surveys should be introduced. This should be noted in part 7 of the Contents of condition evaluation report.

ANNEX 8

RECOMMENDED PROCEDURES FOR THICKNESS MEASUREMENTS

General

1 These procedures should be used for recording thickness measurements as required by annex 2.

2 Reporting forms TM1-BC, TM2-BC, TM3-BC, TM4-BC, TM5-BC, TM6-BC and TM7-BC, set out in appendix 2 should be used for recording thickness measurements.

3 Appendix 3 contains guidance diagrams and notes relating to the reporting forms and the requirements for thickness measurement.

4 The reporting forms should, where appropriate, be supplemented by data presented on structural sketches.

Appendix 1 General particulars

Appendix 2 Reports on thickness measurement

Appendix 3 Guidance on thickness measurement

APPENDIX 1

GENERAL PARTICULARS

Ship's name:

IMO number:

Class/Administration identity number:

Port of registry:

Gross tonnage:

Deadweight:

Date of build:

Classification society:

Name of company performing thickness measurement:

Thickness measurement company certified by:

Certificate number:

Certificate valid from:..... to .....

Place of measurement:

First date of measurement:

Last date of measurement:

Periodical survey/intermediate enhanced survey due*:

Details of measurement equipment:

Qualification of operator:

Report number: consisting of pages

Name of operator: ..... Name of surveyor .....

Signature of operator: ..... Signature of surveyor .....

Company official stamp: ..... Administration: .....
Official stamp:

---

* Delete as appropriate.

APPENDIX 2

REPORTS ON THICKNESS MEASUREMENT

Report on thickness measurement of all deck plating, all bottom shell plating or side shell plating (TM1-BC)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRAKE POSITION / PLATE POSITION	No or Letter	Org. Thk. (mm)	Forward Reading						Aft Reading						Mean diminution	
			Gauged		Diminution P		Diminution S		Gauged		Diminution P		Diminution S			
			P	S	mm	%	mm	%	P	S	mm	%	mm	%	P	S
12th forward																
11th																
10th																
9th																
8th																
7th																
6th																
5th																
4th																
3rd																
2nd																
1st																
Amidships																
1st aft																
2nd																
3rd																
4th																
5th																
6th																
7th																
8th																
9th																
10th																
11th																
12th																

Operator's signature .....

Surveyor's signature ....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of:

.1 All strength deck plating within the cargo length area.

.2 Keel, bottom shell plating and bilge plating within the cargo length area.

.3 Side shell plating that is all wind and water strakes within the cargo length area.

.4 Side shell plating that is selected wind and water strakes outside the cargo length area.

2 The strake position should be clearly indicated as follows:

2.1 For strength deck indicate the number of the strake of plating inboard from the stringer plate.

2.2 For bottom plating indicate the number of the strake of plating outboard from the keel plate.

2.3 For side shell plating give number of the strake of plating below sheerstrake and letter as shown on shell expansion.

3 Only the deck plating strakes outside line of openings should be recorded.

4 Measurements should be taken at the forward and aft areas of all plates and the single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of shell and deck plating (one, two or three transverse sections) (TM2-BC(1))

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRENGTH DECK AND SHEERSTRAKE PLATING

STRAKE POSITION	FIRST TRANSVERSE SECTION AT FRAME NUMBER								SECOND TRANSVERSE SECTION AT FRAME NUMBER								THIRD TRANSVERSE SECTION AT FRAME NUMBER							
	No. or Letter	Org. Thk.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%			P	S	mm	%	mm	%			P	S	mm	%	mm	%
Stringer plate																								
1st strake inboard																								
2nd																								
3rd																								
4th																								
5th																								
6th																								
7th																								
8th																								
9th																								
10th																								
11th																								
12th																								
13th																								
14th																								
centre strake																								
sheer strake																								
TOPSIDE TOTAL																								

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of strength deck plating and sheerstrake plating transverse sections:

Two or three sections within the cargo length area, comprising of the structural items (1), (2) and (3) as shown on the diagram of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 Only the deck plating outside the line of openings should be recorded.

3 The topside area comprises deck plating, stringer plate and sheerstrake (including rounded gunwales).

4 The exact frame station of measurement should be stated.

5 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of shell and deck plating (one, two or three transverse sections) (TM2-BC(2))

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

SHELL PLATING																										
STRAKE POSITION	FIRST TRANSVERSE SECTION AT FRAME NUMBER								SECOND TRANSVERSE SECTION AT FRAME NUMBER								THIRD TRANSVERSE SECTION AT FRAME NUMBER							
	No. or Letter	Org. Thk.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk.	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%			P	S	mm	%	mm	%			P	S	mm	%	mm	%
1st below sheer strake																								
2nd																								
3rd																								
4th																								
5th																								
6th																								
7th																								
8th																								
9th																								
10th																								
11th																								
12th																								
13th																								
14th																								
15th																								
16th																								
17th																								
18th																								
19th																								
20th																								
keel strake																								
BOTTOM TOTAL																								

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurements of shell plating transverse sections:

Two or three sections within the cargo length area comprising of the structural items (4), (5), (6), and (7) as shown on the diagram of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 The bottom area comprises keel, bottom and bilge plating.

3 The exact frame station of measurement should be stated.

4 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of longitudinal members (one, two or three transverse sections) (IM3-BC)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRUCTURAL MEMBER	FIRST TRANSVERSE SECTION AT FRAME NUMBER								SECOND TRANSVERSE SECTION AT FRAME NUMBER								THIRD TRANSVERSE SECTION AT FRAME NUMBER							
	Item No.	Org. Thk.	Gauged		Diminution P		Diminution S		Item No.	Org. Thk.	Gauged		Diminution P		Diminution S		Item No.	Org. Thk.	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%			P	S	mm	%	mm	%			P	S	mm	%	mm	%

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of longitudinal members at transverse sections:

Two or three sections within the cargo length area, comprising of the structural items (8) to (20) as shown on the diagram of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 The exact frame station of measurement should be stated.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of transverse structural members in the cargo and ballast tanks within the cargo tank length (TM4-BC)

Ship's name ..... IMO number ..... Class Identity No. ..... Report No. .....

TANK DESCRIPTION :

LOCATION OF STRUCTURE :

STRUCTURAL MEMBER	ITEM	Original Thickness (mm)	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%

Operator's signature .....

Surveyor's signature ....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of transverse structural members, comprising of the appropriate structural items (23) to (25) as shown on the diagram of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 Guidance for areas of measurement is indicated in tables 1 to 3 of appendix 3.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of cargo hold transverse bulkheads (TM5-BC)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

TANK/HOLD DESCRIPTION :

LOCATION OF STRUCTURE : FRAME No. :

STRUCTURAL COMPONENT (PLATING/STIFFENER)	Original Thickness (mm)	Gauged		Diminution P		Diminution S	
		Port	Starboard	mm	%	mm	%

Operator's signature .....

Surveyor's signature ..... NOTES - See reverse

NOTES

1 This report form should be used for recording the thickness measurement of cargo hold transverse bulkheads.

2 Guidance for areas of measurement is indicated in tables 1 to 3 of appendix 3.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of miscellaneous structural members (TM6-BC)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRUCTURAL MEMBER :

LOCATION OF STRUCTURE :

SKETCH

Description	Org. Thk. (mm)	Gauged		Diminution P		Diminution S	
		P	S	mm	%	mm	%

Operator's signature .....

Surveyor's signature .....

Notes - See reverse

NOTES

1 This report should be used for recording the thickness measurement of miscellaneous structural members including the structural items (28), (29), (30) and (31) as shown on the diagram of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 Guidance for areas of measurement is indicated in tables 1 to 3 of appendix 3.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of cargo hold transverse frames (TM7-BC)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

CARGO HOLD No.																									
	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		Org. Thk. (mm)	Gauged		Diminution P		Diminution S		Org. Thk. (mm)	Gauged		Diminution P		Diminution S					
		P	S	mm	%	mm	%		P	S	mm	%	mm	%		P	S	mm	%	mm	%				

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

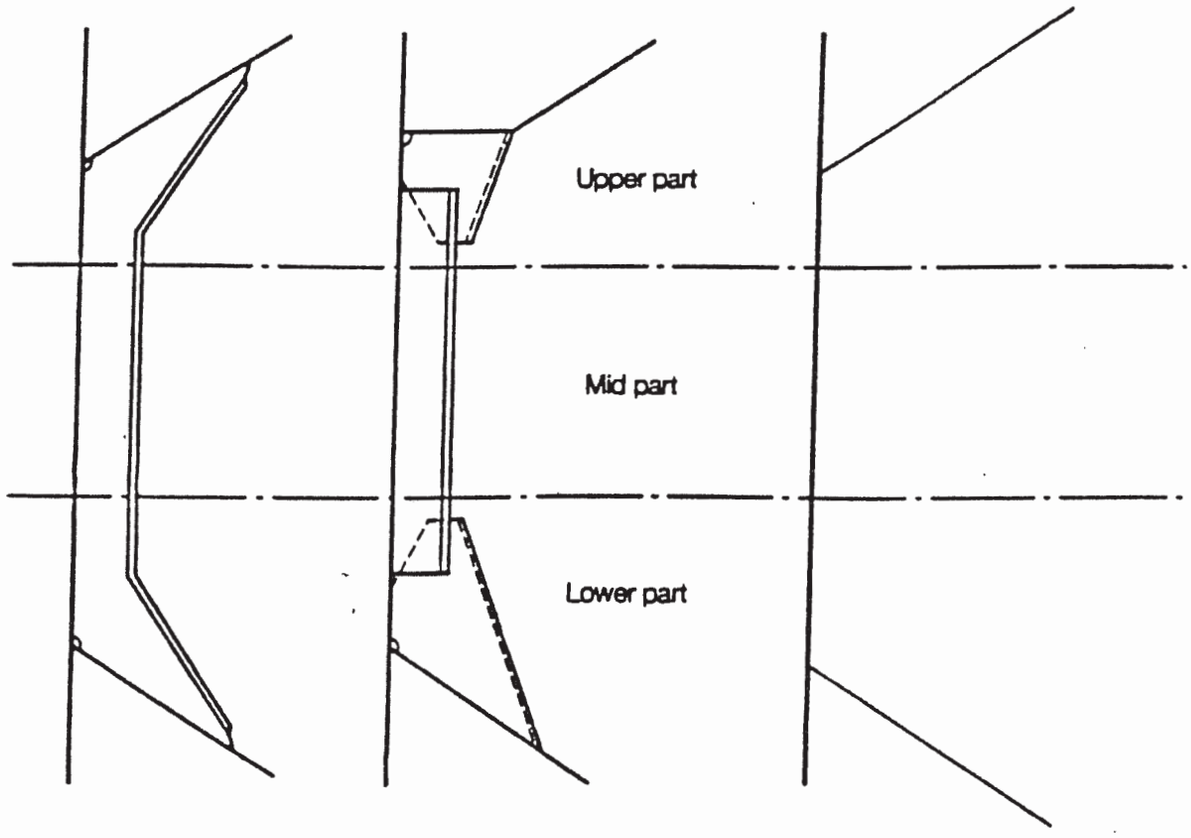
1 This report should be used for recording the thickness measurement of:

- cargo hold transverse frames; and

- structural item number 34 as shown on the diagram of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 Guidance for areas of measurement is indicated in tables 1 to 3 of appendix 3.

