The IMO Model Assembly

Environmental Regulations Of CO_2 Emissions by IMO

Team Name : Triple J

Contents

1. Introduction

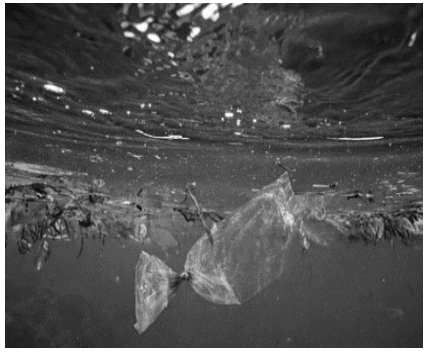
Today Earth…?

- Marine pollution

There are many reasons that cause marine pollution such as oil spill, marine litter, inflow wastewater and co_2 emission from ships

1. Introduction

Today Earth…?



- Marine pollution

- There are many reasons that cause marine pollution such as oil spill, marine litter, inflow wastewater and co_2 emission from ships

2. Background

1997
Kyoto protocol issued

2003
GHG is introduced to Ship for the first time

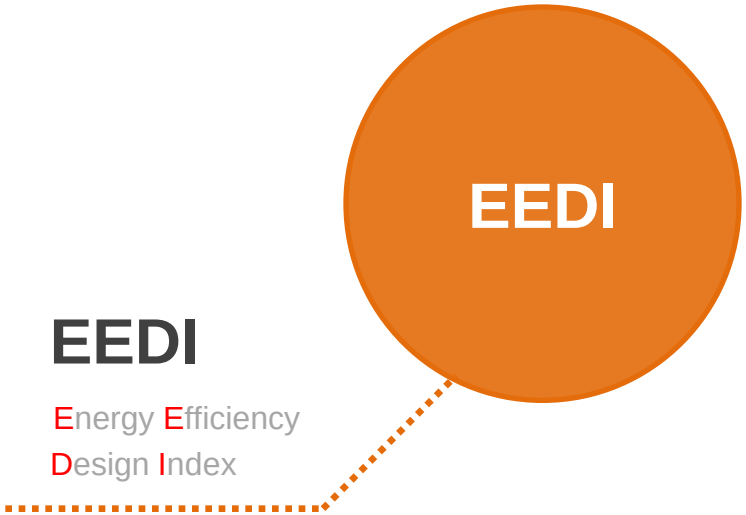
2009
MEPC prepared draft text on mandatory requirements for the EEDI, EEOI and SEEMP

2013
Applied EEDI, EEOI, SEEMP

EEDI EEOI SEEMP

2. Background

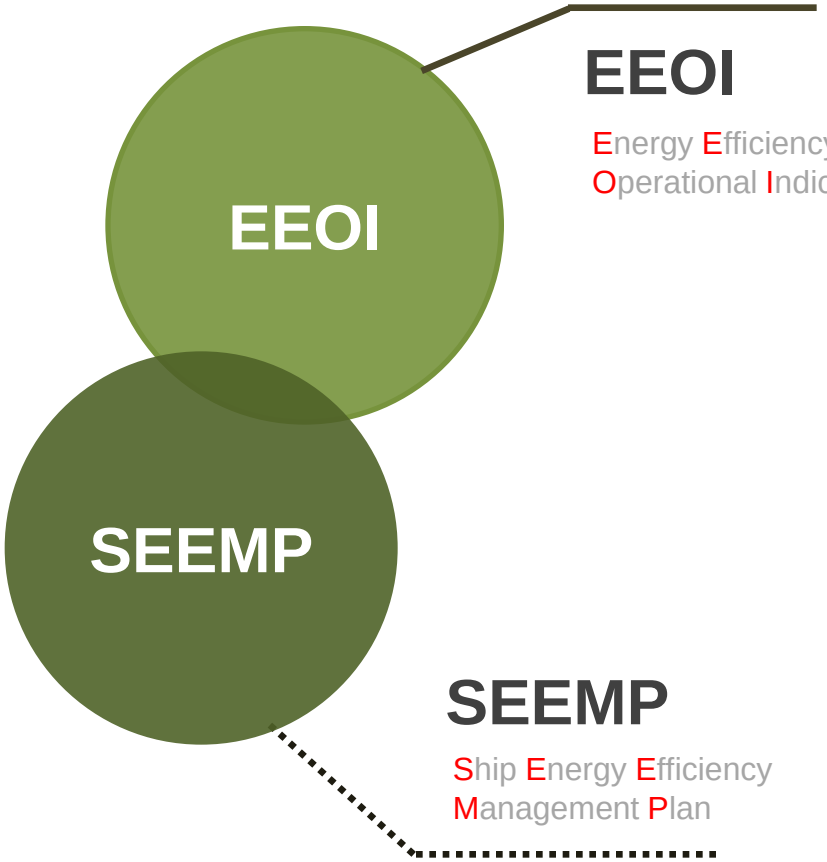
Compulsory regulation
(Technical point of view)



EEDI

Energy Efficiency
Design Index

Voluntary regulation
(Operational point of view)



EEOI

Energy Efficiency
Operational Indicator

SEEMP

Ship Energy Efficiency
Management Plan

2. Background

EEDI

Energy Efficiency
Design Index

EEOI

Energy Efficiency
Operational Indicator

SEEMP

Ship Energy Efficiency
Management Plan

1. EEDI has applied since 2013 and means what amount of CO_2 emitted per metric ton of freight and per mile of transportation
2. Reduce 30% of CO_2 emission from 2015 to 2030
3. EEDI is compulsory regulation

2. Background

EEDI

Energy Efficiency Design Index

EEOI

Energy Efficiency Operational Indicator

SEEMP

Ship Energy Efficiency Management Plan

1. EEOI as “operational CO_2 - Indicator”
2. EEOI is a monitoring tool for the SEEMP
3. EEOI is a operational technical measure for ships in service

