

# Reorganization Plan of Master Course Program of KUMM Responding to the Changing Maritime World

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## ABSTRACT

The KUMM is now planning to make an overall reorganization of the master course of graduate school. The reorganized master course will be consisting of 3 divisions as follows,

- Maritime systems management (MSM)
- Maritime transportation science (MTS),
- Ocean mechanical & energy science (OME),

The marine shipping industries and maritime science & technology are now changing drastically. The recent noticeable trends are # structural change of Japanese shipping industries characterized by globalization, # globalization of world maritime society especially regarding with safety and environmental problems, # rapid developing computerization and information technology. The reorganization is aiming to respond those changing situation of maritime societies. This paper intends to introduce the whole outline of the reorganization plan. One of main points of reorganization is to set up a new division of MSM, in which two Chairs of Maritime safety management and Maritime technology management. Secondly, the paper gives a bit more precise explanation on the objectives and features of each new division from the viewpoints of increasingly serious problems of safety and environmental deterioration concerning regarding marine transportation activities

## 1. Introduction

Recently the situations surrounding the Kobe University of Mercantile Marine, KUMM, though not especially only KUMM but also other maritime study institutes, are changing drastically in the various aspects concerned. Those aspects are, for example,

- # Maritime societies both of Japan and the world,
- # Rapidly developing computerization and information technology,
- # Increasingly serious safety and environment issues,
- # Decrease of population at age 18 and decrease of young applicants for maritime jobs.

In addition, the government is going to change drastically the university policy for the sake of financial curtailment and for activating the university in response to social and industrial movements. Main points of governmental plan are, i) introduction of business administration to the budget system, ii) unification of universities, iii) introduction of university achievement assessment.

Those trends require the education and research systems of KUMM to make a reform in both aspects of substance and procedure. The KUMM, therefore, has carried out an overall review of its education and research systems, and have made a reform plan of them intending to respond the changing situation in and around the KUMM. This report describes briefly the current situations concerned, and the reform plan, though which is still now under discussion. The plan is comprehensive over the whole system of KUMM. Here description, however, will be focused mainly on the plan of Master course of graduate program.

