海事科学研究科　特別講義　ー　特論　海事を科学するⅠ

Special Lecture in Graduate Course: Advanced Lecture on Maritime Sciences, I

Dates & Venue

August 4 (MON)　1st – 4th Periods　Room 4303 (Fukae Campus)

August 7 (THU)　1st – 4th Periods　IPC Room (Fukae Campus)

中澤　武　Takeshi NAKAZAWA (International Association of Maritime Universities)

Lecture topic: Energy Efficient Operation of Ships

Aims: To provide a general understanding of the relationship between energy used for shipping and generation of carbon dioxide(CO2); to emphasize importance of IMO's approaches to reduce CO2 generated from shipping and development of marine engineering to support those approaches; and to provide theoretical consideration on effective use of energy for transportation.

Contents: IMO's Studies of GHG Emissions from ships; IMO's approaches to reduce CO2; EEDI, EEOI and SEEMP; Cost of energy to operate ships; Basic facts about ship propulsion; Type of engine and their merits; Technical development of merchant vessels; Theoretical analysis based on the specific tractive force

References and Recommended Reading:

IMO (2000), Study of Greenhouse Gas Emissions from Ships

IMO (2009), MEPC 59/INF.10, Second IMO GHG study 2009

Lloyd's List, Future of Shipping, December 2009

Other IMO documents related to the reduction of GHG

Gabrialli, G., et al. (1950), What Price Speed?, Specific power required for propulsion of vehicles, Mechanical Engineering, pp. 775-781

赤木新介(1995), 新交通機関論-社会的要請とテクノロジー、コロナ社

Special Lecture for MSc in Maritime Sciences,
Kobe University

Subject:	**Introduction to Maritime Sciences I**
Lecture topic:	**Energy Efficient Operation of Ships**
Lecturer:	**Takeshi Nakazawa**

Aims:
To provide a general understanding of the relationship between energy used for shipping and generation of carbon dioxide(CO_2); to emphasize importance of IMO's approaches to reduce CO_2 generated from shipping and development of marine engineering to support those approaches; and to provide theoretical consideration on effective use of energy for transportation.

Learning outcomes:
The student will be able to describe/identify/explain/discuss/analyze:
- IMO's approaches to reduce CO_2 from ships
- Demand of shipping industry and development of propulsion system on board
- Effective use of energy for operating ships
- Technical development of merchant vessels
- Theoretical analysis of energy efficiency for transport vehicles

Syllabus Contents:
IMO's Studies of GHG Emissions from ships
IMO's approaches to reduce CO_2
EEDI, EEOI and SEEMP
Cost of energy to operate ships
Basic facts about ship propulsion
Type of engine and their merits
Technical development of merchant vessels
Theoretical analysis based on the specific tractive force

References and Recommended Reading:
IMO (2000), Study of Greenhouse Gas Emissions from Ships
IMO (2009), MEPC 59/INF.10, Second IMO GHG study 2009
Lloyd's List, Future of Shipping, December 2009
Other IMO documents related to the reduction of GHG
Gabrialli, G., et al. (1950), What Price Speed?, Specific power required for propulsion of vehicles, Mechanical Engineering, pp. 775-781
Akagi, S.(1995), *Transportation Vehicles Engineering – Social Demands and Technology*, Corona Publishing Co., Ltd.

June 2014, Prepared by TN

神戸大学海事科学研究科特別講義

講義名称：　海事を科学するⅠ

講義内容：　エネルギー効率を考えた船舶の運航

講師：　　　中澤　武

講義の目的：
海運で利用されるエネルギーと CO_2 の発生に関する一般的な理解を提供し；海運により発生する CO_2 の削減のための国際海事機関の取組みの重要性とそれらを支援する舶用機関学の発展を強調し；輸送へのエネルギーの有効利用に関する理論的な考察を提供する。

学習の成果：
学生は、以下について、記述/理解/説明/議論/分析することができる：

- CO_2 削減のための IMO のアプローチ
- 海事産業の要望と船舶の推進システムの発展
- 船舶運航に対するエネルギーの有効利用
- 商船の技術進展
- 輸送手段別のエネルギー効率の理論的な分析

講義の要目：
船舶から発生する温室効果ガスに関する IMO の調査
CO_2 削減のための IMO のアプローチ
EEDI, EEOI および SEEMP
船舶運航に要する費用
船舶の推進に関する基礎事項
機関の種類と利点
商船の技術進展
比出力に基づいた分析

推奨する参考資料：
IMO (2000), Study of Greenhouse Gas Emissions from Ships
IMO (2009), MEPC 59/INF.10, Second IMO GHG study 2009
Lloyd’s List, Future of Shipping, December 2009
温室効果ガスの削減に関する他の IMO 文書
Gabrialli, G., et al. (1950), What Price Speed?, Specific power required for propulsion of vehicles, Mechanical Engineering, pp. 775-781
赤木新介(1995), 新交通機関論-社会的要請とテクノロジー、コロナ社