2. Background

EEDI

Energy Efficiency Design Index

EEOI

Energy Efficiency Operational Indicator

SEEMP

Ship Energy Efficiency Management Plan

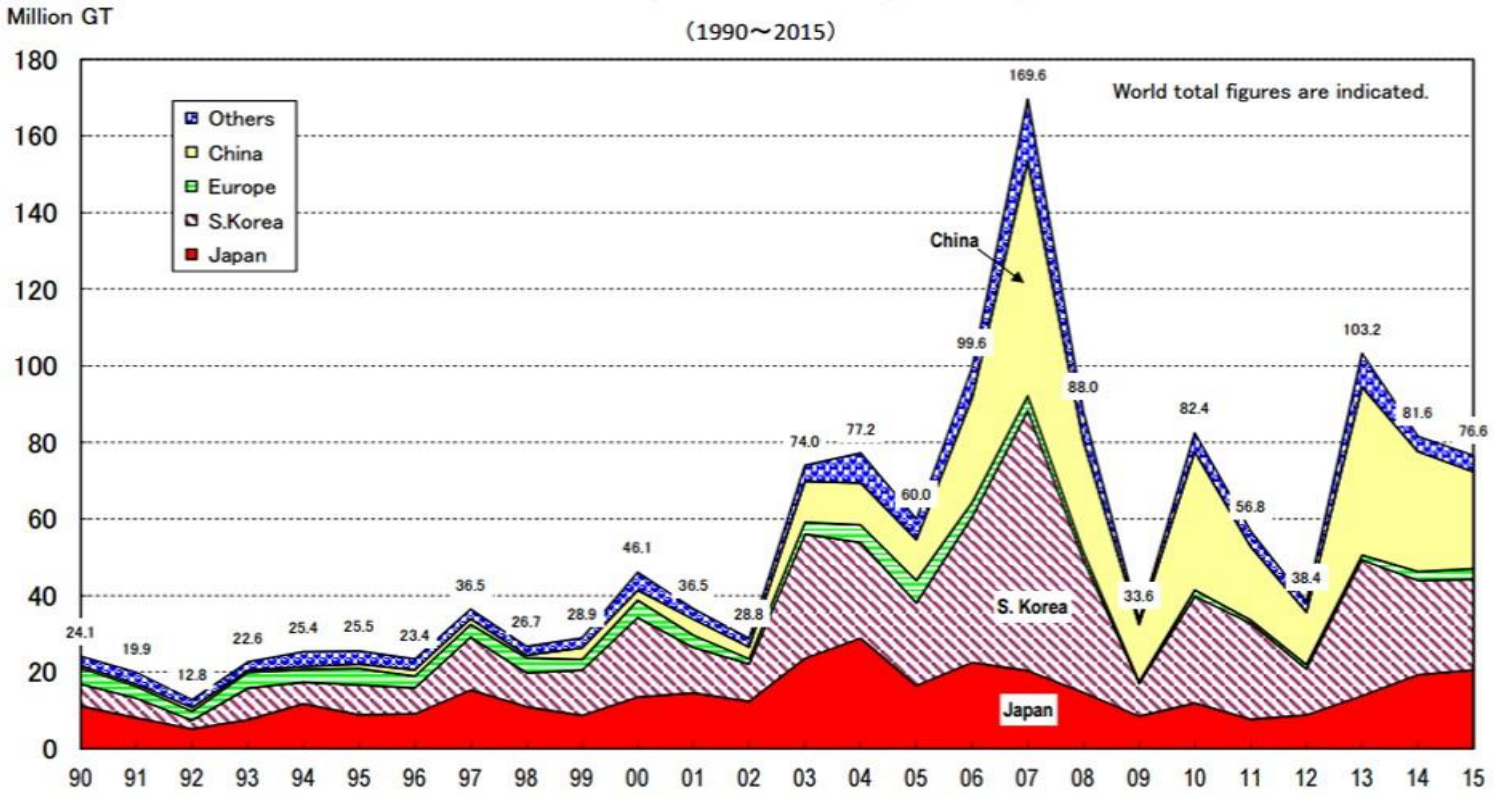
1. The SEEMP seeks to improve a ship's energy efficiency through four steps: planning, implementation, monitoring, and self-evaluation and improvement

2. The purpose of a SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency of a ship's operation.

3. Each company has a different format of SEEMP

3. Current State

Fig.1 WORLD NEW ORDERS

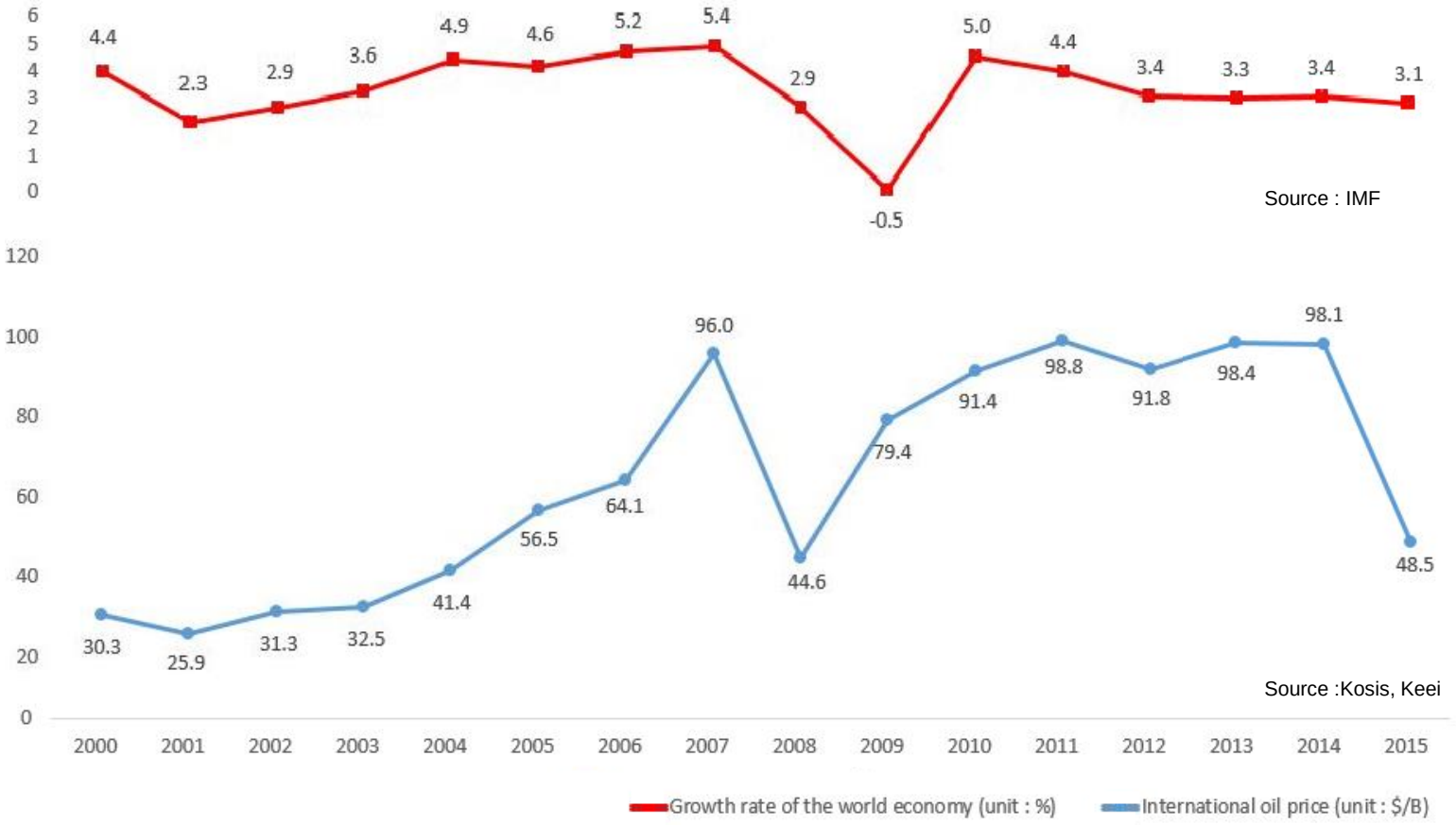


(Note) 1. Data Source : JSEA report based on LR until 1994. IHS "World Shipbuilding Statistics" from 1995.
2. Ship Size Coverage : 100 Gross Tonnage and over.

