財團法人驗船中心
CR CLASSIFICATION SOCIETY

MEPC.395(82)

2024 年船舶能源效率管理計畫(SEEMP)之制定準則 – 內容摘要

◆ 目的

為因應船舶能源效率管理計畫第三部分(SEEMP Part III)納入 MAPROL 附錄 VI 為強制性法規，此為國際海事組織(IMO)針對能源效率管理計畫(SEEMP)之制定給予說明。IMO 亦提請各會員國納入國家法令時，應充分考量此準則，也同步向船長、海員、船東、船舶營運者或其他相關利益方告知此準則之內容及處理方式。

MEPC.395(82)決議案已取代 MEPC.346(78)決議案

◆ 內容摘要

一、 準則共分十五個部分，大致分為介紹、定義、SEEMP 第一部分之說明、SEEMP 第二部分之說明、SEEMP 第三部分之說明、年度 CII 碳強度指標計算方法、未來三年船舶之 CII 要求值、為期三年的實施計畫、自我評估及改善之程序、SEEMP 第三部分之審查及更新、矯正及預防措施等。該準則的目的是降低國際航運的碳強度，並鼓勵航運公司採取行動，提高其船舶和船舶管理實踐的能源效率和碳強度，其中船舶應按照 MARPOL 附錄 VI 第 28.1 條的要求計算達到的年度營運碳強度指標(CII)的方法，以及應用於向船舶主管機關或其認可組織報告數據的過程。

二、 SEEMP 包含三個部分，SEEMP 第一部分適用於 400 總噸及以上之任何國際線船舶。SEEMP 第二部分適用於 5000 總噸及以上之任何國際線船舶。SEEMP 第三部分適用於所有需符合 MARPOL 附錄 VI 第 28 條的船舶，也就是總噸 5000 及以上且屬於散裝船(Bulk carrier)、氣體運輸船(Gas carrier)、液貨船(Tanker)、貨櫃船(Container ship))、雜貨船(General cargo ship)、冷凍/藏貨船(Refrigerated cargo carrier)、混載船(Combination carrier)、液化天然氣運輸船(LNG carrier)、載運車輛之駛上駛下貨船(Ro-ro cargo ship (vehicle carrier))、駛上駛下貨船(Ro-ro cargo ship)、駛上駛下客船(Ro-ro passenger ship)、郵輪(Cruise passenger ship)等船型的船舶。

三、 本文僅就 SEEMP 第三部分簡要敘述 (適用 MARPOL 附錄 VI 第 26.3 條的船舶)：

1、 該準則為協助船舶制定 SEEMP 第三部分，以收集必要的數據。MARPOL 附錄 VI 第 28 條規定，應使用根據第 27 條（燃油數據收集系統）收集的數據計算實際達成的年度營運 CII。若船舶從一家公司轉移到另一家公司，根據 MARPOL 附錄 VI 第 27.5 或 27.6 條，原公司應在轉讓日後一個月內，將相關數據交付給交接公司前，由主管機關或其認可組織，依據 MARPOL 附錄 VI 第 6.7 條進行驗證。

2、 船舶年度營運 CII 要求值的計算方法，並將其報告給船舶主管機關；

根據 MARPOL 附錄 VI 第 28 條，計算並考慮到 IMO 制定的指南(MEPC.353(78), MEPC.338(76), MEPC.400(83))，作為這些計算的基礎。

3、 確定船舶未來三年所需的年度營運 CII，並制定及應用實施計畫，記錄未來三年將如何實現所需的 CII；三年實施計畫應在設想和可行的範圍內實現，其中應包括：提升船舶能效和降低碳強度的措施清單，以及實現所需的營運 CII 所需的實施時間和方法、描述在實施所列措施時，將如何實現所需的營運 CII，同時考慮到這些措施對營運碳強度的綜合影響、三年實施計畫負責的公司人員，並負責監測和記錄全年能效，以審查三年實施計畫的有效性、預想提升船舶能效和降低碳強度措施有效性可能將遭遇的障礙，以及克服這些障礙需採取的可能應急措施，並對三年實施計畫進行監測，必要時進行調整，以確定監測數據。