2014 年 6 月作成

Matthew John ROOKS (Graduate School of Maritime Sciences, Kobe University)

Lecture topic: Maritime Debate

Materials:

Writing notebook, English/Japanese dictionary, pen/pencil, file for handouts, good attitude

Course goals:

Learn and practice debate language, phrases, and skills

Practice communicative, on-the-spot interaction

Improve academic research and presentation skills

Develop teamwork and cooperation skills

Course objectives:

Practice and use specific debate language and skills during an academic debate

Research background information about controversial maritime topics

Demonstrate the ability to develop and support opinions

Demonstrate the ability to disagree and debate current maritime topics

Assessment:

Participation (20%), Group work (20%), Debate (60%)

Advanced Lecture on Maritime Sciences, I

Kobe University – School of Maritime Sciences Summer Semester 2014

Instructor: Matthew Rooks
Email: kobe.rooks@gmail.com
Class Hours: Thursday, August 7th, 2014
Office Hours: By appointment

Materials:
Writing notebook, English/Japanese dictionary, pen/pencil, file for handouts, good attitude

Course goals:

- Learn and practice debate language, phrases, and skills
- Practice communicative, on-the-spot interaction
- Improve academic research and presentation skills
- Develop teamwork and cooperation skills

Course objectives:

- Practice and use specific debate language and skills during an academic debate
- Research background information about controversial maritime topics
- Demonstrate the ability to develop and support opinions
- Demonstrate the ability to disagree and debate current maritime topics

Assessment:
Participation (20%), Group work (20%), Debate (60%)

Schedule of Instruction*

Period	Time	In Class
1	8:50 ~ 9:20	• Warm-up activity + ice breaker (learner profiles and opinion exchange)
	9:20 ~ 10:20	• Introduction to debate skills: • Listening + note-taking, opinions + disagreeing, supporting opinions • Politeness + pivoting, summarizing main points • Phrases + strategies
2	10:40 ~ 12:10	• Simple debate topic practice • Brainstorming controversial maritime topics (pros + cons) • Class discussion: choosing main debate topic • Group breakdown + online research
3	13:20 ~ 14:50	• Debate outlines • Online research + preparation • Debate Practice
4	14:50 ~	• Maritime Debate • Discussion + Final comments

海事科学研究科　特別講義　ー　特論　海事を科学するⅡ
Special Lecture in Graduate Course: Advanced Lecture on Maritime Sciences, II

Dates & Venue

August 5 (TUE)	1st – 4th Periods	5F Meeting Room (Fukae Campus)
August 11 (MON)	2nd – 5th Periods	5F Meeting Room (Fukae Campus)

川口　明　Akira KAWAGUCHI (The City College of New York, U.S.A.)

Lecture topic: Introduction to dynamic programming

Abstract: Dynamic programming solves complex problems in way of breaking down into much simpler subproblems and then combining the solutions to subproblems. Note that "Programming" refers to a tabular method, not to writing computer code. Hence, attending this lecture requires no skills for advanced mathematics or computer programming. We typically apply dynamic programming to optimization problems (minimization or maximization) that may have many possible solutions. There is a close relationship to well-known divide-and-conquer solutions that partition the problem into disjoint subproblems, solve the subproblems recursively, and then combine their solutions to solve the original problem. In contrast, dynamic programming applies when the subproblems "overlap," that is, when subproblems share subsubproblems. Dynamic programming solves each subsubproblem just once and then saves its answer in a table, thereby avoiding the work of recomputing the answer every time it solves each subsubproblem. Tailored for the Kobe University's maritime sciences, this lecture will open your eyes to this important subject, from optimization techniques to an interesting world of algorithmic computations, and power up your skill training in general sciences.

Michael WOODWARD (Newcastle University, U.K.)

Lecture topic: Dynamic response of ships including Maneuvering, Seakeeping and Stability

Overview of English language lectures on Ship Stability

The following report gives an overview of the intended aims and objectives of the lecture series.

About the Lecturer

Dr. Michael D. Woodward is a lecturer in Marine Technology and Director of the Newcastle University Hydrodynamic Laboratory - within the School of Marine Science and Technology at Newcastle University, UK. Dr. Woodward is a member of the Royal Institution of Naval Architects, a member of the International Marine Simulation Forum and chairman of the next MARSIM conference. He contributes to the ITTC as a member of the QSG committee, specialising in experimental uncertainty analysis and is chair of the HTA committee on hydrodynamic measurement and experimental uncertainty.

Background information for the lecture structure

All lectures will be conducted in English language and have a duration of 1.5 hours each. Similar subject areas will be covered for both the undergraduate and graduate lectures. However undergraduate lectures will take a more introductory approach while the graduate lectures will use more advanced terminology and concepts. The subject content is generic and is suitable for either students of Naval Architecture or Maritime Cadets.