Source : SAJ

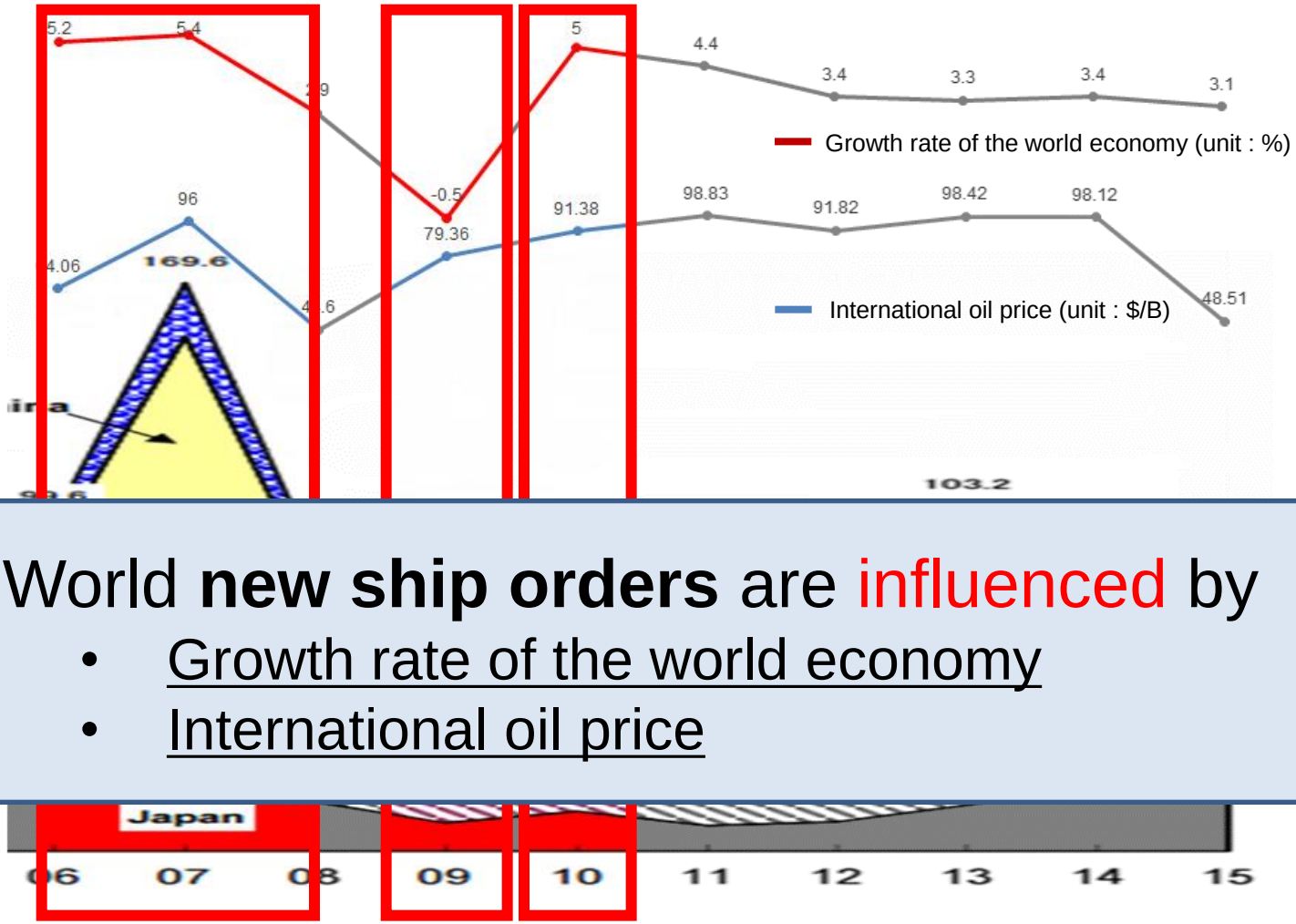
3. Current State

Fig.2 Economy Analysis Chart



3. Current State

Fig.3 World New Orders Analysis



World **new ship orders** are influenced by

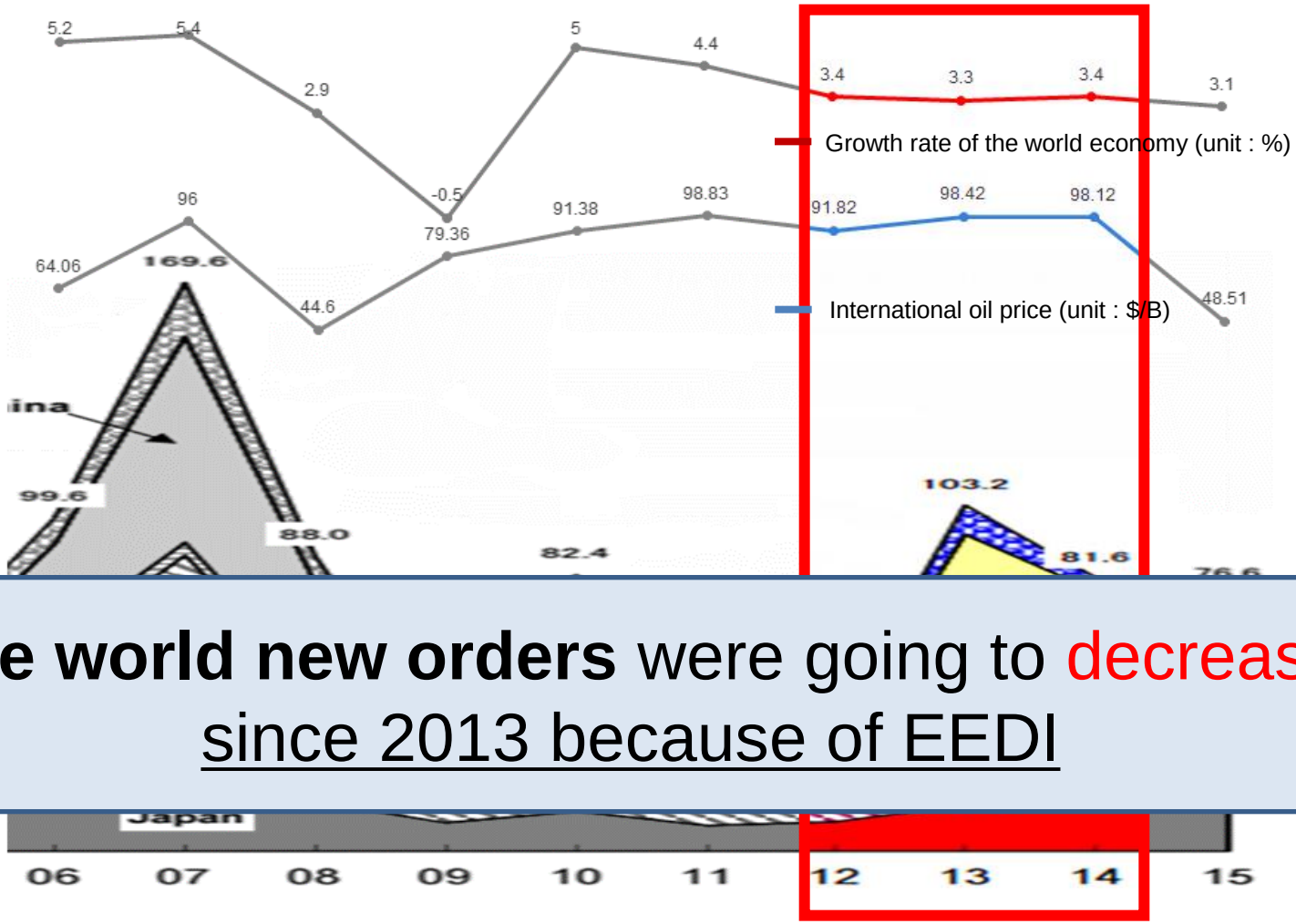
- Growth rate of the world economy
- International oil price

(Note) 1. Data Source : JSEA report based on LR until 1994. IHS "World Shipbuilding Statistics" from 1995.
2. Ship Size Coverage : 100 Gross Tonnage and over.