3 The single measurements recorded should represent the average of multiple measurements.



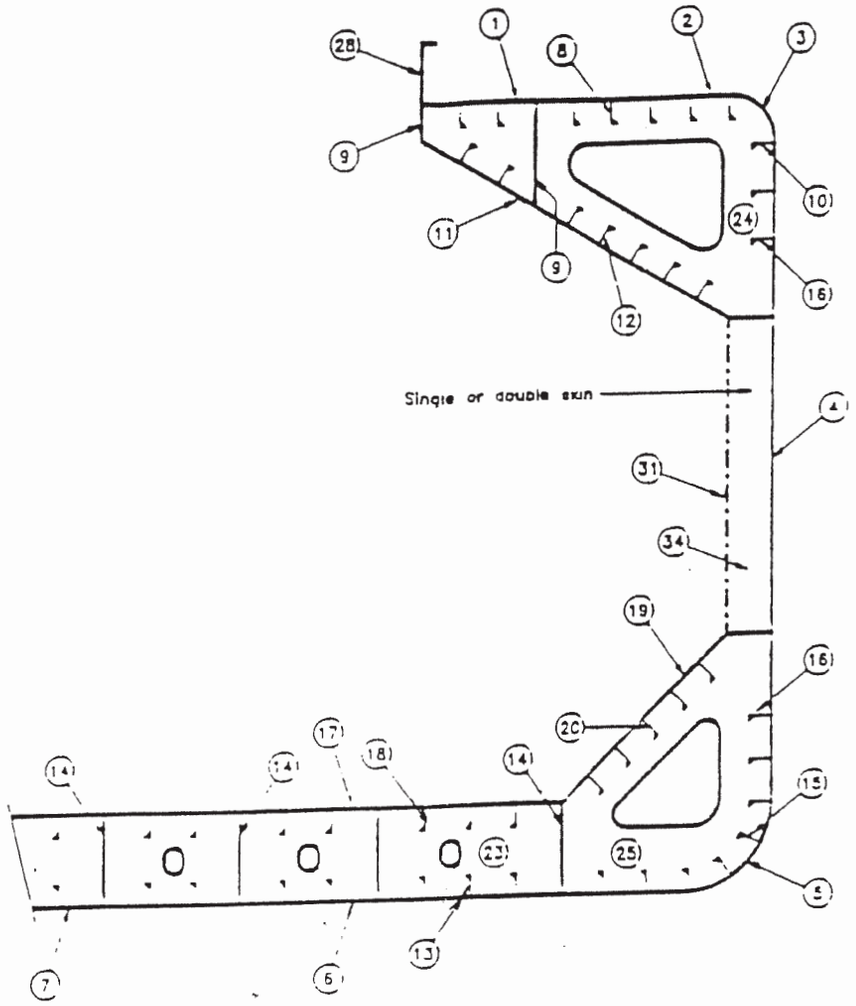
Typical transverse frames in cargo hold
Thickness gauging area Ⓐ

Non - typical transverse frame in cargo hold
Thickness gauging area Ⓐ

APPENDIX 3

GUIDANCE ON THICKNESS MEASUREMENT

Typical transverse section indicating longitudinal and transverse members



REPORT ON TM2-BC

(1) Strength deck plating
(2) Stringer plate
(3) Sheerstrake
(4) Side shell plating
(5) Bilge plating
(6) Bottom shell plating
(7) Keel plate

REPORT ON TM3-BC

(8) Deck longitudinals
(9) Deck girders
(10) Sheerstrake longitudinals
(11) Topside tank sloping plating
(12) Topside tank sloping plating longitudinals
(13) Bottom longitudinals
(14) Bottom girders
(15) Bilge longitudinals
(16) Side shell longitudinals
(17) Inner bottom plating
(18) Inner bottom longitudinals
(19) Hopper side plating
(20) Hopper side longitudinals
(21)
(22)

REPORT ON TM4-BC

(23) Double bottom tank floors
(24) Topside tank transverses
(25) Hopper side tank transverses
(26)
(27)

REPORT ON TM6-BC

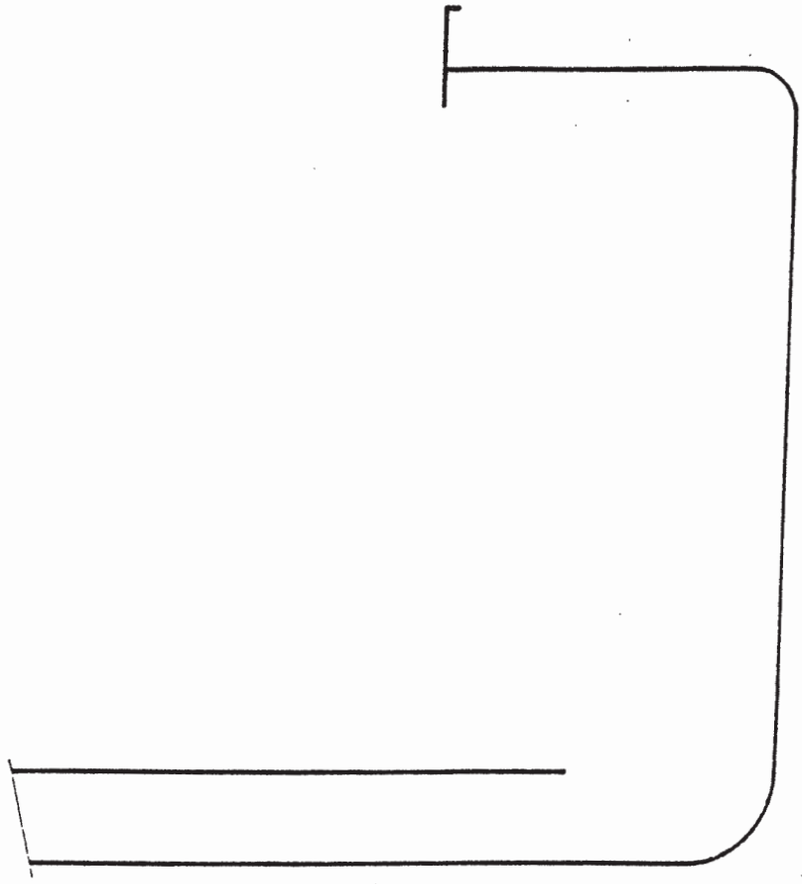
(28) Hatch coamings
(29) Deck plating between hatches
(30) Hatch covers
(31) Inner bulkhead plating
(32)
(33)

REPORT ON TM7-BC

(34) Hold frames or diaphragms

Transverse section outline

(To be used for longitudinal and transverse members where the typical transverse section is not applicable)



REPORT ON TM2–BC
(1) Strength deck plating
(2) Stringer plate
(3) Sheerstrake
(4) Side shell plating
(5) Bilge plating
(6) Bottom shell plating
(7) Keel plate

REPORT ON TM3–BC	
(8) Deck longitudinals	(16) Side shell longitudinals
(9) Deck girders	(17) Inner bottom plating
(10) Sheerstrake longitudinals	(18) Inner bottom longitudinals
(11) Topside tank sloping plating	(19) Hopper side plating
(12) Topside tank sloping plating longitudinals	(20) Hopper side longitudinals
(13) Bottom longitudinals	(21)
(14) Bottom girders	(22)
(15) Bilge longitudinals	

REPORT ON TM4–BC
(23) Double bottom tank floors
(24) Topside tank transverses
(25) Hopper side tank transverses
(26)
(27)

REPORT ON TM6–BC
(28) Hatch coamings
(29) Deck plating between hatches
(30) Hatch covers
(31) Inner bulkhead plating
(32)
(33)

REPORT ON TM7–BC
(34) Hold frames or diaphragms

Thickness measurement requirements

Table 1

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
1. Suspect areas	1. Suspect areas 2. Within the cargo length area: .1 Two transverse sections of deck plating outside line of cargo hatch openings. 3. Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey in accordance with table 2 of this appendix. 4. Selected cargo hold hatch covers and coamings (plating and stiffeners). 5. Selected areas of deck plating inside line of openings between cargo hold hatches. 6. All wind and water strakes within the cargo length area.	1. Suspect areas 2. Within the cargo length area: .1 Each deck plate outside line of cargo hatch openings .2 Two transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings. 3. Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey in accordance with table 2 of this appendix. 4. All cargo hold hatch covers and coamings (plating and stiffeners). 5. All deck plating inside line of openings between cargo hold hatches. 6. All wind and water strakes within the cargo length area. 7. Selected wind and water strakes outside the cargo length area.	1. Suspect areas 2. Within the cargo length area: .1 Each deck plate outside line of cargo hatch openings .2 Three transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings. .3 Each bottom plate. 3. Points 3 to 7 referred to in column 3

Close-up survey requirements

Table 2

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
(A) – 25% of frames in the forward cargo hold at representative positions. (A) – Selected frames in remaining cargo holds. (B) – One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type (i.e. topside, hopper side or side tank). (C) – Two selected cargo hold transverse bulkheads.	(A) – 25% of frames in the forward cargo hold at representative positions (A) – Selected frames in remaining cargo holds. (B) – One transverse web with associated plating and longitudinals in each water ballast tank (i.e. topside, hopper side or side tank). (B) – Forward and aft transverse bulkhead in one side ballast tank including stiffening system. (C) – One transverse bulkhead in each cargo hold. (D) – Selected cargo hold hatch covers and coamings. (E) – Selected areas of deck plating inside line of hatch openings between cargo hold hatches.	(A) – 25% of frames in all cargo holds (B) – All transverse webs with associated plating and longitudinals in each water ballast tank (i.e. topside, hopper side or side tank). (C) – All transverse bulkheads in all ballast tanks including stiffening system. (C) – All cargo hold transverse bulkheads. (D) – All cargo hold hatch covers and coamings. (E) – All deck plating inside line of hatch openings between cargo hold hatches.	(A) – All frames in all cargo holds (B) – All transverse webs with associated plating and longitudinals in each water ballast tank (i.e. topside, hopper side or side tank). (C) – All transverse bulkheads in all ballast tanks including stiffening system. (C) – All cargo hold transverse bulkheads. (D) – All cargo hold hatch covers and coamings. (E) – All deck plating inside line of hatch openings between cargo hold hatches.

(A) – Cargo hold transverse frames.

(B) – Transverse web or watertight transverse bulkhead in water ballast tanks.

(C) – Cargo hold transverse bulkheads, plating, stiffeners and girders.

(D) – Cargo hold hatch covers and coamings.

(E) – Deck plating inside line of hatch openings between cargo hold hatches.