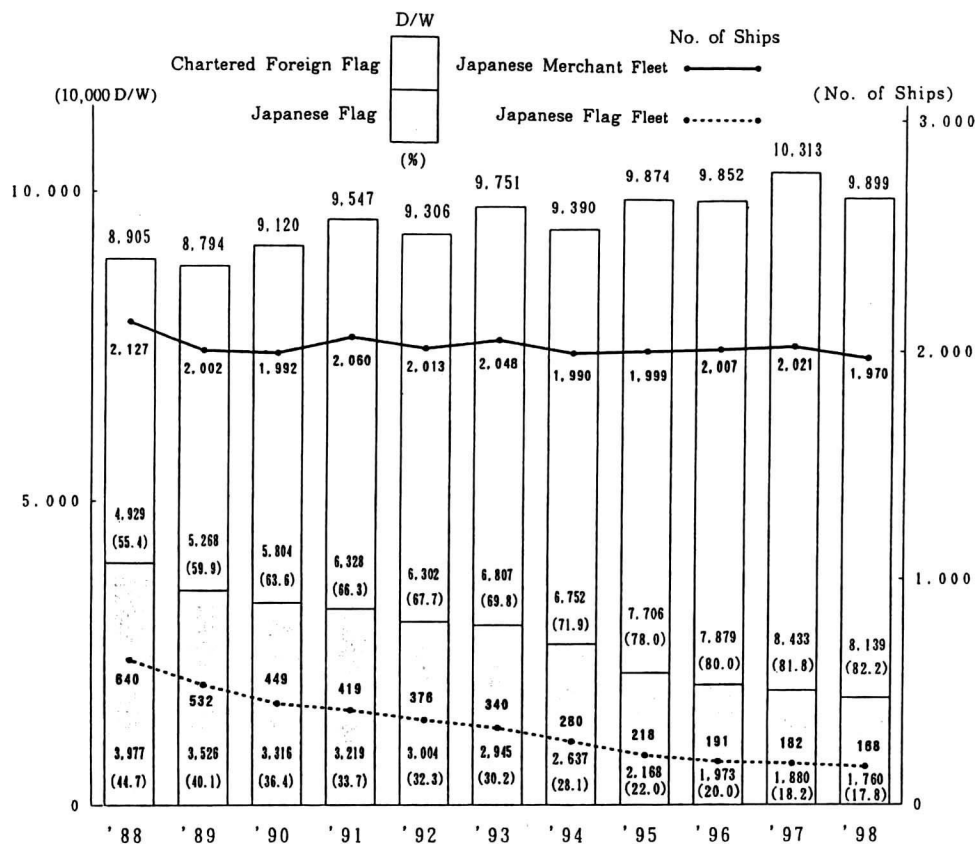
## 2. Rapidly changing Maritime Society

### 2.1 Structural change of Japanese shipping industries

In these years, Japanese shipping industries have been changing their performances drastically due to keen competition in the world shipping business. The following points could characterize their change.

- # Continuous flagging-out of Japanese merchant ships
- # Multi-nationalization of ship manning
- # Rapid decrease of young age seafarers and ratings
- # Separation of ship operation & maintenance division to outer other company

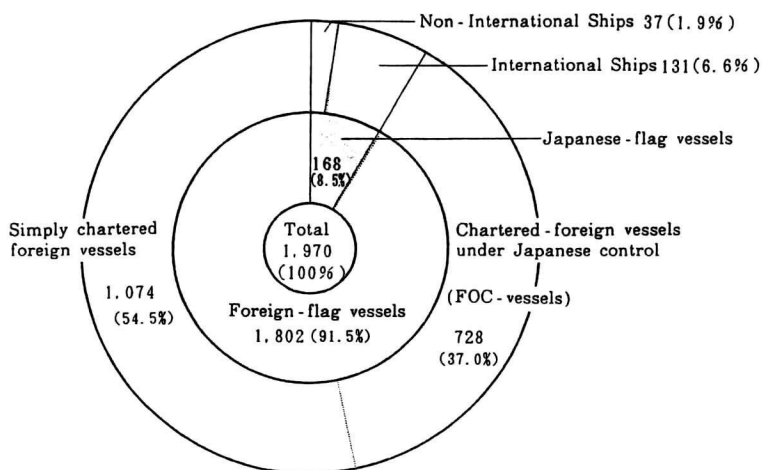
As can be seen in Figs. 1, 2, Japanese merchant fleet is continuously flagging out and a number of Japanese



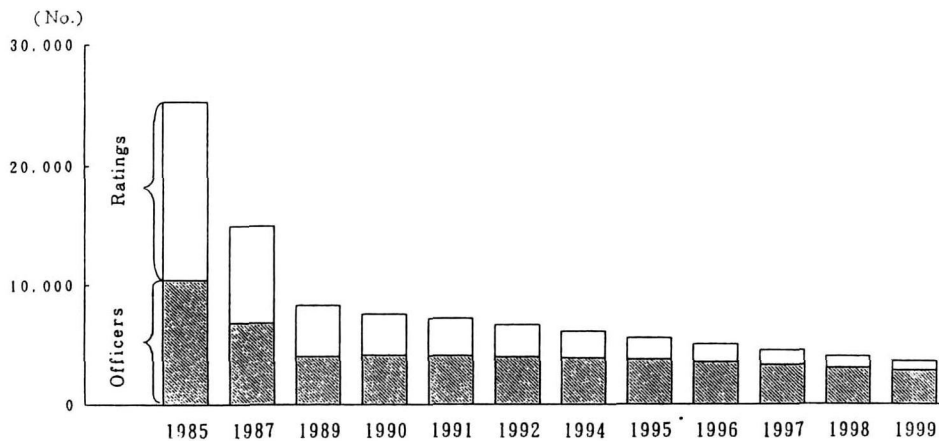
Source: Ministry of Transport [The Current Situation of Japanese Shipping]  
 Oceangoing ships of 2,000G/T and over.