Source : SAJ

3. Current State

Fig.4 World New Orders Analysis



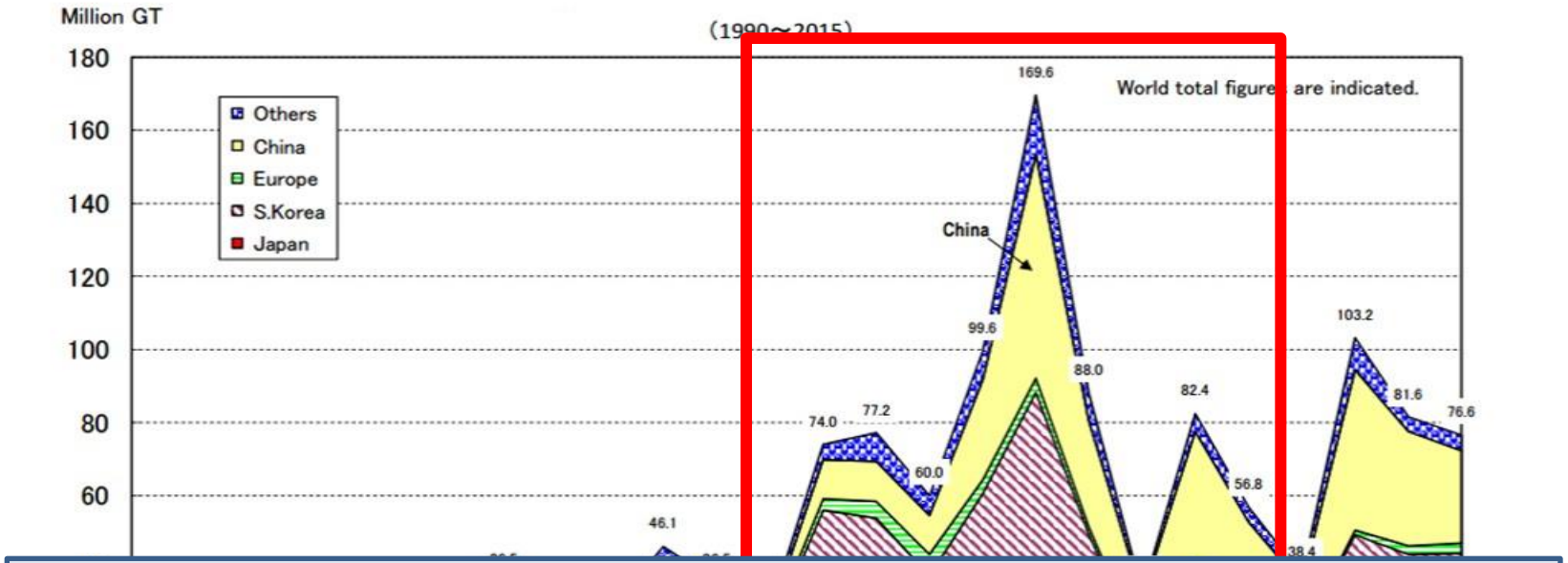
The world new orders were going to decrease since 2013 because of EEDI

(Note) 1. Data Source : JSEA report based on LR until 1994. IHS "World Shipbuilding Statistics" from 1995.
2. Ship Size Coverage : 100 Gross Tonnage and over.

Source : SAJ

3. Current State

Fig.5 World New Orders Analysis



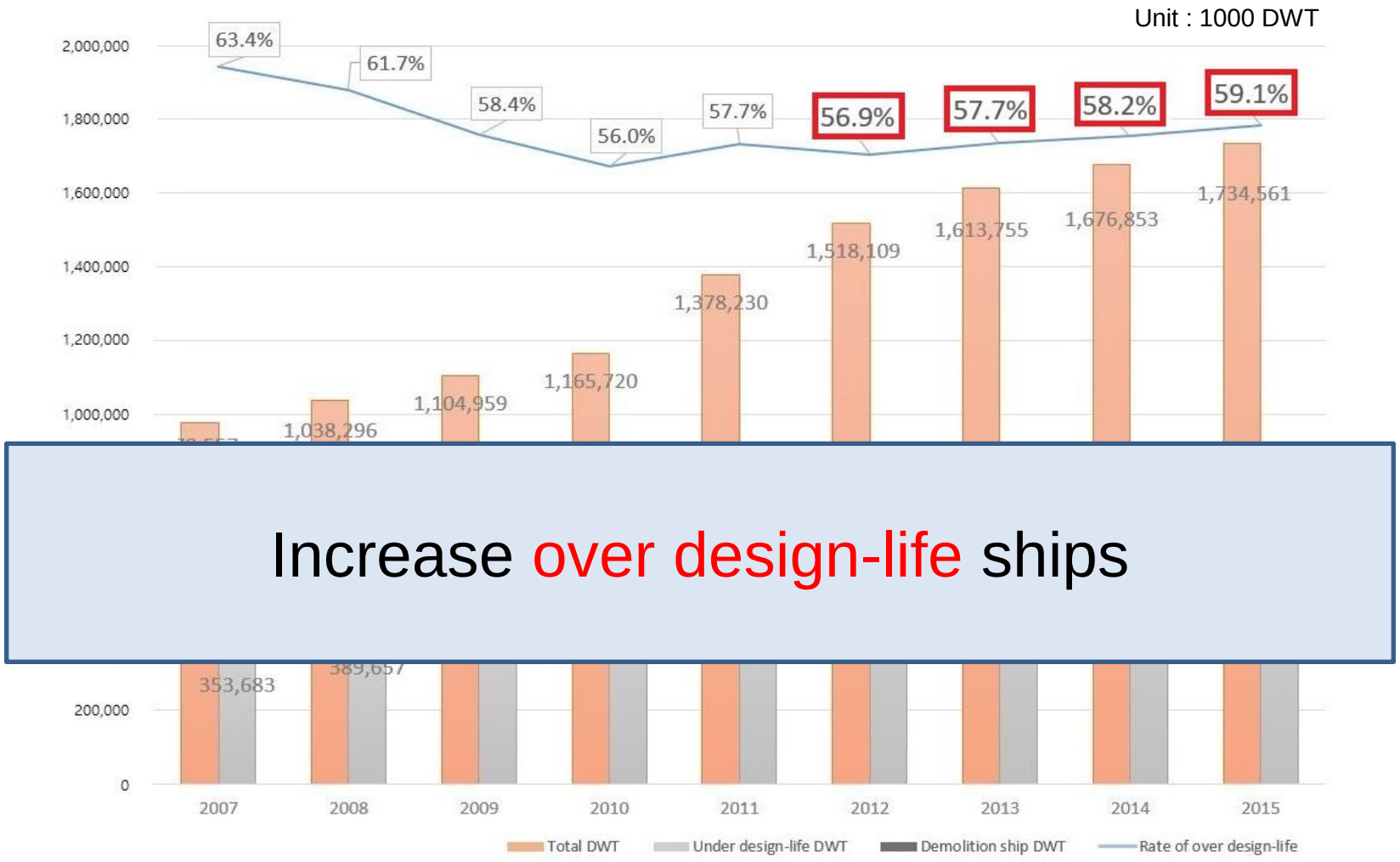
Most of ships will operate W/O EEDI until 2030

(Note) 1. Data Source : JSEA report based on LR until 1994. IHS "World Shipbuilding Statistics" from 1995.
2. Ship Size Coverage : 100 Gross Tonnage and over.