Notes and sketches – see table 3 of this appendix

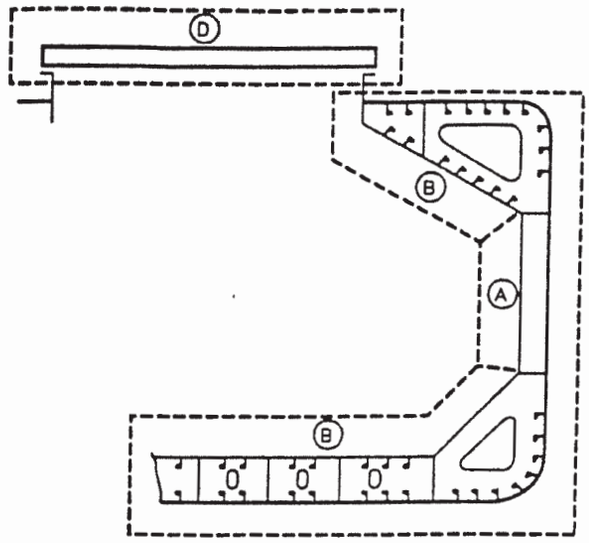
Table 3

Close-up survey and thickness measurement areas

(Typical areas for thickness measurement of cargo hold frames, structural members and transverse bulkheads in association with close-up survey requirements)

Typical transverse section

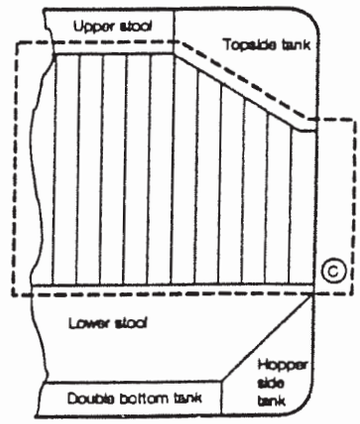
Areas Ⓐ, Ⓑ and Ⓓ



Thickness to be reportedd on TM3-BC, TM4-BC, TM6-BC and TM7-BC as appropriate

A cargo hold, transverse bulkhead

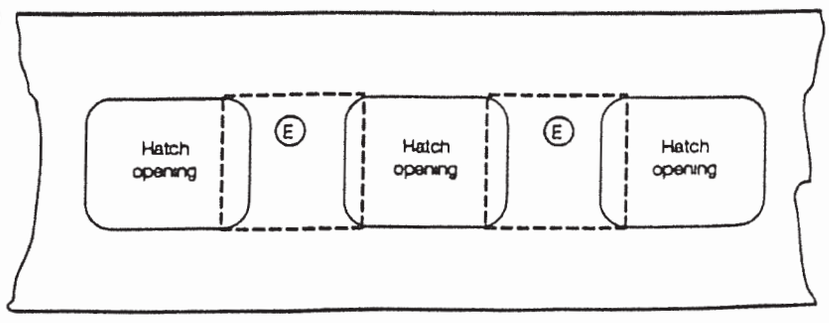
Area Ⓒ



Thickness to be reported on TM5-BC

Typical areas of deck plating inside line of hatch openings between cargo hold hatches

Area Ⓔ



Thickness to be reported on TM6-BC

ANNEX B

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF OIL TANKERS

Contents

GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTION DURING SURVEYS OF OIL TANKERS

1 GENERAL

1.1 Application*

1.1.1 The Guidelines should apply to all oil tankers of 500 tons gross tonnage and above.

1.1.2 The compliance with the Guidelines is mandatory for crude oil tankers of 20,000 tons deadweight and above and product carriers of 30,000 tons deadweight and above under regulation 13G of Annex I to MARPOL 73/78.

1.1.3 The Guidelines should apply to surveys of hull structure and piping systems in way of cargo tanks, pump-rooms, cofferdams, pipe tunnels, void spaces within the cargo area and all ballast tanks.

1.1.4 The Guidelines contain the extent of examination, thickness measurements and tank pressure testing. The survey should be extended when substantial corrosion and/or structural defects are found and include additional close-up survey when necessary.

1.2 Definitions

1.2.1 Ballast tank is a tank which is used for water ballast and includes segregated ballast tanks, ballast double bottom spaces and peak tanks.

1.2.2 Overall survey is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

1.2.3 Close-up survey is a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e. preferably within reach of hand.

1.2.4 Transverse section includes all longitudinal members such as plating, longitudinals and girders at the deck, side, bottom, inner bottom and longitudinal bulkheads.

1.2.5 Representative tanks are those which are expected to reflect the condition of other tanks of similar type and service and with similar corrosion prevention systems. When selecting representative tanks account should be taken of the service and repair history on board and identifiable critical and/or suspect areas.

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* The intention of these guidelines is to ensure that an appropriate level of review of plans and documents is conducted and consistency in application is attained. Such evaluation of survey reports, survey programmes, planning documents, etc., should be carried out at the managerial level of the Administration or organization recognized by the Administration.

1.2.6 Suspect areas are locations showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage.

1.2.7 Substantial corrosion is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

1.2.8 Corrosion prevention system is normally considered either:

.1 a full hard coating supplemented by anodes;

.2 a full hard coating.

Other coating systems (e.g. soft coating) may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturers specification.

1.2.9 Coating condition is defined as follows:

GOOD condition with only minor spot rusting;

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition;

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

1.2.10 Critical structural areas are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

1.2.11 Cargo area is an area as defined in regulation II-2/3.32 of the 1974 SOLAS Convention, as amended.

1.2.12 Intermediate enhanced survey is an enhanced survey carried out either at the second or third annual survey or between these surveys.

1.3 Scope of surveys

1.3.1 Prior to inspection the surveyor should examine the completeness of documentation on board, and its contents as a basis for the survey.

1.3.2 When a survey results in the identification of significant corrosion or of significant structural defects which, in the opinion of the surveyor, will impair the structural integrity of the ship, then remedial action, in consultation with the Administration should be agreed and implemented before the ship continues in service.

2 ENHANCED SURVEY CARRIED OUT DURING PERIODICAL SURVEY

2.1 General

2.1.1 The enhanced survey may be commenced at the fourth annual survey and be progressed during the succeeding year with a view to completion by the fifth anniversary date.

2.1.2 As part of the preparation for the enhanced survey, the thickness measurement and survey programme should be dealt with, in advance of the enhanced survey. The thickness measurement should not be held before the fourth annual survey.

2.1.3 The survey should include, in addition to the requirements of the annual survey, examination, tests and checks of sufficient extent to ensure that the hull and related piping is in a satisfactory condition and is fit for its intended purpose for the new period of validity of the Certificate, subject to proper maintenance and operation and to periodical surveys being carried out.

2.1.4 All cargo tanks, ballast tanks, pump-rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull should be examined, and this examination should be supplemented by thickness measurement and testing as deemed necessary, to ensure that the structural integrity remains effective. The examination should be sufficient to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration.

2.1.5 All piping systems within the above tanks and spaces should be examined to ensure that tightness and condition remain satisfactory. Special attention should be given to ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces.

2.1.6 The survey extent of combined ballast/cargo tanks should be evaluated based on the records of ballast history and extent of the corrosion prevention system provided.

2.2 Dry-dock survey

2.2.1 A survey in dry-dock should be a part of the enhanced survey during periodical survey. There should be a minimum of two inspections of the outside of the ship's bottom during the 5-year period of the certificate. In all cases, the maximum interval between bottom inspections should not exceed 36 months.

2.2.2 Alternate inspections of the ship's bottom not conducted in conjunction with the enhanced survey during periodical survey may be carried out with the ship afloat. Special consideration should be given to ships of 15 years of age or over before being permitted to have such inspections. Inspections of the ship afloat should only be carried out when the conditions are satisfactory and the proper equipment and suitably qualified staff are available.

2.2.3 If a survey in dry-dock is not completed in conjunction with the enhanced survey during periodical survey or if the 36 month maximum interval referred to in 2.2.1 is not complied with, the Cargo Ship Safety Construction Certificate issued to oil tankers referred to in paragraph 1.1.1 and/or the International Oil Pollution Prevention Certificate, as appropriate, issued to oil tankers referred to in paragraph 1.1.2 should cease to be valid until a survey in dry-dock is completed.

2.2.4 However, in order to allow time for transition to the enhanced inspection system, until 6 July 1997, the Administration with a survey cycle of 4 years or less may carry out dry dock-surveys separately from the enhanced inspections during periodical survey. For ships to which this applies, the

enhanced inspections during periodical survey should be conducted at facilities which possess the capabilities necessary to properly conduct the examinations and testing required, and all other requirements of the enhanced inspection guidelines should be met.

2.3 Tank corrosion prevention system

2.3.1 Where provided, the condition of the corrosion prevention system of cargo tanks should be examined. A ballast tank where a protective coating is found in POOR condition as defined in 1.2.9 and it is not renewed, or where a protective coating has not been applied, the tank in question should be examined at annual intervals. Thickness measurement should be carried out as deemed necessary by the surveyor.

2.4 Extent of overall and close-up surveys

2.4.1 An overall survey of all integral tanks and spaces should be carried out at the enhanced survey carried out during periodical survey.

2.4.2 The requirements for close-up surveys at the enhanced survey carried out during periodical survey are given in annex 1.

2.4.3 The surveyor may extend the scope of the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

.1 in particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information;

.2 in tanks which have structures with reduced scantlings in association with a corrosion prevention system approved by the Administration.

2.4.4 For areas in tanks where coatings are found to be in GOOD condition as defined in 1.2.9, the extent of close-up surveys according to annex 1 may be specially considered by the Administration.

2.5 Extent of thickness measurements

2.5.1 The requirements for thickness measurements at the periodical survey are given in annex 2.

2.5.2 Where substantial corrosion as defined in 1.2.7 is found the extent of thickness measurements should be increased in accordance with the requirements of annex 4 or as specified in planning document as described in annex 6.

2.5.3 The surveyor may extend the thickness measurements as deemed necessary.

2.5.4 For areas in tanks where coatings are found to be in GOOD condition as defined in 1.2.9, the extent of thickness measurements according to annex 2 may be specially considered by the Administration.

2.5.5 Transverse sections should be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

2.5.6 In cases where two or three sections are to be measured, at least one should include a ballast tank within 0.5L amidships.

2.6 Extent of tank pressure testing

2.6.1 The requirements for tank pressure testing at the periodical survey are given in annex 3.

2.6.2 The surveyor may extend the tank pressure testing as deemed necessary.

2.6.3 Generally, the pressure should correspond to a water level to the top of access hatches for cargo tanks, or top of air pipes for ballast tanks.

3 ENHANCED SURVEY CARRIED OUT DURING ANNUAL SURVEY

3.1 General

3.1.1 The survey should consist of an examination for the purpose of ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition and should take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

3.2 Examination of the hull

3.2.1 Examination of the hull plating and its closing appliances should be carried out as far as can be seen.

3.2.2 Examination of watertight penetrations should be carried out as far as practicable.

3.3 Examination of weather decks

3.3.1 Examination of cargo tank openings including gaskets, covers, coamings and flame screens.

3.3.2 Examination of cargo tank pressure/vacuum valves and flame screens.

3.3.3 Examination of flame screens on vents to all bunker, oily ballast and oily slop tanks.

3.3.4 Examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers.

3.4 Examination of cargo pump-rooms and pipe tunnels

3.4.1 Examination of all bulkheads for signs of oil leakage or fractures and, in particular, the sealing arrangements of all penetrations of bulkheads.