4、 制定自我評估和改進的程序；

自我評價和改進的程序可以包括以下內容：評估標準(包括評價要素，如監測質量、記錄保存、實施措施的有效性和目標的實現)、能效及碳強度方面評估所採取的不同措施的有效性、哪些因素在船舶或公司對 CII 產生不利影響，及如何改進這些措施、為解決缺失和差異而確定的措施，包括矯正數據差距和系統弱點、改進實施的新措施（例如培訓）以及根據需要採取新的碳強度改進措施、找出導致無法達到 CII 目標的關鍵因素。SEEMP 應包括一個紀錄表，用於記錄何時審核及更新，並確定哪些部分已更改。

5、 制定矯正措施。

矯正計畫不需要包含在 SEEMP 中，除非船舶連續三年被評為 D 級或一年被評為 E 級。對於需要按照 MARPOL 附錄 VI 第 28.7 條制定矯正計畫的船舶，依據 MARPOL 附錄 VI 第 28.8 條，應向主管

機關或其授權的組織提交經修訂的 SEEMP，包括減少 CII 的矯正措施。根據條例 28.2，修訂後的 SEEMP 不得遲於報告已達到的年度營運 CII 後一個月提交。MARPOL 附錄 VI 第 28.9 條進一步規定，連續三年被評為 D 級或 E 級的船舶，應按照修訂後的 SEEMP 適當地採取計畫的矯正措施。

四、 SEEMP 第三部分之審查及更新：依據 MARPOL 附錄 VI 第 26.1 條之規定，每艘船舶應備有船舶特定的船舶能源效率管理計畫(SEEMP)。此可構成船舶安全管理體系的一部分，其制定及審查應考慮到 IMO 通過的準則。MARPOL 附錄 VI 第 26.3.2 條規定，對於船舶年度 CII 評級為 E 或連續三年評級為 D，SEEMP 應按照 MARPOL 附錄 VI 第 28.8 條進行審查，包括實現所需的年度營運 CII 的矯正計畫。公司應在必要時審查和更新 SEEMP，且 SEEMP 之內容應包含日誌，以記錄其何時被審查和更新，並確定哪些部分已被更改。

五、 附錄一 - SEEMP 第一部分表格範例

APPENDIX 1

SAMPLE FORM OF SHIP MANAGEMENT PLAN TO IMPROVE ENERGY EFFICIENCY (PART I OF THE SEEMP)

Name of ship:		Gross tonnage:	
Ship type:		Capacity:	
IMO number:			

Date of development:		Developed by:	
Implementation period:	From: Until:	Implemented by:	
Planned date of next evaluation:			

Review and update log

Date/timeline	Updated parts	Developed by	Implemented by

1 MEASURES

Energy efficiency measures	Implementation (including the starting date)	Responsible personnel

2 MONITORING

Description of monitoring tools

3 GOAL

Measurable goals

4 EVALUATION

Procedures of evaluation

六、 附錄二 - SEEMP 第二部分表格範例

APPENDIX 2

SAMPLE FORM OF SHIP FUEL OIL CONSUMPTION DATA-COLLECTION PLAN (PART II OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by

2 Ship particulars

Name of ship	
IMO number	
Company	
Flag	
Year of delivery	
Ship type	
Gross tonnage	
NT	
DWT	
Attained EEDI (if applicable)	
Attained EEXI (if applicable)	
Ice class	

3 Record of revision of Fuel Oil Consumption Data-Collection Plan

Date of revision	Revised provision

4 Ship engines and other fuel oil consumers and fuel oil types used

	Engines or other fuel oil consumer type	Power	Fuel oil types
1	Type/model of main engine	(kW)	
2	Type/model of auxiliary engine	(kW)	
3	Boiler	(…)	
4	Inert gas generator	(…)	
5	Others (Specify)	(…)	

5 Emission factor

C_F is a non-dimensional conversion factor between fuel oil consumption and CO_2 emission in the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)), as amended. The annual total amount of CO_2 is calculated by multiplying annual fuel oil consumption and C_F for the type of fuel.