Source : SAJ

3. Current State

Fig.6 World Fleet by tonnage



Increase over design-life ships

Source : made by Triple J. based on data supplied by clarksons research

4. Problem

Review

01

Decreased new ship orders from 2013

Enhanced management regulation for operational ships

03

Over design-life ships were increased since 2013

5. Proposal

Enhanced management regulation for operational ships

Proposal. 1

EEOI : Certification

Proposal. 2

SEEMP : Standardization

5. Proposal

EEOI Certification

5. Proposal

Proposal. 1 EEOI : Certification

Module	Rating	Green Ship1	Green Ship2	Green Ship3	Green Ship4	Remark (Data to be submitted)
Ship Management Module	ISO 14001 Certification	O	O	O	O	(ISO 14001 Certificate)
	GHG Inventory Verification	X	O	O	O	means GHG emissions for a ship verified by the appropriate third party to recognize from the Society. (GHG Inventory Verification Certificate)
	Green Management System or Equivalent	X	X	O	O	means to comply with Korean Law to promote Environment-friendly industrial structure. (Green Management System or Equivalent System Certificate)
	Ship Environmental Assessment Index	X	X	X	O	means index for a ship performed in CCWG, CSP, etc. (Data for Ship Environmental Assessment Index Management)
Ship Operation Module	Ship Energy Efficiency Management Plan	O	O	O	O	means the plan specified by MARPOL Annex VI/Ch.4 Reg.22 amended by IMO Res.MEPC.203(62) and Res.MEPC.213(63). (Ship Energy Efficiency Management Plan)
	[illegible]	X	O	O	O	[illegible]
Convention Applicable Module	[illegible]	[illegible]	[illegible]	10%)	more)	Design Index Management)
	Ballast Water Management System	X	X	O	O	means to comply with "International Convention for the control and Management of Ship's Ballast Water and Sediments, 2004". (Data for Ballast Water Management System)
	Part I Inventory	X	X	X	O	means Part I of the Inventory of the Ship Recycling Convention(Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009) accepted by SR/CNF/45 in May 10th, 2009. (Data for Part I Inventory)

Source : KR

What is the Green Ship Certification

Green Ship Certification is a rating scheme to issue a certificate with a Green Ship Rating of the ship in accordance with the separate requirements of the Society considering satisfactory level of major environmental IMO requirements

Requirements for Green Ship Certification

[illegible]gs and

The Green Ship Certificate will be issued to ships certified by Green Ship Certification. The Green Ship Certificate will be issued with validity within 5 years, and the Renewal Survey is to be carried out before the expiry date of the Green Ship Certificate and then the Green Ship Certificate will be newly issued

These kinds of EEOI certification would be helpful

5. Proposal

Proposal. 2 SEEMP : Standardization

MEPC 63/23
Annex 9, page 12

APPENDIX

A SAMPLE FORM OF A SHIP EFFICIENCY ENERGY MANAGEMENT PLAN

Name of Vessel:		GT:	
Vessel Type:		Capacity:	

Date of Development:		Developed by:	
Implementation Period:	From: Until:	Implemented by:	
Planned Date of Next Evaluation:			

1 MEASURES

Energy Efficiency Measures	Implementation (including the starting date)	Responsible Personnel
Weather Routeing	<Example> Contracted with [Service providers] to use their weather routeing system and start using on-trial basis as of 1 July 2012.	<Example> The master is responsible for selecting the optimum route based on the information provided by [Service providers].
Speed Optimization	While the design speed (85% MCR) is 19.0 kt, the maximum speed is set at 17.0 kt as of 1 July 2012.	The master is responsible for keeping the ship's speed. The log-book entry should be checked every day.

2 MONITORING

Description of monitoring tools

3 GOAL

Measurable goals

4 EVALUATION

Procedures of evaluation

(Annexes 10 to 34 to the report are contained in document MEPC 63/23/Add.1)

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The example of SEEMP by IMO

Appendix Ship's Particular

Ship Name	
Vessel Type	
Flag	
IMO No.	
Light Weight	
Gross Tonnage	
Draft(Summer/Winter)	
Bunker Tank Capacity	
Ballast Tank Capacity	

AppendixII

FORM OF SHIP EFFICIENCY ENERGY MANAGEMENT PLAN (SEEMP)

Voyage Number		Commenced Date		Completed Date	

1. Measures

(O : Applied, X : Not applied)

Measures		Applied/ Not Applied	Responsible Personnel	Implementation (incl. start dates)
Category 1. Operational Improvement				
1.1	Improved Vayage Planning			
1.2	Weather Routing			
1.3	Just in Time arrival			
1.4	Speed Optimization			
1.5	Slow steaming			
1.6	Main Engine Optimization			
1.7	Optimized shaft power			
1.8	Optimum Ballast			
1.9	Trim optimization			
1.10	Propeller and Propulsion Optimization			
1.11	Port Turn-around Time			
1.12	M/E Maintenance			
1.13	Aux. machinery maintenance			
1.14	Electricity management			
Category 2. Modifications during Voyage in				
2.1	Propulsion Resistance			
	Management			
2.2	Autopilot Tuning/Update			
2.3	Energy Monitoring and Management Systems			
2.4	Frequency Converters for Pumps/Fans			
2.5	High Efficiency Electrical Motors			
Category 3. Modifications during Dry Docking				
3.1	Propeller and Propulsion Optimization			
3.2	Bulbous Bow Modification			
3.3	Scallops or Grids			
3.4	Ducktail			
3.5	Hull Coatings			
3.6	Micro Bubble Technology			
Category 4. Gas emission management optimization				
4.1	GHG Reduction device Operation and Optimization			
4.2	Combustion Control System			
Category 5. New Technology				
5.1	Waste Heat Recovery System			
5.2	Hybrid Auxiliary Power			
5.3	Diesel electric propulsion system			
5.4	Fuel type-LNG			
5.5	Fuel Cell			
5.6	Solar Power			
5.7	Wind Power			
5.8	Bio Fuels			
5.9	Nuclear Power			
Category 6. Other Measures				

2. MONITORING (Description of monitoring tools)

EEOI is to be used under the guidance of IMO Circular MEPC.1/Circ.684. (Refer to Appendix III)

Voyage / Year	EEOI			
	EEOI Goal	Actual EEOI	Deviation Rate	Rolling Average
1				
2				
3				
4				

Special comments:

1. This plan requires to be written on one voyage or one year basis.
2. Prior to the commencement of each vayage/year, the Company Management team (or onboard management team) Should set the target EEOI for the following voyage/year.
3. The target EEOI should be achieved through the application of the items in 'Energy Efficiency Measures Code'
   When the voyage/year completes, the actual EEOI should be calculated and assessed.
4. The sample form can be stored separately from the SEEMP Gide-line.