3.4.2 Examination of the condition of all piping systems and pipe tunnels.

3.5 Examination of ballast tanks

3.5.1 Examination of ballast tanks should be carried out when required as a consequence of the results of the periodical survey and intermediate enhanced survey. When extensive corrosion is found, thickness measurements should be carried out.

3.5.2 Where substantial corrosion as defined in 1.2.7 is found, the extent of thickness measurements should be increased in accordance with the requirements in annex 4.

4 INTERMEDIATE ENHANCED SURVEY

4.1 General

4.1.1 Those items which are additional to the requirements of the annual survey may be surveyed either at the second or third annual survey or between these surveys.

4.1.2 The survey extent of cargo and ballast tanks dependent on the age of the ship is specified in 4.2 and 4.3.

4.1.3 For weather decks, an examination as far as applicable of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, the piping may be required to be pressure tested, thickness measured or both.

4.2 Oil tankers over 5 years of age but not more than 10 years of age

4.2.1 In the case of oil tankers over 5 years of age but not more than 10 years of age, the following should apply in addition to 4.1.3.

4.2.2 For ballast tanks, an overall survey of representative tanks selected by the surveyor should be carried out. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the corrosion prevention system remains effective.

4.2.3 Where POOR coating condition as defined in 1.2.9, corrosion or other defects are found in ballast tanks or where a coating has not been applied, the examination should be extended to other ballast tanks of the same type.

4.2.4 A ballast tank where a coating is found in POOR condition as defined in 1.2.9 and it is not renewed, or where a coating has not been applied, the tank in question should be examined at annual intervals. Thickness measurements should be carried out as deemed necessary by the surveyor.

4.3 Oil tankers over 10 years of age

4.3.1 General

4.3.1.1 In the case of oil tankers over 10 years of age the following should apply in addition to 4.2.

4.3.1.2 An overall survey of at least two representative cargo tanks should be carried out.

4.3.1.3 An overall survey of all ballast tanks and combined cargo/ballast tanks should be carried out. If such survey reveals no visible structural defects, the survey may be limited to a verification that the corrosion prevention system remains effective.

4.3.2 Extent of close-up survey

4.3.2.1 Close-up survey should be carried out to the following extent:

.1 for ballast tanks:

- to the same extent as previous periodical survey, after second periodical survey;

.2 for cargo tanks:

- at least two combined cargo/ballast tanks after second periodical survey. The extent of survey should be based on the record of the previous periodical survey, and repair history of the tanks;

- additionally at least one cargo tank after third periodical survey. The extent of survey should be based on the record of the previous periodical survey and repair history of the tanks.

4.3.2.2 The extent of close-up surveys may be extended as stated in 2.4.3.

4.3.2.3 For areas in tanks where coatings are found to be in GOOD condition as defined in 1.2.9, the extent of close-up survey may be specially considered by the Administration.

4.4 Extent of thickness measurements

4.4.1 Thickness measurements at the intermediate enhanced survey should be carried out for areas found to be suspect as defined in 1.2.6 at the previous periodical survey.

4.4.2 Where substantial corrosion as defined in 1.2.7 is found the extent of thickness measurements should be increased in accordance with the requirements of annex 4.

5 PREPARATIONS FOR SURVEY

5.1 Planning

5.1.1 A specific survey programme should be worked out in advance of the periodical survey by the owner in co-operation with the Administration.

5.1.2 The survey programme should include conditions for survey, access to structures and equipment for surveys, taking into account the requirements of annexes 1, 2 and 3 for close-up survey, thickness measurements and tank pressure testing as described in 2.6.

5.1.3 Alternatively, the close-up survey in this survey programme may be based on a planning document, approved by the Administration, as described in annex 6. The planning document should comply with a procedure for the application of risk assessment developed by the Organization.

5.1.4 The survey programme should take into account the information included in the documentation on board, as described in 6.2 and 6.3.

5.2 Conditions for survey

5.2.1 The owner should provide the necessary facilities for a safe execution of the survey*.

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* Reference is made to chapter 10 of the International Safety Guide for Oil Tankers and Terminals (ISGOTT) - Entry into and working in enclosed spaces.

5.2.2 Tanks and spaces should be safe for access, i.e. gas freed, ventilated, etc.

5.2.3 Tanks and spaces should be sufficiently clean and free from water, scale, dirt, oil residues, etc., to reveal significant corrosion, deformation, fractures, damages or other structural deterioration. In particular this applies to areas which are subject to thickness measurement.

5.2.4 Sufficient illumination should be provided to reveal significant corrosion, deformation, fractures, damages or other structural deterioration.

5.3 Access to structures

5.3.1 For overall survey, means should be provided to enable the surveyor to examine the structure in a safe and practical way.

5.3.2 For close-up survey, one or more of the following means for access, acceptable to the surveyor, should be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- lifts and moveable platforms
- boats or rafts
- other equivalent means.

5.4 Equipment for survey

5.4.1 Thickness measurement should normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment should be proven to the surveyor as required.

5.4.2 One or more of the following fracture detection procedures may be required if deemed necessary by the surveyor:

- radiographic equipment
- ultrasonic equipment
- magnetic particle equipment
- dye penetrant
- other equivalent means.

5.5 Survey at sea or at anchorage

5.5.1 Survey at sea or at anchorage may be accepted provided the surveyor is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey should be in accordance with 5.1, 5.2, 5.3 and 5.4.

5.5.2 A communication system should be arranged between the survey party in the tank and the responsible officer on deck. This system should also include the personnel in charge of ballast pump handling if boats or rafts are used.

5.5.3 Explosimeter, oxygen-meter, breathing apparatus, lifeline and whistles should be at hand during the survey. When boats or rafts are used, appropriate lifejackets should be available for all participants. Boats or rafts should have satisfactory residual buoyancy and stability even if one chamber is ruptured. A safety check-list should be provided.

5.5.4 Surveys of tanks by means of boats or rafts may only be undertaken with the agreement of the surveyor, who should take into account the safety arrangements provided, including weather forecasting and ship response in reasonable sea conditions.

6 DOCUMENTATION ON BOARD

6.1 General

6.1.1 The owner should supply and maintain on-board documentation as specified in 6.2 and 6.3, which should be readily available for the surveyor. The condition evaluation report referred to in 6.2 should include a translation into English.

6.1.2 The documentation should be kept on board for the lifetime of the ship.

6.2 Survey report file

6.2.1 A survey report file should be a part of the documentation on board consisting of:

.1 reports of structural surveys (annex 8)

.2 condition evaluation report (annex 9)

.3 thickness measurement reports (annex 10)

.4 survey planning document according to principles in annex 6, where provided.

6.2.2 The survey report file should be available also in the owner's and the Administration offices.

6.3 Supporting documents

6.3.1 The following additional documentation should be available on board:

.1 main structural plans of cargo and ballast tanks

.2 previous repair history

.3 cargo and ballast history

.4 extent of use of inert gas plant and tank cleaning procedures

.5 inspections by ship's personnel with reference to:

- structural deterioration in general;

- leakages in bulkheads and piping;

- condition of coating or corrosion prevention system, if any,

a guidance for reporting is shown in annex 5;

and any other information that would help to identify critical structural areas and/or suspect areas requiring inspection.

6.4 Review of documentation on board

6.4.1 Prior to inspection, the surveyor should examine the completeness of the documentation on board, and its contents as a basis for the survey.

7 PROCEDURES FOR THICKNESS MEASUREMENTS

7.1 General

7.1.1 Thickness measurements should normally be carried out under the supervision of the surveyor. However, the surveyor may accept thickness measurements not carried out under his direct supervision provided that:

.1 the thickness measurements are carried out by a qualified company certified by an organization recognized by the Administration;

.2 the thickness measurements are carried out within 12 months prior to completion of the periodical survey specified in section 2 or intermediate enhanced survey specified in section 4.

The surveyor should recheck the measurements as deemed necessary to ensure acceptable accuracy.

7.2 Certification of thickness measurement company

7.2.1 The thickness measurements should be carried out by a qualified company certified by an organization recognized by the Administration according to principles stated in annex 7.

7.3 Reporting

7.3.1 A thickness measurement report should be prepared and submitted to the Administration. The report should give the location of measurements, the thickness measured as well as corresponding original thickness. Furthermore, the report should give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications and be signed by the operator. The thickness measurement report should follow the principles as specified in the recommended procedures for thickness measurements set out in annex 10.

7.3.2 The surveyor should verify and countersign the thickness measurement reports.

8 REPORTING AND EVALUATION OF SURVEY

8.1 Evaluation of survey report

8.1.1 The data and information on the structural condition of the ship collected during the survey should be evaluated for acceptability and continued structural integrity of the ship.

8.1.2 The analysis of data should be carried out and endorsed by the Administration and the conclusions of the analysis should form a part of the condition evaluation report.

8.2 Reporting

8.2.1 Principles for survey reporting are shown in annex 8.

8.2.2 A condition evaluation report of the survey and results should be issued to the owner as shown in annex 9 and placed on board the ship for reference at future surveys. The condition evaluation report should be endorsed by the Administration.

ANNEX 1

REQUIREMENTS FOR CLOSE-UP SURVEY AT PERIODICAL SURVEYS

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
(A) ONE WEB FRAME RING – in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast (B) ONE DECK TRANSVERSE – in a cargo tank (D) ONE TRANSVERSE BULKHEAD – in a ballast tank (D) ONE TRANSVERSE BULKHEAD – in a cargo wing tank (D) ONE TRANSVERSE BULKHEAD – in a cargo centre tank	(A) ALL WEB FRAME RINGS – in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast (B) ONE DECK TRANSVERSE – in each of the remaining ballast tanks, if any (B) ONE DECK TRANSVERSE – in a cargo wing tank (B) ONE DECK TRANSVERSE – in two cargo centre tanks (C) BOTH TRANSVERSE BULKHEADS in a wing ballast tank, if any, or a cargo wing tank used primarily for water ballast (D) ONE TRANSVERSE BULKHEAD – in each remaining ballast tank (D) ONE TRANSVERSE BULKHEAD – in a cargo wing tank (D) ONE TRANSVERSE BULKHEAD – in two cargo centre tanks	(A) ALL WEB FRAME RINGS – in all ballast tanks (A) ALL WEB FRAME RINGS – in a cargo wing tank (A) ONE WEB FRAME RING – in each remaining cargo wing tank (C) ALL TRANSVERSE BULKHEADS – in all cargo and ballast tanks (E) ONE DECK AND BOTTOM TRANSVERSE – in each cargo centre tank (F) As considered necessary by the Administration	As for ships referred to in column 3 Additional transverses included as deemed necessary by the Administration

(A) Complete transverse web frame ring including adjacent structural members

(B) Deck transverse including adjacent deck structural members

(C) Transverse bulkhead complete – including girder system and adjacent members

(D) Transverse bulkhead lower part – including girder system and adjacent structural members

(E) Deck and bottom transverse including adjacent structural members

(F) Additional complete transverse web frame ring

ANNEX 2

REQUIREMENTS FOR THICKNESS MEASUREMENTS AT PERIODICAL SURVEYS

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
1. One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast) 2. Measurements of structural members subject to close-up survey according to annex 1, for general assessment and recording of corrosion pattern 3. Suspect areas	1. Within the cargo area: .1 Each deck plate .2 One transverse section 2. Measurements of structural members subject to close-up survey according to annex 1, for general assessment and recording of corrosion pattern 3. Suspect areas 4. Selected wind and water strakes outside the cargo area	1. Within the cargo area: .1 Each deck plate .2 Two transverse sections 2. Measurements of structural members subject to close-up survey according to annex 1, for general assessment and recording of corrosion pattern 3. Suspect areas 4. Selected wind and water strakes outside the cargo area 5. All wind and water strakes within the cargo area	1. Within the cargo area: .1 Each deck plate .2 Three transverse sections .3 Each bottom plate 2. Measurements of structural members subject to close-up survey according to annex 1, for general assessment and recording of corrosion pattern 3. Suspect areas 4. Selected wind and water strakes outside the cargo area 5. All wind and water strakes within the cargo area

ANNEX 3

REQUIREMENTS FOR TANK PRESSURE TESTING AT PERIODICAL SURVEYS

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1. Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams. 2. Representative tanks for fresh water, fuel oil and lubrication oil.	1. Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams. 2. All cargo tank bulkheads which form the boundaries of segregated cargoes. 3. Representative tanks for fresh water, fuel oil and lubrication oil.	1. Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams. 2. All remaining cargo tank bulkheads. 3. Representative tanks for fresh water, fuel oil and lubrication oil.	1. Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams. 2. All remaining cargo tank bulkheads. 3. All fresh water fuel oil and lubrication oil tanks.