**Fig. 1 Size change of Japanese merchant fleet (JSA2000)**

<Breakdown of the Japanese Merchant Fleet>



**Fig.2 Break down of Japanese merchant fleet(JSA2000)**



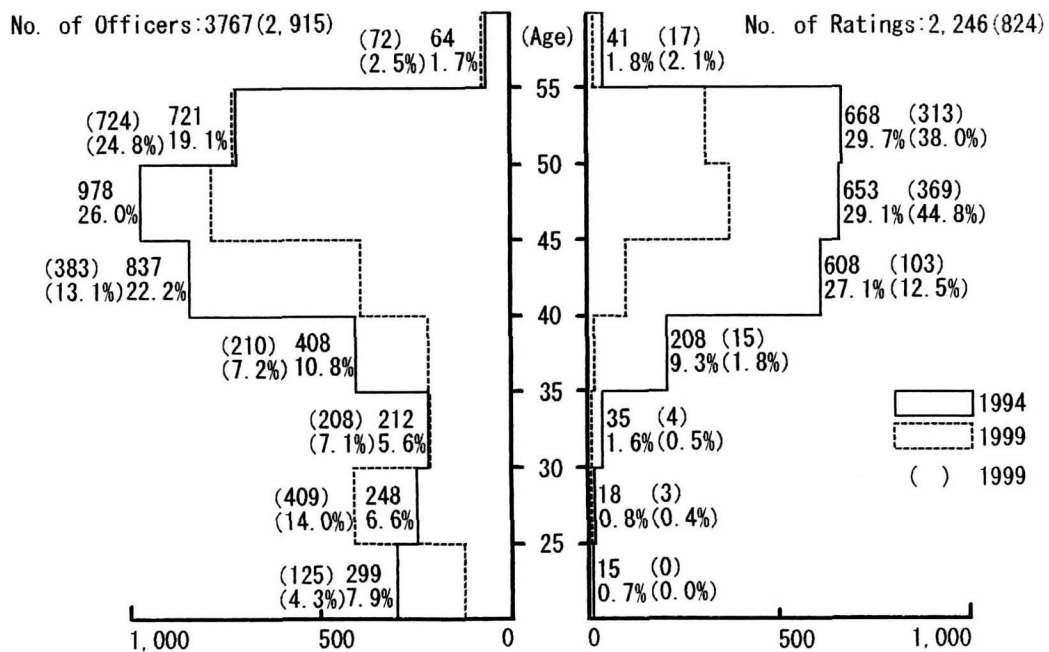
**Fig.3 Change of Japanese seamen employed by 24 Japanese leading oceangoing shipping companies (JSA2000)**

<Remark> #The number of seamen employed by Japan's 24 leading ocean going shipping companies in 1999 was 3,585.

#This number is approximately 40% of the number of seamen 10 years ago and reflects a decrease in the number of Japanese ships.

#Japanese seamen are required to not only fulfill the duties as navigation staff but also play the roles of trainers and supervisors of foreign seamen.

Japanese seamen are also required to be qualified to handle ship Management and corporate management on shore.