3. GOAL(Measurable goals)

4.1 SELF-EVALUATION

Evaluation and improvement of the performance :
Special comments for next :

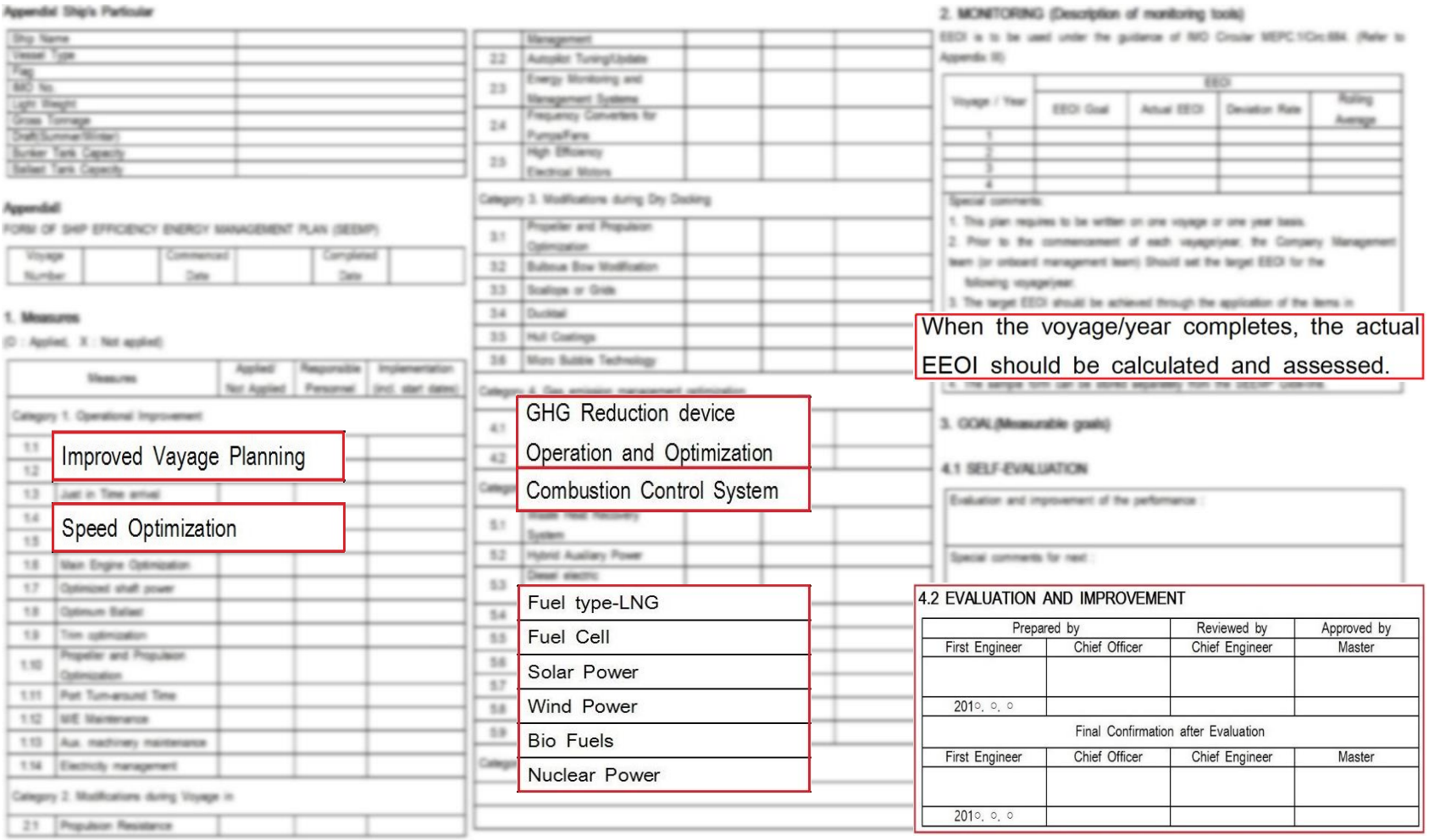
4.2 EVALUATION AND IMPROVEMENT

Prepared by		Reviewed by	Approved by
First Engineer	Chief Officer	Chief Engineer	Master
201○. ○. ○			

Final Confirmation after Evaluation			
First Engineer	Chief Officer	Chief Engineer	Master
201○. ○. ○			

SEEMP standard proposal

5. Proposal



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3.4	Ducktail			
3.5	Hull Coatings			
3.6	Micro Bubble Technology			
Category 4. Gas emission management optimization				
4.1	GHG Reduction device			
4.2	Operation and Optimization			
Category 5. Alternative Energy				
5.1	Combustion Control System			
5.2	Hybrid Auxiliary Power			
5.3	Diesel electric			
5.4	Fuel type-LNG			
5.5	Fuel Cell			
5.6	Solar Power			
5.7	Wind Power			
5.8	Bio Fuels			
5.9	Nuclear Power			
Category 6. Others				

2. MONITORING (Description of monitoring tools)

EEOI is to be used under the guidance of IMO Circular MEPC.1/Circ.684. (Refer to Appendix III)

Voyage / Year	EEOI			
	EEOI Goal	Actual EEOI	Deviation Rate	Rolling Average
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3. GOAL(Measurable goals)

4.1 SELF-EVALUATION

Evaluation and improvement of the performance :

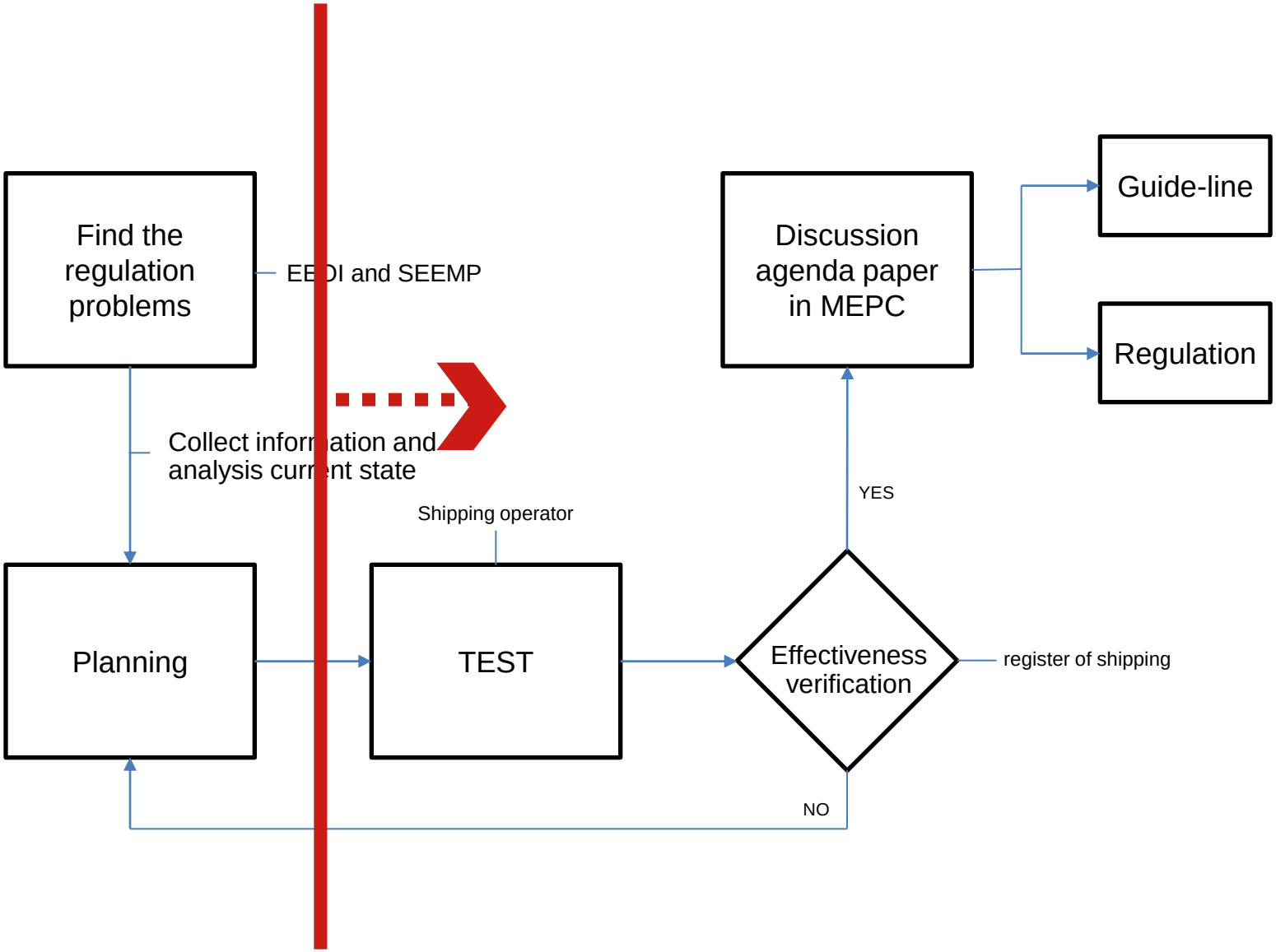
Special comments for next :