ANNEX 4

REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT AREAS OF SUBSTANTIAL CORROSION. PERIODICAL SURVEY WITHIN THE CARGO AREA

Bottom structure

STRUCTURAL MEMBER	EXTENT OF MEASUREMENT	PATTERN OF MEASUREMENT
1. Bottom plating	Minimum of 3 bays across tank, including aft bay. Measurements around and under all bell mouths.	5 point pattern for each panel between longitudinals and webs.
2. Bottom longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured.	3 measurements in line across flange and 3 measurements on vertical web.
3. Bottom girders and brackets	At fore and aft transverse bulkhead bracket toes and in centre of tanks.	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat. 5 point pattern on girder/bulkhead brackets.
4. Bottom transverse webs	3 webs in bays where bottom plating measured, with measurements at both ends and middle.	5 point pattern over 2 square metre area. Single measurements on face flat.
5. Panel stiffening	Where fitted.	Single measurements.

Deck structure

STRUCTURAL MEMBER	EXTENT OF MEASUREMENT	PATTERN OF MEASUREMENT
1. Deck plating	Two bands across tank.	Minimum of three measurements per plate per band.
2. Deck longitudinals	Minimum of 3 longitudinals in each of two bays.	3 measurements in line vertically on webs, and 2 measurements on flange (if fitted).
3. Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks.	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat. 5 point pattern on girder/bulkhead brackets.
4. Deck transverse webs	Minimum of two webs with measurements at middle and both ends of span.	5 point pattern over about 2 square metre area. Single measurements on face flat.
5. Panel stiffening	Where available.	Single measurements.

Shell and longitudinal bulkheads

STRUCTURAL MEMBER	EXTENT OF MEASUREMENT	PATTERN OF MEASUREMENT
1. Deckhead and bottom strakes, and strakes in way of stringer platforms	Plating between each pair of longitudinals in a minimum of 3 bays	Single measurement
2. All other strakes	Plating between every third pair of longitudinals in same 3 bays	Single measurement
3. Longitudinals - deckhead and bottom strakes	Each longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
4. Longitudinals - all others	Every third longitudinal in same 3 bays	3 measurments across web and 1 measurement on flange
5. Longitudinals - bracket	Minimum of three at top, middle and bottom of tank in same 3 bays	5 point pattern over area of bracket
6. Web frames and cross ties	3 webs with minimum of three locations on each web, including in way of cross tie connections	5 point pattern over about 2 square metre area, plus single measurements on web frame and cross tie face flats

Transverse bulkheads and swash bulkheads

STRUCTURAL MEMBER	EXTENT OF MEASUREMENT	PATTERN OF MEASUREMENT
1. Deckhead and bottom strakes, and strakes in way of stringer platforms	Plating between pair of stiffeners at three locations - approx. 1/4, 1/2 and 3/4 width of tank	5 points pattern between stiffeners over 1 metre length
2. All other strakes	Plating between pair of stiffeners at middle location	Single measurement
3. Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange or fabricated connection	5 point pattern over about 1 square metre of plating
4. Stiffeners	Minimum of three typical stiffeners	For web, 5 point pattern over span between bracket connections (2 measurements across web at each bracket connection, and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
5. Brackets	Minimum of three at top, middle and bottom of tank	5 point pattern over area of bracket
6. Deep webs and girders	Measurements at toe of bracket and centre of span	For web, 5 point pattern over about 1 square metre area. 3 measurements across face flat
7. Stringer platforms	All stringers with measurements at both ends and middle	5 point pattern over 1 square metre area plus single measurements near bracket toes and on face flats

ANNEX 5

OWNER'S INSPECTION REPORT

Structural condition

Ship's name: .....

OWNERS'S INSPECTION REPORT – Structural condition

For tank No.: .....

Grade of steel: Deck :..... Side :.....
Bottom :..... Longitudinal bulkhead :.....

Elements	Cracks	Buckles	Corrosion	Coating condition	Pitting	Modification/ repair	Other
Deck:							
Bottom:							
Side:							
Longitudinal bulkheads:							
Transverse bulkheads:							

Repairs carried out due to:

Thickness measurements carried out (dates):

Results in general:

Overdue surveys:

Outstanding conditions of class:

Comments:

Date of inspection: .....
Inspected by: .....
Signature: .....

ANNEX 6

PRINCIPLES FOR PLANNING DOCUMENT

1 A planning document is intended to identify critical structural areas and to stipulate the minimum extent, locations and means for close-up survey and thickness measurements with respect to sections and internal structures as well as nominate suspect areas.

2 The document should be worked out by the owner in co-operation with the Administration well in advance of the survey.

3 The basis for nomination of tanks and areas referred to in 1 is a risk assessment in consideration of possible deteriorations where the following elements on the particular ship are taken into account:

.1 design features such as extent of high tensile steel and local details;

.2 former history available at owner's and Administration offices with respect to corrosion, cracking, buckling, indents and repairs for the particular ship as well as similar ships;

.3 information from same offices with respect to type of cargo, use of different tanks for cargo/ballast, corrosion prevention system and condition of coating, if any.

4 The degree of criticality should be judged and decided on the basis of recognized principles and practice.

5 The planning document should contain:

.1 main particulars;

.2 plan of tanks;

.3 list of tanks with information on use, protection and condition of coating;

.4 corrosion risk nomination of tanks;

.5 design risk nomination of structures;

.6 nomination of tanks and areas for close-up survey;

.7 nomination of sections and structures for thickness measurements; and

.8 list of acceptable corrosion allowance of different structures.

ANNEX 7

PROCEDURES FOR CERTIFICATION OF A COMPANY ENGAGED IN THICKNESS MEASUREMENT OF HULL STRUCTURES

1 Application

This guidance applies for certification of the company which intends to engage in the thickness measurement of hull structures of ships.

2 Procedures for certification

Submission of documents

2.1 The following documents should be submitted to an organization recognized by the Administration for approval.

.1 Outline of the company, e.g. organization and management structure.

.2 Experience of the company on thickness measurement of hull structures of ships.

.3 Technicians careers, i.e. experience of technicians as thickness measurement operators, technical knowledge and experience of hull structure, etc. Operators should be qualified according to a recognized industrial NDT Standard.

.4 Equipment used for thickness measurement such as ultrasonic testing machines and their maintenance/calibration procedures.

.5 A guide for thickness measurement operators.

.6 Training programmes for technicians for thickness measurement.

.7 Measurement record format in accordance with recommended procedures for thickness measurements (see annex 10).

Auditing of the company

2.2 Upon reviewing the documents submitted with satisfactory results, the company should be audited in order to ascertain that the company is duly organized and managed in accordance with the documents submitted, and eventually is capable of conducting thickness measurement of the hull structure of ships.

2.3 Certification is conditional upon an on-board demonstration of thickness measurement as well as satisfactory reporting.

3 Certification

3.1 Upon satisfactory results of both the audit of the company referred to in 2.2 and the demonstration tests referred to in 2.3, the Administration or organization recognized by the Administration should issue a Certificate of Approval as well as a notice to the effect that the thickness measurement operation system of the company has been certified.

3.2 Renewal/endorsement of the certificate should be made at intervals not exceeding 3 years by verification that original conditions are maintained.

4 Report of any alteration to the certified thickness measurement operation system

In case where any alteration to the certified thickness measurement operation system of the company is made, such an alteration should be immediately reported to the organization recognized by the Administration. Re-audit should be made where deemed necessary by the organization recognized by the Administration.

5 Withdrawal of the certification

The certification may be withdrawn in the following cases:

.1 where the measurements were improperly carried out or the results were improperly reported;

.2 where the surveyor found any deficiencies in the approved thickness measurement operation system of the company;

.3 where the company failed to report any alteration referred to in 4 to the organization recognized by the Administration as required.

ANNEX 8

REPORTING PRINCIPLES

Reporting formats should be worked out individually by the Administration. As a principle the following contents of reports for oil tanker structures should be included as applicable for the survey.

1 Type of survey (periodical survey, intermediate enhanced survey, annual survey, other)

1.1 Date, location, whether or not the survey was in dry-dock and whether or not the survey was completed.

1.2 Date of the previous:

- bottom inspection .....

- dry-docking .....

2 Extent of the survey

2.1 Identification of overall surveyed tanks.

2.2 Where in each tank close-up survey has been carried out, and means of access.

2.3 Identification of tanks and location of structures to be given with respect to the thickness measurements carried out.

2.4 Identification of pressure tested tanks.

3 Results of the survey

3.1 Coating condition of each tank (if applicable). Identification of tanks with anodes.

3.2 Structural condition of each tank:

- identified tank found in satisfactory condition. Otherwise identification of findings which should be corrected or recorded, such as:

- corrosion:
  - structure members
  - type of corrosion (pitting, general)
  - extent

- cracks (location)

- buckling (location)

- indents (location)

The narrative report may be supplemented by sketches/photos of damages/repairs.

3.3 Thickness measurement report endorsed by the attending surveyor.

4 Actions to possible findings

4.1 Repair in identified tanks:

- structural member
- repair method
- repair extent

4.2 Recorded findings considered not to necessitate immediate repairs. Memoranda for future inspections and thickness measurements should be given, e.g. for areas found as suspect with respect to corrosion (see 1.2.6).

4.3 Condition of class/flag State requirements.

The structure of the reporting contents may be different, depending on the report system for the Administration.