Fuel oil type	C_F (t-CO_2 / t-Fuel)
Diesel/Gas oil (e.g. ISO 8217 grades DMX through DMB)	3.206
Light fuel oil (LFO) (e.g. ISO 8217 grades RMA through RMD)	3.151
Heavy fuel oil (HFO) (e.g. ISO 8217 grades RME through RMK)	3.114
Liquefied petroleum gas (LPG) (Propane)	3.000
Liquefied petroleum gas (LPG) (Butane)	3.030
Liquefied natural gas (LNG)	2.750
Methanol	1.375
Ethanol	1.913
Other (……)	

6 Method to measure fuel oil consumption

The applied methods for measurement for each consumer type of this ship are given below. The description explains the procedure for measuring data and calculating annual values, measurement equipment involved, etc.

Engines or other fuel oil consumer type	Method	Description
Type/model of main engine		
Type/model of auxiliary engine		
Boiler		
Others (Specify)		

7 Method to measure distance travelled including laden distance

Description

8 Method to measure hours under way

Description

9 Processes that will be used to report the data to the Administration

Description

10 Data quality

Description

七、 附錄三 - SEEMP 第三部分表格範例

APPENDIX 3

SAMPLE FORM OF SHIP OPERATIONAL CARBON INTENSITY PLAN (PART III OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by
<1st time>			
<2nd time>			
Etc.			

2 Required CII over the next three years, attained CII and rating over three consecutive years

Name of the ship		IMO number	
Company		Year of delivery	
Flag		Ship type	
Gross tonnage		DWT	
Applicable CII		□AER ; □cgDIST	

Year	Required annual operational CII	Attained annual operational CII (before any correction)	Attained annual operational CII	Operational carbon intensity rating (A, B, C, D or E):
<year -1>				
<year -2>				
<year -3>				

	Required annual operational CII
<year>:	
<year + 1>	
<year + 2>	

3 Calculation methodology of the ship's attained annual CII, including required data and how to obtain these data as far as not addressed in part II

Description

4 Three-year implementation plan

Description

Company personnel to be responsible for the three-year implementation plan, monitoring and recording performance

List of measures to be considered and implemented

Measure	Impact on CII	Time and method of implementation and responsible personnel			Impediments and contingency measures	
		Milestone	Due	Responsible	Impediment	Contingencies
		Milestone	Due	Responsible	Impediment	Contingencies
		Milestone	Due	Responsible	Impediment	Contingencies
		Milestone	Due	Responsible	Impediments	Contingencies

Calculation showing the combined effect of the measures and that the required operational CII will be achieved

Year	Required annual operational CII	Targeted operational annual CII	Targeted rating
<year>:			
<year + 1>			
<year + 2>			

5 Self-evaluation and improvement

Description

6 Plan of corrective actions (if applicable)

Analysis of causes for inferior CII rating

Cause	Analysis of effect	Actions

Analysis of measures in the implementation plan

Measure	Analysis of effect	Actions

List of additional measures and revised measures to be added to the implementation plan

Measure	Impact on CII	Time and method of implementation and responsible personnel			Impediments and contingency measures	
		Milestone	Due	Responsible	Impediments	Contingencies

八、 附錄四 - 數據收集系統及行政部門對於碳強度審核之標準報告格式

APPENDIX 4

STANDARDIZED DATA-REPORTING FORMAT FOR THE DATA-COLLECTION SYSTEM AND OPERATIONAL CARBON INTENSITY TO THE ADMINISTRATION

Identity of the ship

Name of the ship	
Company	
Flag	
IMO number	
Period of the calendar year for which the data is submitted	
Start date for DCS (dd/mm/yy)	
End date for DCS (dd/mm/yy)	

Technical characteristics of the ship

Year of delivery		
Ship type, as defined in regulation 2.2 of MARPOL Annex VI or other (to be stated)		
Gross tonnage (GT)		
Net tonnage (NT)		
Deadweight tonnage (DWT)		
Power output (rated power) over 130 (kW)	Main Engine(s)	
	Auxiliary Engine(s)	
Attained EEDI (if applicable)		
Attained EEXI (if applicable)		
Ice class (if applicable)		

Fuel oil[1] consumption data

Total fuel oil consumption data		
Fuel oil type	Quantity in metric tonnes (t)	Method(s) used for collecting fuel oil consumption data (BDN / Flow meters / bunker FO tank monitoring / LNG cargo tank monitoring / Cargo tank monitoring other than LNG)
Diesel/Gas Oil (CF: 3.206)		
LFO (CF: 3.151)		
HFO (CF: 3.114)		
LPG (Propane) (CF: 3.000)		
LPG (Butane) (CF: 3.030)		
Ethane (CF: 2.927)		
LNG (CF: 2.750)		

Total fuel oil consumption data		
Methanol (CF: 1.375)		
Ethanol (CF: 1.913)		
Other (…….) (Cf: ……..)		