4.2 EVALUATION AND IMPROVEMENT

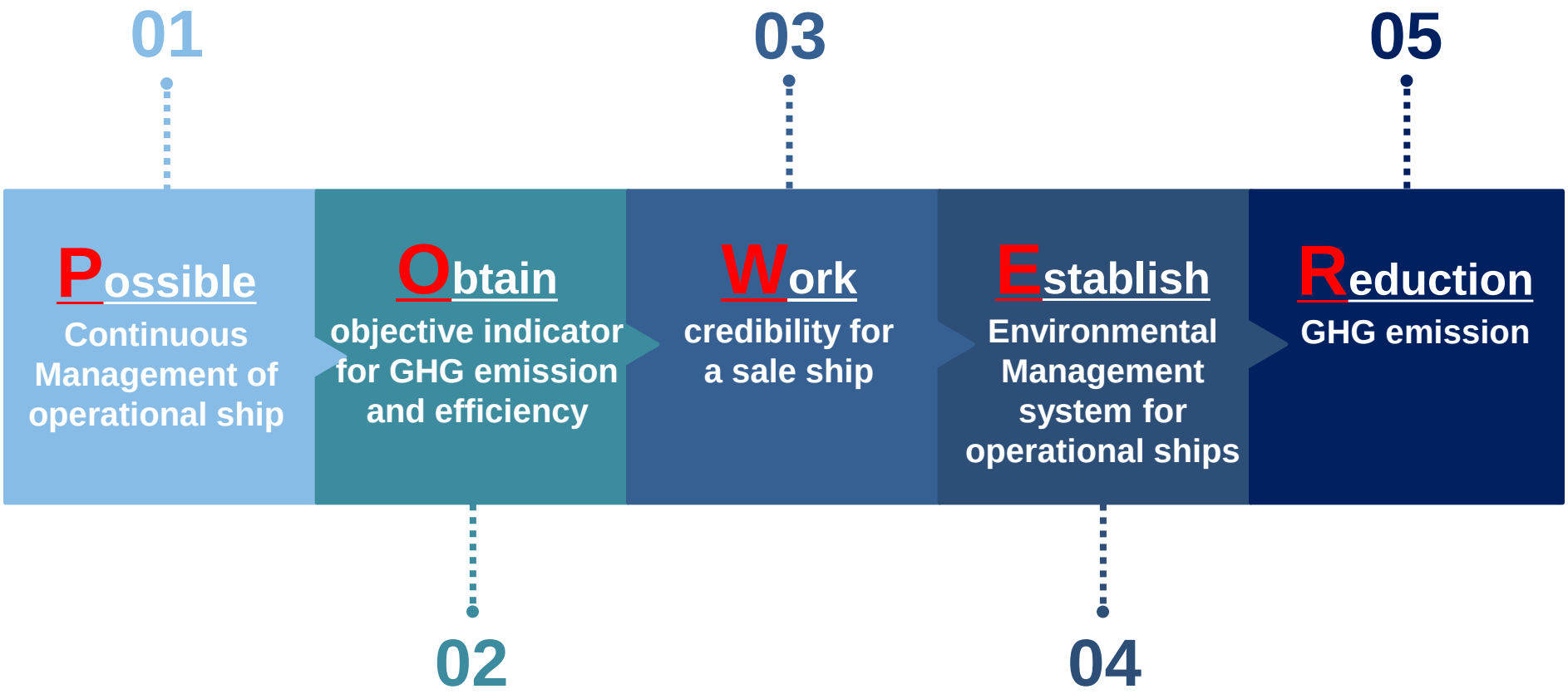
Prepared by		Reviewed by	Approved by
First Engineer	Chief Officer	Chief Engineer	Master
201○. ○. ○			
Final Confirmation after Evaluation			
First Engineer	Chief Officer	Chief Engineer	Master
201○. ○. ○			

SEEMP standard proposal

6. Process


Find the regulation problems
EEDI and SEEMP
Collect information and analysis current state
Planning
Shipping operator
TEST
Effectiveness verification
register of shipping
YES
NO
Discussion agenda paper in MEPC
Guide-line
Regulation

7. Expected Effect



8. Review

1997
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2010
MEPC prepared draft text on mandatory requirements for the EEDI and the SEEMP

2003
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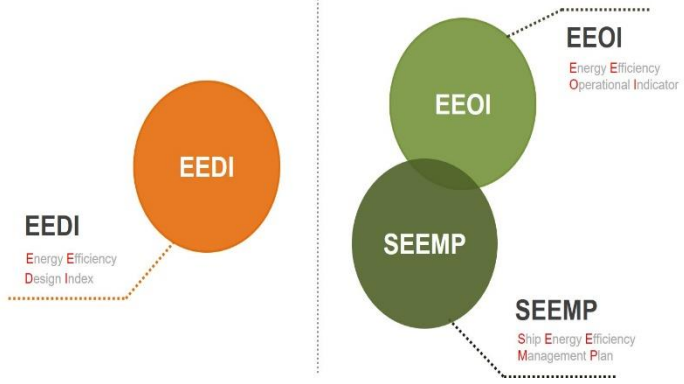
2013
Applied EEDI, EEOI, SEEMP

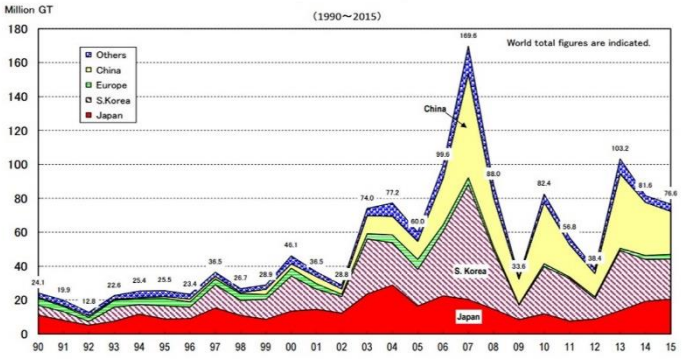
Compulsory regulation
(Technical point of view)

Voluntary regulation
(Operational point of view)



8. Review

Fig.1 WORLD NEW ORDERS



(Note) 1. Data Source : JSEA report based on LR until 1994. IHS "World Shipbuilding Statistics" from 1995.
2. Ship Size Coverage : 100 Gross Tonnage and over.