ANNEX 9

CONDITION EVALUATION REPORT
Issued upon completion of periodical survey

General particulars

Ship's name:	Class/Administration identity number: Previous class/Administration identity number(s): IMO number:
Port of registry:	National flag: Previous national flag(s):
Deadweight (metric tonnes):	Gross tonnage: National: ITC(1969):
Date of build:	Classification notation:
Date of major conversion:	
Type of conversion:	Owner: Previous owner(s):

1 The survey reports and documents listed below have been reviewed by the undersigned and found to be satisfactory

2 The periodical survey has been completed in accordance with the present guidelines on (date) .....

Condition evaluation report completed by	Name Signature	Title
Office	Date	
Condition evaluation report verified by	Name Signature	Title
Office	Date	

Attached reports and documents:

1)
2)
3)
4)
5)
6)

Contents of condition evaluation report

Part 1	-	General particulars:	- See front page
Part 2	-	Report review:	- Where and how survey was done
Part 3	-	Close-up survey:	- Extent (which tanks)
Part 4	-	Thickness measurements:	- Reference to thickness measurement report
			- Summary of where measured
			- Separate form indicating the tanks/areas with substantial corrosion, and corresponding:
			- thickness diminution
			- corrosion pattern
Part 5	-	Tank corrosion prevention system:	- Separate form indicating:
			- location of coating/anodes
			- condition of coating (if applicable)
Part 6	-	Repairs:	- Identification of tanks/areas
Part 7	-	Condition of class/flag State requirements:	
Part 8	-	Memoranda:	- Acceptable defects
			- Any points of attention for future surveys, e.g. for suspect areas
			- Extended annual/intermediate enhanced survey due to coating breakdown
Part 9	-	Conclusion:	- Statement on evaluation/verification of survey report

Extract of thickness measurements

Reference is made to the thickness measurements report:

Position of substantially corroded tanks/areas[1/]	Thickness diminution [%]	Corrosion pattern[2/]	Remarks: e.g. Ref. attached sketches

Remarks

1/ Substantial corrosion, i.e. 75%-100% of acceptable margins wasted.

2/ P = Pitting
C = Corrosion in general

Tank corrosion prevention system

Tank Nos.1/	Tank corrosion prevention system2/	Coating condition3/	Remarks

Remarks

1/ All segregated ballast tanks and combined cargo/ballast tanks should be listed.

2/ C = Coating A = Anodes NP = No protection

3/ Coating condition according to the following standard.

GOOD condition with only minor spot rusting.

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

If coating condition "POOR" is given, extended annual surveys should be introduced. This should be noted in part 7 of the Contents of condition evaluation report.

ANNEX 10

RECOMMENDED PROCEDURES FOR THICKNESS MEASUREMENTS

General

1 These procedures should be used for recording thickness measurements as required by annexes 2 and 4.

2 Reporting forms TM1, TM2-T, TM3-T, TM4-T, TM5-T and TM6-T, set out in appendix 2, should be used for recording thickness measurements.

3 Appendix 3 contains guidance diagrams and notes relating to the reporting forms and the requirements for thickness measurement.

4 The reporting forms should, where appropriate, be supplemented by data presented on structural sketches.

Appendix 1 General particulars

Appendix 2 Reports on thickness measurement

Appendix 3 Guidance on thickness measurement

APPENDIX 1

GENERAL PARTICULARS

Ship's name:

IMO number:

Class/Administration identity number:

Port of registry:

Gross tonnage:

Deadweight:

Date of build:

Classification society:

Name of company performing thickness measurement:

Thickness measurement company certified by:

Certificate number:

Certificate valid from:..... to .....

Place of measurement:

First date of measurement:

Last date of measurement:

Periodical survey/intermediate enhanced survey due*:

Details of measurement equipment:

Qualification of operator:

Report number: consisting of pages

Name of operator: ..... Name of surveyor: .....

Signature of operator: ..... Signature of surveyor: .....

Company official stamp: ..... Administration: .....
Official stamp:

---

* Delete as appropriate

APPENDIX 2

REPORTS ON THICKNESS MEASUREMENT

Report on thickness measurement of all deck plating, all bottom shell plating or side shell plating (TM1-T)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRAKE POSITION																			
PLATE POSITION	No or Letter	Org. Thk. (mm)	Forward Reading						Aft Reading						Mean diminution	
			Gauged		Diminution P		Diminution S		Gauged		Diminution P		Diminution S			
			P	S	mm	%	mm	%	P	S	mm	%	mm	%	P	S
12th forward																
11th																
10th																
9th																
8th																
7th																
6th																
5th																
4th																
3rd																
2nd																
1st																
Amidships																
1st aft																
2nd																
3rd																
4th																
5th																
6th																
7th																
8th																
9th																
10th																
11th																
12th																

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of:

.1 All strength deck plating within the cargo area.

.2 All keel, bottom shell plating and bilge plating within the cargo area.

.3 Side shell plating including selected wind and water strakes outside the cargo area.

2 The strake position should be clearly indicated as follows:

.1 For strength deck indicate the number of the strake of plating inboard from the stringer plate.

.2 For bottom plating indicate the number of the strake of plating outboard from the keel plate.

.3 For side shell plating give number of the strake of plating below sheerstrake and letter as shown on shell expansion.

3 For oil tankers all deck plating strakes should be recorded, for ore/oil ships only the deck plating strakes outside line of openings should be recorded.

4 Measurements should be taken at the forward and aft areas of all plates and where plates cross ballast/cargo tank boundaries separate measurements for the area of plating in way of each type of tank should be recorded.

5 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of shell and deck plating (one, two or three transverse sections) (TM2-T (1))

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRENGTH DECK AND SHEERSTRAKE PLATING

STRAKE POSITION	FIRST TRANSVERSE SECTION AT FRAME NUMBER								SECOND TRANSVERSE SECTION AT FRAME NUMBER								THIRD TRANSVERSE SECTION AT FRAME NUMBER							
	No. or Letter	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk. (mm)	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%			P	S	mm	%	mm	%			P	S	mm	%	mm	%
Stringer plate																								
1st strake inboard																								
2nd																								
3rd																								
4th																								
5th																								
6th																								
7th																								
8th																								
9th																								
10th																								
11th																								
12th																								
13th																								
14th																								
centre strake																								
sheer strake																								
TOPSIDE TOTAL																								

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of strength deck plating and sheerstrake plating transverse sections:

One, two or three sections within the cargo area comprising of the structural items (1), (2) and (3) as shown on the diagrams of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 For oil tankers all deck plating strakes should be recorded, for ore/oil ships only the deck plating strakes outside line of openings should be recorded.

3 The topside area comprises deck plating, stringer plate and sheerstrake (including rounded gunwales).

4 The exact frame station of measurement should be stated.

5 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of shell and deck plating (one, two or three transverse sections) (TM2-T(2))

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

SHELL PLATING

STRAKE POSITION	FIRST TRANSVERSE SECTION AT FRAME NUMBER								SECOND TRANSVERSE SECTION AT FRAME NUMBER								THIRD TRANSVERSE SECTION AT FRAME NUMBER							
	No. or Letter	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		No. or Letter	Org. Thk. (mm)	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%			P	S	mm	%	mm	%			P	S	mm	%	mm	%
1st below sheer strake																								
2nd																								
3rd																								
4th																								
5th																								
6th																								
7th																								
8th																								
9th																								
10th																								
11th																								
12th																								
13th																								
14th																								
15th																								
16th																								
17th																								
18th																								
19th																								
20th																								
keel strake																								
BOTTOM TOTAL																								

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurements of shell plating transverse sections:

One, two or three sections within the cargo area comprising of the structural items (4), (5), (6), and (7) as shown on the diagrams of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 The bottom area comprises keel, bottom and bilge plating.

3 The exact frame station of measurement should be stated.

4 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of longitudinal members (one, two or three transverse sections) (TM3- T)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRUCTURAL MEMBER	FIRST TRANSVERSE SECTION AT FRAME NUMBER								SECOND TRANSVERSE SECTION AT FRAME NUMBER								THIRD TRANSVERSE SECTION AT FRAME NUMBER							
	Item No.	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		Item No.	Org. Thk. (mm)	Gauged		Diminution P		Diminution S		Item No.	Org. Thk. (mm)	Gauged		Diminution P		Diminution S	
			P	S	mm	%	mm	%			P	S	mm	%	mm	%			P	S	mm	%	mm	%

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of longitudinal members at transverse sections:

One, two or three sections within the cargo area comprising of the structural items (8) to (20) as shown on the diagrams of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 The exact frame station of measurement should be stated.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of transverse structural members in the cargo and ballast tanks within the cargo area (TM4 – T)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

TANK DESCRIPTION :

LOCATION OF STRUCTURE :

STRUCTURAL MEMBER	ITEM	Original Thickness (mm)	Gauged		Diminution P		Diminution S	
			Port	Starboard	mm	%	mm	%

Operators Signature .....

Surveyors Signature .....

NOTES - See Reverse

NOTES

1 This report should be used for recording the thickness measurement of transverse structural members, comprising of the appropriate structural items (25) to (32) as shown on the diagrams of typical transverse section indicating longitudinal and transverse members, in appendix 3.

2 Guidance for areas of measurement is indicated in tables 1 to 3 of appendix 3.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of W.T./O.T. transverse bulkheads
within the cargo tank or cargo hold spaces (TM 5 - T)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

TANK/HOLD DESCRIPTION :

LOCATION OF STRUCTURE : FRAME No. :

STRUCTURAL COMPONENT (PLATING/STIFFENER)	Original Thickness (mm)	Gauged		Diminution P		Diminution S	
		Port	Starboard	mm	%	mm	%

Operator's signature .....

Surveyor's signature .....

NOTES - See reverse

NOTES

1 This report should be used for recording the thickness measurement of W.T./O.T. transverse bulkheads.

2 Guidance for areas of measurement is indicated in tables 1 to 3 of appendix 3.

3 The single measurements recorded should represent the average of multiple measurements.

Report on thickness measurement of miscellaneous structural members (TM6-I)

Ship's name ..... IMO number ..... Class identity No. ..... Report No. .....

STRUCTURAL MEMBER :

LOCATION OF STRUCTURE :

SKETCH

Description	Org. Thk. (mm)	Gauged		Diminution P		Diminution S	
		P	S	mm	%	mm	%

Operator's signature .....

Surveyor's signature .....