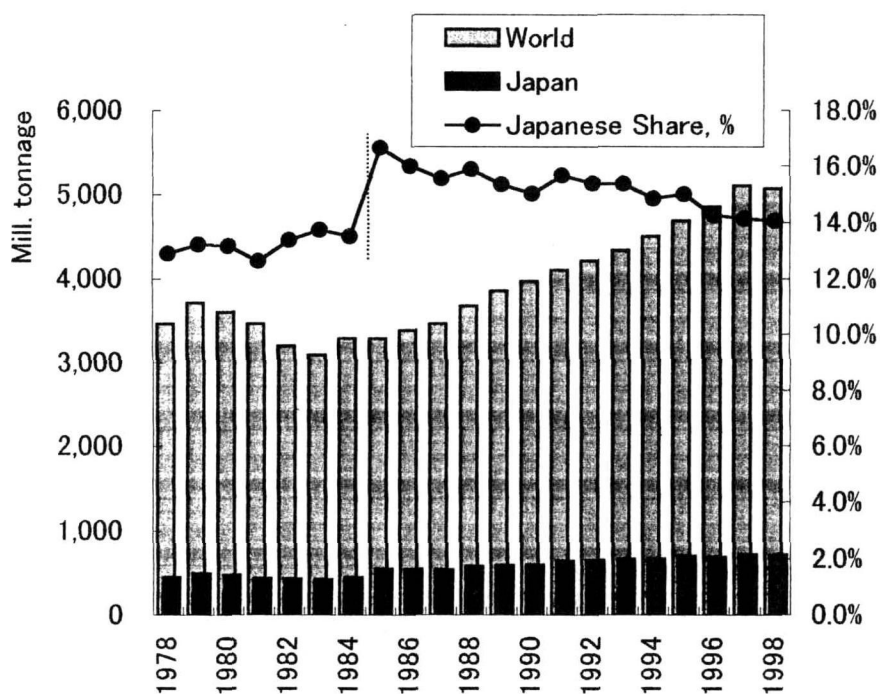


**Fig.4 Remarkably distorted age composition of Japanese seamen (JSA2000)**

flagged vessels have decreased to only 168, the percentage of 8.5% in 1998. Moreover, even among those 168 Japanese flagged ships, 131 are recognized as the international ship, which is allowed to be manned with a foreign crew except a captain and a chief engineer. This trend means that Japanese merchant fleet has been becoming to be operated overwhelmingly by foreign seamen. Owing to this trend, the number of Japanese seamen employed has been rapidly decreased as shown in Fig.3. The figure also suggests that the decrease of fresh seamen employed has been seriously more rapid. As a result, the age composition of Japanese seamen has been distorted to such an extent that young seamen under aged 30 are less than 15% as shown in Fig.4. On the other hand, Japanese shipping companies, however, are keeping, or rather, expanding their activities worldwide in the seaborne trading as shown in Fig.5.

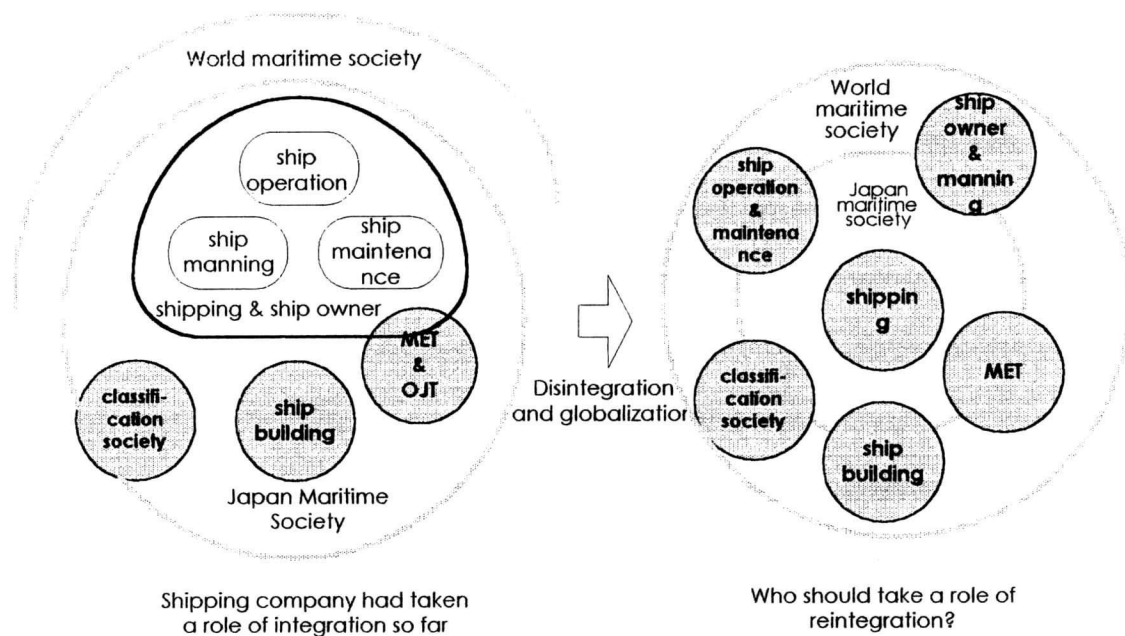
The trends reviewed above may show on one side a business progress of Japanese shipping industries, but on the other side, also show that most fundamental essentials, that is, vessels and seamen, supporting such vital Japanese shipping business have been becoming dependent almost on the charter from foreign countries.