The lecture will be structured in such a way as to modify the content as necessary depending on the ability of the students. If the students are having difficulty with spoken English, then the 'Section A' subject will be covered more slowly. If the student's make good progress then 'Section-B' will be added.

Graduate Lecture 1

Section-A

The lecture will introduce general terminology for ships and ship stability. The first section address ship terminology and introduces key word needed for the study of ships. This includes an animation of the ship together with itemised terms; to help students relate words to objects.

Key words include: *forward; aft; bow; stern; amidships; rudder; propeller; transom; parallel mid-body; aft perpendicular; forward perpendicular; length between perpendiculars; length over all; draught; freeboard; height.*

The second section introduces ship stability terminology and introduces key words needed for the study of ship stability. Again, this includes an animation of the ship together with itemised terms; to help students relate words to objects.

Key words include: *length; breadth; draught; area; volume; block coefficient; centre of buoyancy; centre of gravity; longitudinal; transverse; water-plane area; longitudinal centre of flotation; second moment of water plane area; keel; metacentre.*

The third section introduces technical subjects. The aim is to talk through very simple (and familiar) derivations for the shift in the ships centre of gravity. The objective in to enable students to listen to the spoken word, while already being familiar with the general meaning. Technical subjects covered should be equal applicable to and engineering student study naval architecture maritime cadets. The technical subjects covered include the movement of weights inside the ship, the addition and removal of weights; effects of suspended loads and the effects of a free-surface.

Key words include: *stability; stable; unstable; mass; vertical; horizontal; diagonal; distance; crane; suspended; heel angle; roll; free-surface.*

Section-B

Also, as part of this section, the derivation of the wall-sided formula will be used to introduce terms that should be familiar from a mathematical point of view; giving the opportunity to listen to spoken English while watching a familiar derivation.

Key words include: *algebra; add; subtract; multiply; divide; substituting; derivation, integration; differentiation; substitution.*

Graduate Lecture 2

Section-A

This lecture will cover the subject of the Inclining Experiment. All vessels have to undergo an inclining experiment (or stability survey) on completion. The experiment allows the KG of the ship to be determined for the 'as built' condition. This is important with respect to meeting formal stability criteria. It also needed after ships are extensively modified or repaired. The objective is to be familiar with the practical procedures used to establish the KG of a vessel by undertaking an 'inclining experiment'.

Key words include: *Inclining experiment; light ship; deadweight; criteria; displacement; inclining masses; angle-of-heel; draught measurement; hydrostatic particulars; pendulum; deflection; moored/mooring lines; gangways; tide; waves; wash; regulations; procedures.*

Section-B

The lecture will also consider the subject of draught measurement. The objectives are: to be familiar with the way a ship's draught is indicated; to be aware of the difficulties inherent in taking a ship's draught; to be able to calculate a ship's true draught from draught mark measurements.

The Load Line Marks are important with respect to the maximum draught (minimum allowable freeboard) and also have to take into account a fresh water allowance. Draught Marks indicate the depth that the keel is below waterline. They are painted on both sides of the ship: forward, aft and sometimes amidships. The position is arbitrary, and not necessarily at the perpendiculars. The lecture will cover the main characteristics of the draught marks together with explaining the issues related to hog and sag and the layer correction; all needed to establish correctly the true draught of the ship.

Key words include: *draught marks; loading condition; Hydrostatic Particulars; hogging; sagging; layer correction; trim; trimmed; Load Lines; freeboard; fresh water; brackish water; longitudinal center of flotation.*

Graduate Lecture 3

Section-A

The objective of the lecture is to help students be aware of alternative measures of stability and to understand the concept of static stability. Also, students will be able to calculate static stability from the Wall Sided Formula and be aware of the curves that are used to present static stability. Students will be able to calculate static stability from the cross curves of stability and be able to evaluate static stability from the IMO criteria.

Key words include: *metacentric theory; metacentric height; static stability; initial stability; cross-curves of stability; dynamic; dynamic stability; GZ-curve; inflection; maximum; minimum; range-of-stability; angle of vanishing stability; parallel mid-body; KN-curves; departure; ballast; arrival; stability booklet; loading; discharging; stability criteria.*

Section-B

The objective are to understand the safety implications of a compartment being flooded and to be able to evaluate the condition of a vessel after flooding. If a ship is damaged through collision or grounding it is in danger of flooding. A compartment that is damaged below the waterline, and is open to the sea is said to be 'bilged'. This may present a risk of loss by foundering, capsize or plunging. This section will explore the concept of flooding and the implications of permeability.

Key words include: *flooding; damage; permeability; stowage factor; bilged; compartment; collision; grounding; water-line; reserve buoyancy; foundering; capsize; plunging; added-mass (method); lost buoyancy (method).*