Notes - See reverse

NOTES

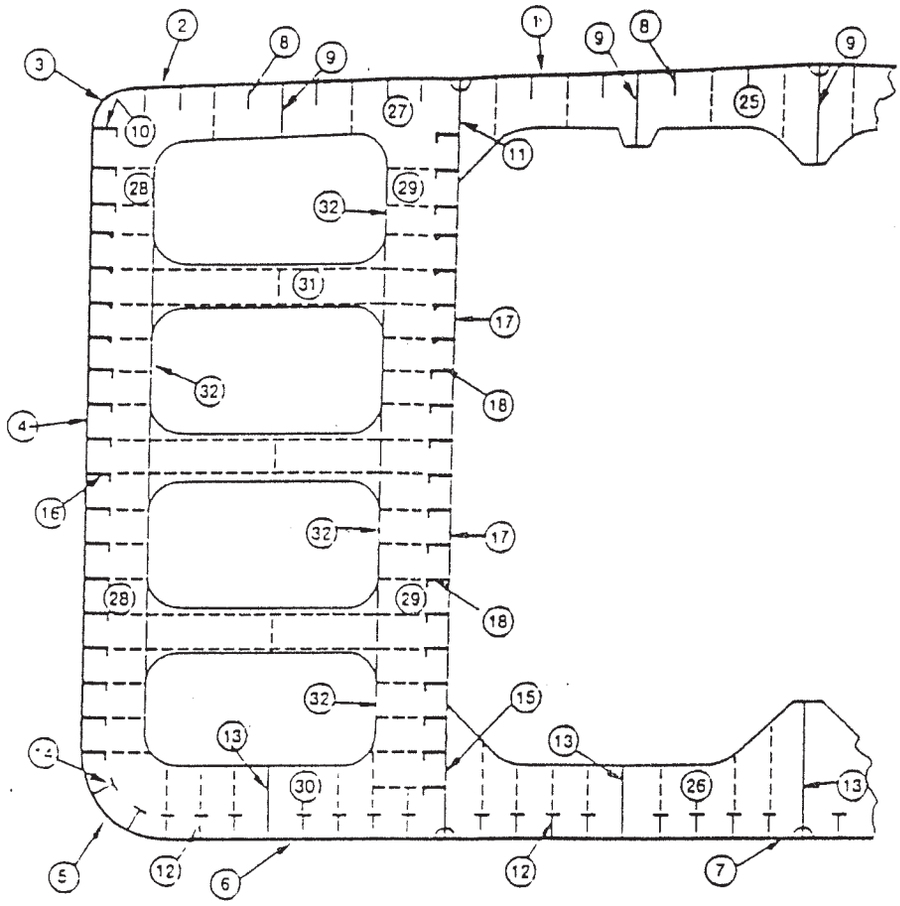
1 This report should be used for recording the thickness measurement of miscellaneous structural members including the structural items (36), (37) and (38) shown in appendix 3.

2 The single measurements recorded should represent the average of multiple measurements.

APPENDIX 3

GUIDANCE OF THICKNESS MEASUREMENT

Typical transverse section of oil tanker indicating longitudinal and transverse members



Report on TM2-T (1)&(2)

(1) Strength deck plating
(2) Stringer plate
(3) Sheerstrake
(4) Side shell plating
(5) Bilge plating
(6) Bottom shell plating
(7) Keel plate

Report on TM3-T

(8) Deck longitudinals
(9) Deck girders
(10) Sheerstrake longitudinals
(11) Longitudinal bulkhead top strake
(12) Bottom longitudinals
(13) Bottom girders
(14) Bilge longitudinals
(15) Longitudinal bulkhead lower strake
(16) Side shell longitudinals
(17) Longitudinal bulkhead plating (remainder)
(18) Longitudinal bulkhead longitudinals
(19) Inner bottom plating
(20) Inner bottom longitudinals
(21)
(22)
(23)
(24)

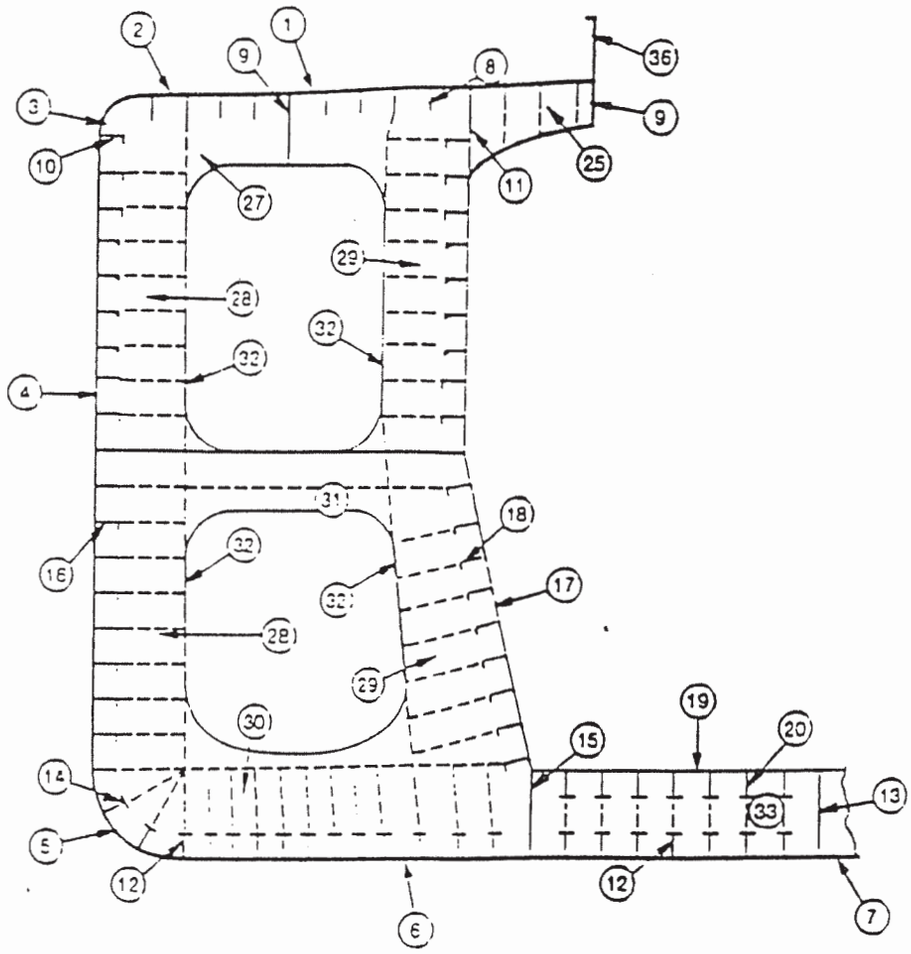
Report on TM4-T

(25) Deck transverse centre tank
(26) Bottom transverse centre tank
(27) Deck transverse wing tank
(28) Side shell vertical web
(29) Longitudinal bulkhead vertical web
(30) Bottom transverse wing tank
(31) Struts
(32) Transverse web face plate
(33) O.B. Floors
(34)
(35)

Report on TM6-T

(36) Hatch coamings
(37) Deck plating between hatches
(38) Hatch covers
(39)
(40)

Typical transverse section of ore/oil ship indicating longitudinal and transverse members



Report on TM2-T (1)&(2)

1. Strength deck plating
2. Stringer plate
3. Sheerstrake
4. Side shell plating
5. Bilge plating
6. Bottom shell plating
7. Keel plate

Report on TM3-T

8. Deck longitudinals
9. Deck girders
10. Sheerstrake longitudinals
11. Longitudinal bulkhead top strake
12. Bottom longitudinals
13. Bottom girders
14. Bilge longitudinals
15. Longitudinal bulkhead lower strake
16. Side shell longitudinals
17. Longitudinal bulkhead plating (remainder)
18. Longitudinal bulkhead longitudinals
19. Inner bottom plating
20. Inner bottom longitudinals
21.
22.
23.
24.

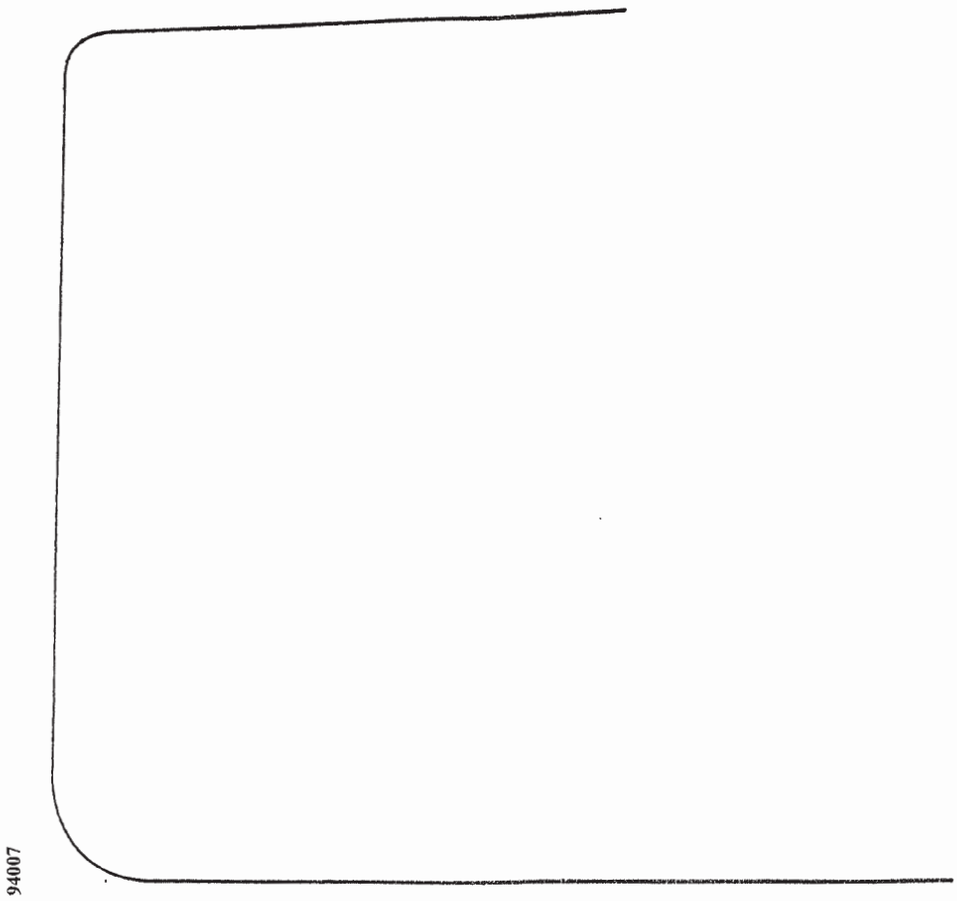
Report on TM4-T

25. Deck transverse centre tank
26. Bottom transverse centre tank
27. Deck transverse wing tank
28. Side shell vertical web
29. Longitudinal bulkhead vertical web
30. Bottom transverse wing tank
31. Struts
32. Transverse web face plate
33. D.B. Floors
34.
35.