Other trend to be noticed from a technological viewpoint is the separation of ship operation and maintenance works to outer other company from shipping company. In addition, it should be also noticed that Japanese ship building industries are now losing their dominant share in the world. The Japanese shipping companies have taken a role of integrating the Japanese shipping system so far. Taking above trends into consideration, however, the Japanese shipping system is going to be disintegrated as far as viewing from technological aspect as shown in Fig.6.



Remark) : Japanese statistic is shown,  
 Before 1984 : Only import and export trade  
 After 1985 : Cross trade added to import and export trade

**Fig. 5 Change of waterborne trade of World and Japan.**



**Fig.6 Disintegration of Japanese maritime shipping system**

## 2.2 Globalization of maritime society

The progress of globalization of maritime society is now noticeable especially from three viewpoints. The first is the globalization of Japanese shipping industries themselves, of which recent trend could be characterized by the keywords “transnationalization” and “globalization” as reviewed above. The second is the globalization of the world shipping system especially in regard to the safety improvement such as seen in the introduction of ISM-code, STCW95, and/or the amendment of SOLAS etc.

The third is the globalization in regard to the environmental problems, especially to worldwide environmental problems such as ocean pollution, global climate change etc. As for the environmental problems caused by ocean shipping, the regulations and/or countermeasures for environment protection should be considered from the worldwide viewpoint whether an environmental pollution in question is local or global, because foreign ships might be the polluter even in the case of local pollution. There have been enacted so far, therefore, various international regulations regarding the issues such as waste disposal, bilge discharge, hull bottom paint, oil spill etc. Further, the global environment problems are deteriorating seriously year by year and require strengthening the global regulations and countermeasures.

## 3. Tasks required for maritime university

### 3.1 Demand and shortage of highly competent seamen

While Japanese shipping industries are still now keeping their business actively and globally, their own vessels and seamen capacity is rapidly and continuously shrinking and almost dependent on the charter from foreign countries. This situation poses some problems to be considered.

- # The first is the problem regarding the Japanese seafarer’s competence required to be higher and higher. They have to take a role of leader and/or key person not only for ship operation but also for multinational crew management when they are on board, and when on shore, they have to be engaged in management works of a large number of chartered ships.
- # In spite of those requirements, it is becoming difficult to bring up such highly competent seamen by the OJT of shipping industries themselves due to disappearance of young seafarers. The second is the problem regarding that how and by whom those high competent Japanese seafarers could be brought up.
- # The third is the problem of the shortage of talents supply for various industries related with ocean shipping industries. There are many various industries and organizations supporting ocean shipping such as pilots,

maritime education & training, inspection, insurance, ship building, ship machineries, administration etc. Those industries need skilled talents of ship operation. Those talents have been supplied from the seafarers of shipping industries so far. In near future, however, it would be impossible to that supply due to the drastic decrease of Japanese seafarers as shown in Figs.3, 4.

# It would be afraid therefore that the manpower would shrink to the extent not enough to support Japanese maritime industries if the situation was left as the current trend goes. According to METHAR Report (2000), the European maritime societies have actually faced with this problem, and at present they are considering various procedures for improving the situation.

These problems require the KUMM to reform its education and research system in order to bring up highly competent persons especially in the field of maritime management.

### 3.2 Education and research responding to globalization

The globalization of Japanese shipping industries, and globalization of safety and environmental problems require the Japanese maritime society to contribute for construction of the safer, more environmentally sound, and more resource-saving world maritime society in partnership with foreign maritime societies.

Education and research responding to globalization should be carried out in two aspects. One is to strengthen the curriculum for cultivating the international sense. The other is to strengthen the academic exchange with foreign universities, researchers, students etc.

### 3.3 Reintegration of marine shipping systems

As already seen in Fig.6, main components of marine shipping systems, that is, shipping management, ship building, ship operation & maintenance, ship manning, are now going to disintegrate to separate companies and/or separate countries. In order to make a comprehensive system reliable, safe, and efficient, it is inevitably important to synthesize all components appropriately. As for the marine shipping system, in Japan, such system integration or synthesization has been done mainly by Japanese shipping companies so far. If the disintegration as shown in Fig.6 would proceed further, how and by whom the reintegration or synthesization could be done?