Source : SAJ

Fig.2 Economy Analysis Chart

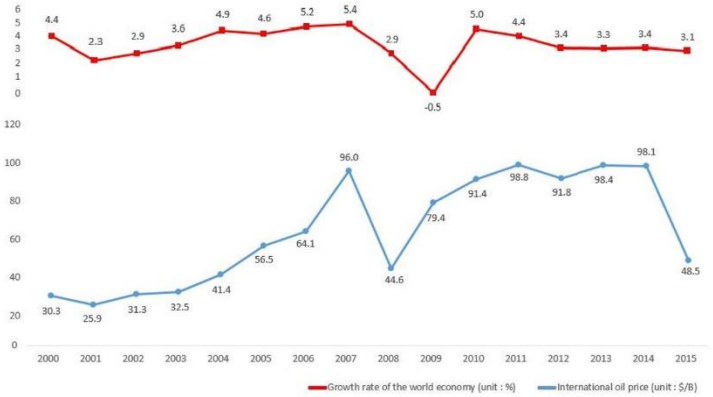
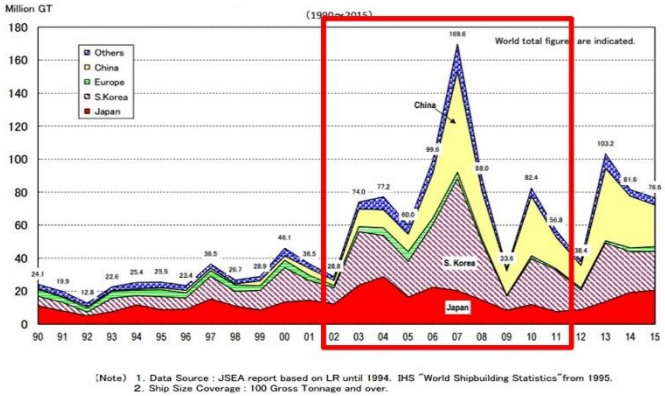


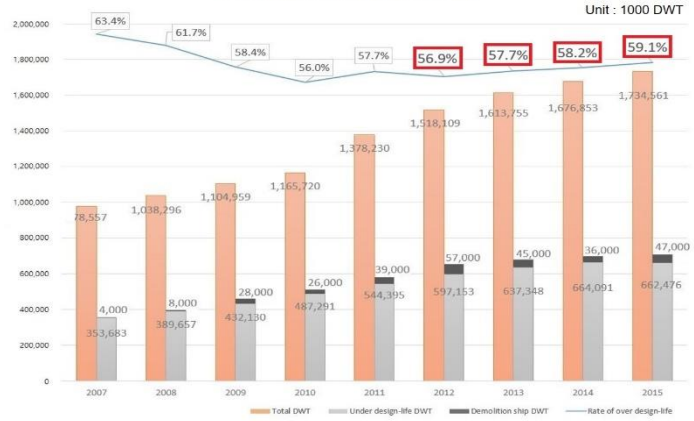
Fig.5 World New Orders Analysis



(Note) 1. Data Source : JSEA report based on LR until 1994. IHS "World Shipbuilding Statistics" from 1995.
2. Ship Size Coverage : 100 Gross Tonnage and over.

Source : SAJ

Fig.6 World Fleet by tonnage



Source : made by Triple J. based on data supplied by clarksons research

8. Review

Enhanced management regulation for operational ships

Proposal. 1

EEOI : Certification

Proposal. 2

SEEMP : Standardization

Proposal. 1 EEOI : Certification

Module	Rating	Green Ship1	Green Ship2	Green Ship3	Green Ship4	Remark (Data to be submitted)
Ship Management Module	ISO 14001 Certification	O	O	O	O	(ISO 14001 Certificate)
	GHG Inventory Verification	X	O	O	O	means GHG emissions for a ship verified by the appropriate third party to recognize from the Society. (GHG Inventory Verification Certificate)
	Green Management System or Equivalent	X	X	O	O	means to comply with Korean Law to promote Environment-friendly industrial structure. (Green Management System or Equivalent System Certificate)
	Ship Environmental Assessment Index	X	X	X	O	means index for a ship performed in CCWG, CSP, etc. (Data for Ship Environmental Assessment Index Management)
Ship Operation Module	Ship Energy Efficiency Management Plan	O	O	O	O	means the plan specified by MARPOL Annex VI/Ch.4 Reg.22 amended by IMO Res.MEPC.203(62) and Res.MSC.213(82). (Ship Energy Efficiency Management Plan)
	Fuel Management	X	O	O	O	(Data for Fuel Management)
	Energy Efficiency Operational Index	X	X	O	O	means the indicator specified by IMO MEPC.1/Circ.684 (Data for Energy Efficiency Operational Indicator Management)
	Carbon Dioxide Footprint	X	X	X	O	means that the GHG emissions occurred directly or indirectly from all transportation system during the carriage of cargo are computed. (Data for Carbon Dioxide Footprint Management)
Convention Applicable Module	Energy Efficiency Design Index	O	O	O (Improving less than 10%)	O (Improving 10% or more)	means the index specified by MARPOL Annex VI/Ch.4 Reg.20 and 21 amended by IMO Res.MEPC.203(62). (Data for Energy Efficiency Design Index Management)
	Ballot Water Management System	X	X	O	O	means to comply with "International Convention for the control and Management of Ship's Ballast Water and Sediments, 2004". (Data for Ballast Water Management System)
	Part I Inventory	X	X	X	O	means Part I of the Inventory of the Ship Recycling Convention(Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009) accepted by SR/CONF/45 in May 10th, 2009. (Data for Part I Inventory)

Source : KR

What is the Green Ship Certification

Green Ship Certification is a rating scheme to issue a certificate with a Green Ship Rating of the ship in accordance with the separate requirements of the Society considering satisfactory level of major environmental IMO requirements

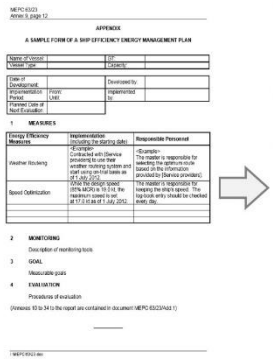
Requirements for Green Ship Certification

Green Ship Certification consists of three(3) modules and four(4) ratings and the requirements for each rating are as following table.

Certificate and Survey for Green Ship Certification

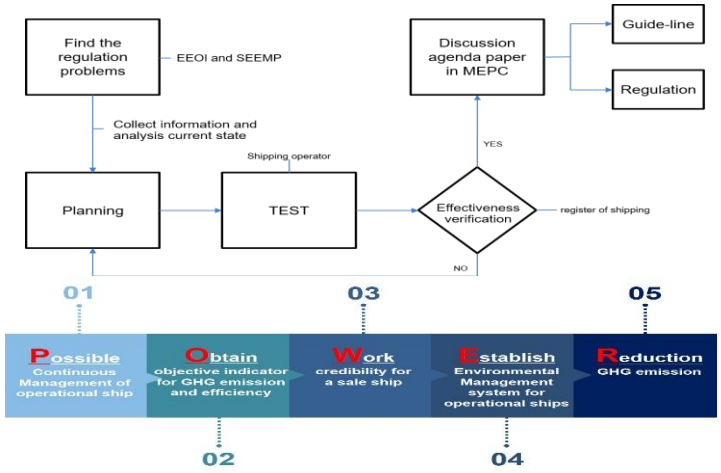
The Green Ship Certificate will be issued to ships certified by Green Ship Certification. The Green Ship Certificate will be issued with validity within 5 years, and the Renewal Survey is to be carried out before the expiry date of the Green Ship Certificate and then the Green Ship Certificate will be newly issued

Proposal. 2 SEEMP : Standardization



The example of SEEMP by IMO

SEEMP standard proposal



Thank you