Report on TM6-T

36. Hatch coamings
37. Deck plating between hatches
38. Hatch covers
39.
40.

Transverse section outline
(To be used for longitudinal and transverse members where typical oil tanker or oil/ore ship sections are not applicable)



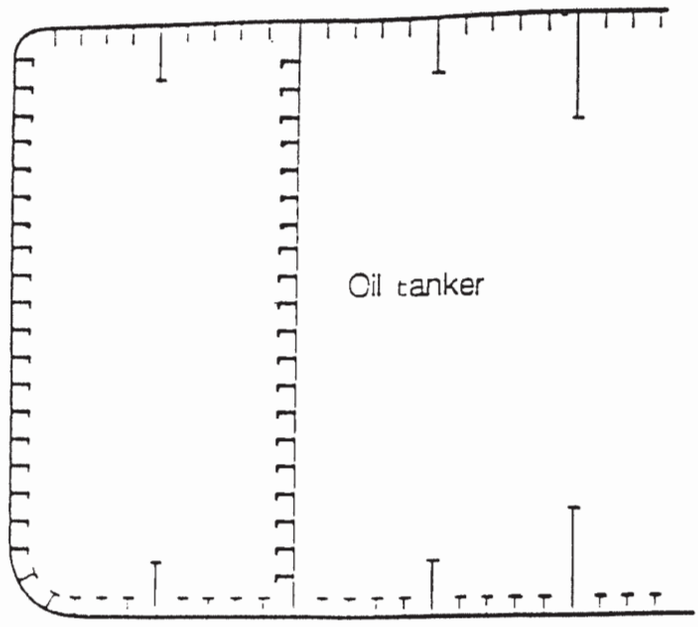
Report on TM2-T (1)&(2)
(1) Strength deck plating
(2) Stringer plate
(3) Sheerstrake
(4) Side shell plating
(5) Bilge plating
(6) Bottom shell plating
(7) Keel plate

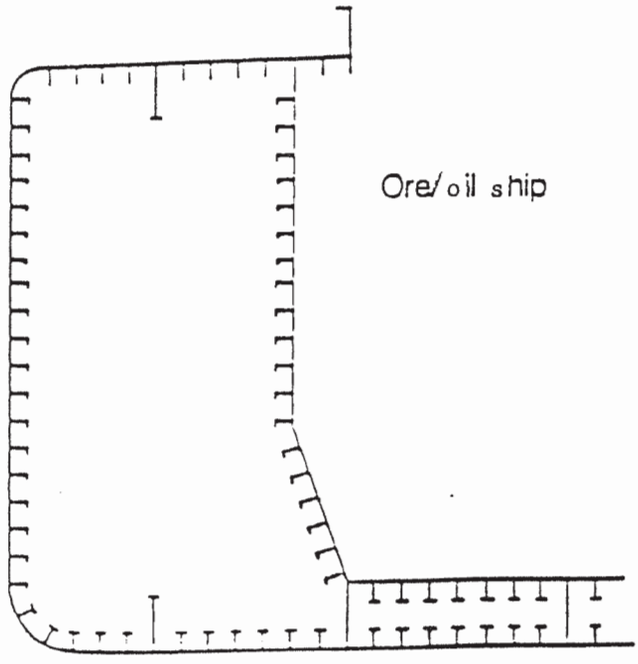
Report on TM3-T
(8) Deck longitudinals
(9) Deck girders
(10) Sheerstrake longitudinals
(11) Longitudinal bulkhead top strake
(12) Bottom longitudinals
(13) Bottom girders
(14) Bilge longitudinals
(15) Longitudinal bulkhead lower strake
(16) Side shell longitudinals
(17) Longitudinal bulkhead plating (remainder)
(18) Longitudinal bulkhead longitudinals
(19) Inner bottom plating
(20) Inner bottom longitudinals
(21)
(22)
(23)
(24)

Report on TM4-T
(25) Deck transverse centre tank
(26) Bottom transverse centre tank
(27) Deck transverse wing tank
(28) Side shell vertical web
(29) Longitudinal bulkhead vertical web
(30) Bottom transverse wing tank
(31) Struts
(32) Transverse web face plate
(33) O.B. Floors
(34)
(35)

Report on TM6-T
(36) Hatch coamings
(37) Deck plating between hatches
(38) Hatch covers
(39)
(40)

Typical transverse sections
showing all longitudinal members to be reported on TM2-T and TM3-T





Thickness measurement requirements

Table 1

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1. One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast) 2. Measurements of structural members subject to close-up survey according to tables 2 and 3 of this appendix, for general assessment and recording of corrosion pattern 3. Suspect areas	1. Within the cargo area: .1 Each deck plate .2 One transverse section 2. Measurements of structural members subject to close-up survey according to tables 2 and 3 of this appendix, for general assessment and recording of corrosion pattern 3. Suspect areas 4. Selected wind and water strakes outside the cargo area	1. Within the cargo area: .1 Each deck plate .2 Two transverse sections 2. Measurements of structural members subject to close-up survey according to tables 2 and 3 of this appendix, for general assessment and recording of corrosion pattern 3. Suspect areas 4. Selected wind and water strakes outside the cargo area 5. All wind and water strakes within the cargo area	1. Within the cargo area: .1 Each deck plate .2 Three transverse sections .3 Each bottom plate 2. Measurements of structural members subject to close-up survey according to tables 2 and 3 of this appendix, for general assessment and recording of corrosion pattern 3. Suspect areas 4. Selected wind and water strakes outside the cargo area 5. All wind and water strakes within the cargo area

Close-up survey requirements

Table 2

AGE ≤ 5	5 < AGE ≤ 10	10 < AGE ≤ 15	AGE > 15
1	2	3	4
(A) ONE WEB FRAME RING – in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast (B) ONE DECK TRANSVERSE – in a cargo tank (D) ONE TRANSVERSE BULKHEAD – in a ballast tank (D) ONE TRANSVERSE BULKHEAD – in a cargo wing tank (D) ONE TRANSVERSE BULKHEAD – in a cargo centre tank	(A) ALL WEB FRAME RINGS – in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast (B) ONE DECK TRANSVERSE – in each of the remaining ballast tanks, if any (B) ONE DECK TRANSVERSE – in a cargo wing tank (B) ONE DECK TRANSVERSE – in two cargo centre tanks (C) BOTH TRANSVERSE BULKHEADS in a wing ballast tank, if any, or a cargo wing tank used primarily for water ballast (D) ONE TRANSVERSE BULKHEAD – in each remaining ballast tank (D) ONE TRANSVERSE BULKHEAD – in a cargo wing tank (D) ONE TRANSVERSE BULKHEAD – in two cargo centre tanks	(A) ALL WEB FRAME RINGS – in all ballast tanks (A) ALL WEB FRAME RINGS – in a cargo wing tank (A) ONE WEB FRAME RING – in each remaining cargo wing tank (C) ALL TRANSVERSE BULKHEADS – in all cargo and ballast tanks (E) ONE DECK AND BOTTOM TRANSVERSE – in each cargo centre tank (F) As considered necessary by the Administration	As for ships referred to in column 3 Additional transverses included as deemed necessary by the Administration

(A) Complete transverse web frame ring including adjacent structural members

(B) Deck transverse including adjacent deck structural members

(C) Transverse bulkhead complete – including girder system and adjacent members

(D) Transverse bulkhead lower part – including girder system and adjacent structural members

(E) Deck and bottom transverse including adjacent structural members*

(F) Additional complete transverse web frame ring

NOTE: * For ore/oil ships applies to deck transverse only

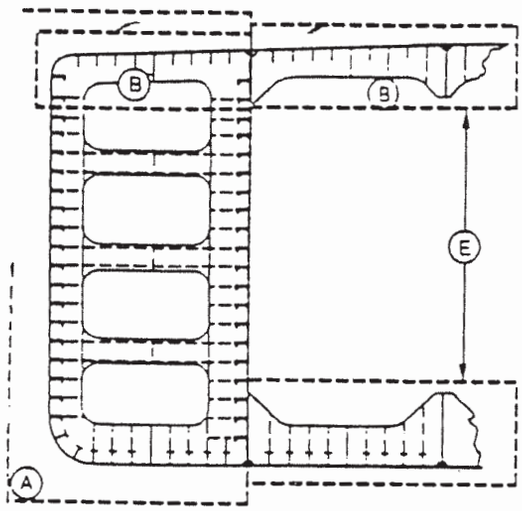
Table 3

Close-up survey requirements

(Transverse sections of oil tankers and ore/oil ships showing typical areas for thickness measurement in association with close-up survey requirements)

Oil tanker

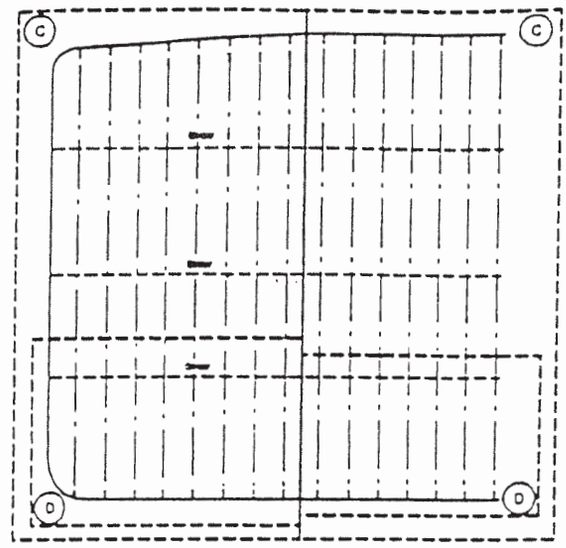
Typical transverse section



Thickness to be reported on TM3-T and TM4-T as appropriate

Oil tanker

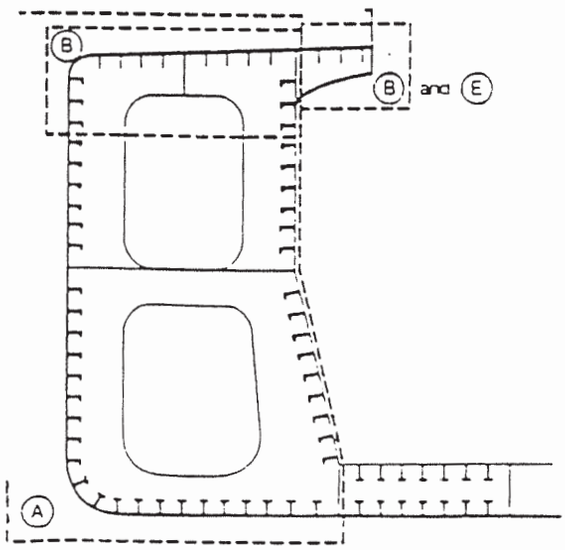
Typical transverse bulkhead



Thickness to be reported on TM5-T

Ore/oil ship

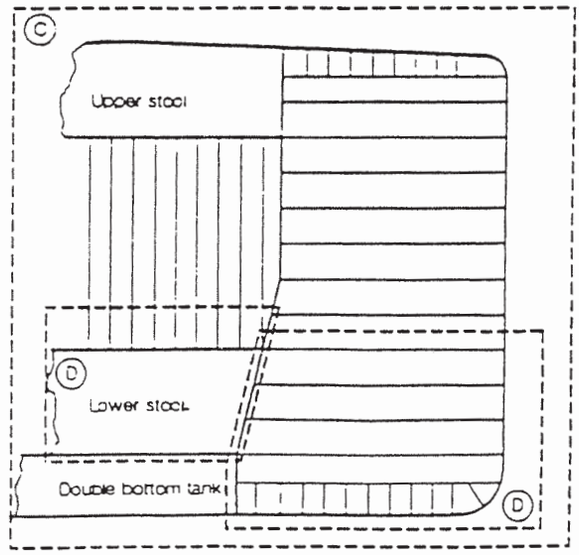
Typical transverse section close-up survey



Thickness to be reported on TM3-T and TM4-T as appropriate

Ore/oil ship

Typical transverse bulkhead



Thickness to be reported on TM5-T

Close-up survey area

Recommendations for the extent and pattern of thickness measurements are indicated in annex 4.