For achieving an appropriate system synthesization, it would be essentially important to investigation of the relation between each component, and to analyze practical data of each component collected by the use of information network at the viewpoint of total system. As said repeatedly in this report, reliability, safety, environment protection, energy saving are becoming so important that the role of reintegration of marine shipping system is also becoming more important. This role is considered to be a new important task of maritime university. Responding to this new task, it is needed to strengthen the education and research of the field regarding maritime technology system management, system assessment method, system risk management, information management etc.

## 4 Reorganization of master course of KUMM

The master course is planned to reorganize as shown in Table 1 in responding to the tasks required from the changing maritime society.

**Table 1 Reorganization of Master course of KUMM**

<Present>		<Future plan>	
Divisions	Chairs	Divisions	Chairs
Maritime science	Nautical studies	Maritime systems management	Maritime safety management
	Maritime studies		Maritime technology management
Transportation & information systems engineering	Transportation systems engineering.	Marine transportation science	Marine transportation engineering.
	Information systems engineering		Marine information science
Ocean electro-mechanical engineering	Ocean mechanical engineering.	Ocean mechanical & environmental science	Ocean mechanical engineering.
	Electro-mechanical engineering.		Environmental material science
Power systems engineering	Marine engineering		
	Nuclear engineering		

The four divisions of present course are reorganized sweepingly to three divisions of Maritime systems management (MSM), Maritime transportation science (MTS), and Ocean mechanical & energy science (OME). The main objects of reorganization are as follows.

- # A main point of reorganization is to set up a new division of MSM. One important object of MSM is aiming to bring up highly competent persons being able to engage in management works both on board and on shore of maritime industries. MSM has other object, seemingly unrealistic, to develop a synthesization of nautical and engineering education at the point viewing the marine shipping system as a total system.
- # One important object of MTS is to carry out newly the education and research of package engineering. MTS is also intending to strengthen the education and research of port management at the viewpoint of total logistic system
- # Main object of OME is to carry out the education and research on ocean field from various aspects not only of transportation, fishery, but also of resources, ecology, environmental base etc.

General points of education & research for all three divisions are mainly as follows.

- \* Environment protection and safety should be most important objectives in any field of education and research
- \* Computer and information technologies are given a great importance both in means and subjects of education and research
- \* Emphasis is put on the education for cultivating international sense both for students and young researchers by the use of various means such as English teaching, academic exchange, acceptance of foreign lecturers, and foreign students, internship abroad etc.

Main points of education and research of each division are as described in Table 2.

**Table 2 Main points of education and research of KUMM new Master Course plan**

Divisions	Chairs	Main points of education & research
Maritime systems management	Maritime safety management	Planning & management theory and technology on maritime systems at the viewpoints of synthesization and globalization *System management for safety and environmental protection
	Maritime technology management	*Management not only for individual ship but also ship fleet *Lifecycle planning & management of technology systems *Study on international systems of maritime society
Marine transportation science	Marine transportation engineering	Techno-economic theory and technology for optimum and synthetic global transportation systems of cargo and person *Logistic and port management for optimum synthesization *Package engineering for safer and higher qualified global marine transportation
	Marine information science	*Information & communication systems of nautical environment and ocean environment
Ocean mechanical & environmental science	Ocean mechanical engineering	Mechanical and energy theory and technology for safe and environmentally-sound transportation, ocean development *Mechatronics engineering for intelligentization of marine technics
	Environmental material science	*Energy and power engineering for marine mechanical systems *Material science for innovative future energy systems

## 5. Conclusion

The KUMM is planning to reorganize its master course program. One of important objects of reorganization is to set up a new division of Maritime Systems Management, which is intending to carry out the education and research for bringing up highly competent persons for management works in the maritime societies. The reorganization is aiming also to strengthen the education and research responding to the globalization of world maritime societies. To do so, KUMM is intending to develop academic exchange activities with foreign maritime universities. To develop the academic exchange would be valuable for all maritime universities. The author would like to propose to construct an academic information network, for example, a library network by the use of Internet system, among the member universities of IAMU as one procedure for developing their academic exchange.

## References

- Japan Ship-owners' Association(JSA2000), Annual report "The Current State of Japanese Shipping"
- Kobe university of mercantile marine(2000), Report on "Kobe university of mercantile marine Vision 21" (in Japanese)
- METHAR Report(2000)