Total fuel oil consumption data per consumer type			
Fuel oil type	Consumer type	Quantity in metric tonnes (t)	Method used for collecting fuel oil consumption data (Flow meters / bunker FO tank monitoring / subtraction / estimated)
Diesel/Gas Oil (CF: 3.206)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LFO (CF: 3.151)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
HFO (CF: 3.114)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LPG (Propane) (CF: 3.000)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LPG (Butane) (CF: 3.030)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		
Ethane (CF: 2.927)	Main engines (s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		
LNG (CF: 2.750)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Methanol (CF: 1.375)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Ethanol (CF: 1.913)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Other(…….) (Cf: ……..)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		

Fuel oil consumption data while the ship is not under way, per consumer type			
Fuel oil type	Consumer type	Quantity in metric tonnes (t)	Method used for collecting fuel oil consumption data
Diesel/Gas Oil (CF: 3.206)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LFO (CF: 3.151)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
HFO (CF: 3.114)	Main engines(s)		
	Auxiliary engines		
	Fired Boiler(s)		
	Others (specify)		
LPG (Propane) (CF: 3.000)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LPG (Butane) (CF: 3.030)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Ethane (CF: 2.927)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LNG (CF: 2.750)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Methanol (CF: 1.375)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		
Ethanol (CF: 1.913)	Main engines (s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Other (.....) (Cf: .....)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		

Total distance travelled (nm)	
Laden distance travelled (nm) (on a voluntary basis)	
Hours under way (h)	
Total amount of onshore power supplied (kWh)	

For ships to which regulation 28 of MARPOL Annex VI applies:

Total transport work	
Applicable CII	□AER ; □cgDIST
Required annual operational CII	
Start date for annual CII (dd/mm/yy)[2]	
End date for annual CII (dd/mm/yy)[2]	
Attained annual operational CII before any correction (AER in g CO_2/dwt.nm or cgDIST in g CO_2/gt.nm)	
Attained annual operational CII (AER in g CO_2/dwt.nm or cgDIST in g CO_2/gt.nm)	
Installation of innovative technology, if applicable (refer to MEPC.1/Circ.896)	□A ; □B-1 ; □B-2 ; □C-1 ; □C-2
Operational carbon intensity rating	□A ; □B ; □C ; □D ; □E
CII for trial purpose (none, one or more on voluntary basis)	□EEPI ; □cbDIST ; □clDIST ; □EEOI
EEPI (gCO_2/dwt.nm)	
cbDIST (gCO_2/berth.nm)	
clDIST (gCO_2/m.nm)	
EEOI (gCO_2/t.nm or others)	

九、 附錄五 - 在自願基礎上計算試驗碳強度指標的參數標準化報告格式

APPENDIX 5

STANDARDIZED DATA-REPORTING FORMAT FOR THE PARAMETERS TO CALCULATE THE TRIAL CARBON INTENSITY INDICATORS ON VOLUNTARY BASIS*

Attained annual EEOI	
Metric of Cargo Mass Carried or Work Done in EEOI calculation (gCO_2/t.nm or others)*****	
Transport work*****	
Attained annual EEPI (gCO_2/dwt.nm)	
Laden distance travelled (n.m)	
Attained annual clDIST (gCO_2/m.nm) ****	
Length of lanes (metre) ****	
Attained annual cbDIST(gCO_2/berth.nm) ***	
Available lower berths***	
End date for trial CII (dd/mm/yy)**	
Start date for trial CII (dd/mm/yy)**	
IMO number**	
End date for DCS (dd/mm/yy)**	
Start date for DCS (dd/mm/yy)**	

* For reporting a trial CII, the data should be reported as applicable taking into account the information already provided in appendix 4.
** Consistent with appendix 4.
*** Only applicable to cruise passenger ships.
**** Only applicable to ro-ro ships.
***** As defined in section 3 of *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* circulated by MEPC.1/Circ.684. The distance travelled shall be determined from berth of the port of departure to berth of the port of arrival and shall be expressed in nautical miles.