

1976  
**ARCHIEF**

**Lab. v. Scheepsbouwkunde  
Technische Hogeschool  
Delft**

**Outline of the Department of Naval Architecture  
Faculty of Engineering, Kyushu University**

By Keizo Ueno  
Professor, Department of Naval Architecture,  
Faculty of Engineering Kyushu University

## Department of Naval Architecture Faculty of Engineering

By Keizo Ueno, Professor, Department of  
Naval Architecture, Faculty of Engineering,  
Kyushu University

### History

Kyushu University is a national university, which was started in December, 1910, as Kyushu Imperial University. Its Faculty of Engineering was opened in January, 1911 and the Department of Naval Architecture was established in October, 1920. The renaming of Kyushu Imperial University to Kyushu University took place in 1947, and in its Graduate School, the Division of Engineering was set up with the revision under a new system in April, 1953.

### Location, Site and Staff

The Department of Naval Architecture, Faculty of Engineering, is located in the eastern part of Fukuoka City in the northern coast of Kyushu which is one of the main four islands of Japan. The City of Fukuoka, metropolis of Kyushu Island and a modernized town with a population of more than 800,000, is about 1,170 kilometers from Tokyo, about a 15-hour ride by train or a one hour flight by air.

The area covered by the buildings of the Department of Naval Architecture is 5,640 square meters.

The number of its staff includes five professors, five assistant professors, who are supplemented by 22 assistants, clerks and secretaries.

### Undergraduate School and Graduate School

#### Undergraduate School

The 4-year course of study for undergraduates is divided into a 1.5-year general education course and a 2.5-year speciality course. The academic year begins on April 1 and ends on March 31. Bachelor of engineering is granted to those who have completed the prescribed number of subjects taking necessary units within the prescribed period of attendance and have passed the examination provided by the faculty concerned.



Front view of the Main Building of the Department of  
Naval Architecture

#### Graduate School

The graduate school has for its purpose the instruction and the advanced research of scientific theories and their application, rendering services to cultural progress thereby. The university has two courses of master and doctor. The master course is for the study of specialities and for the cultivation of exact and profound scientific knowledge and research ability, along with a broad vision based on the high level of refinement and training. The doctor course is for the cultivation of ability for making original studies that may add fresh knowledge and information to science, and for the development of ability for giving guidance in the study of specialities, contributing to the advancement of culture. As for the course of study, that of the master course is of two years and that of the doctor course three years. The degrees to be given in the graduate school are master of engineering and doctor of engineering. Admission is granted on examination to test the fitness of applicants to study their respective courses desired. Those who may apply for the admission to the doctor course should have a master's degree or otherwise be of equal or superior scholastic achievements.



Ship Resistance and Propulsion Experimental Tank (left side) and Ship Oscillation Experimental Tank (right side)



Sea Behaviour and Manoeuvring Experimental Tank



100-ton Hydraulic Universal Testing Machine THV-100  
(Ship Strength Experimental Laboratory)

## Subjects of Instruction and Staff

### Undergraduate Course

Strength and Vibration of Ships

Prof. M. Yamakoshi, D. Eng., M. Eng.

Hydrodynamics and Dynamics of Ships

Prof. S. Inoue, D. Eng., M. Eng.

Asst. Prof. R. Yamazaki, D. Eng., M. Eng.

Structure of Ships; Design of Merchant Ships

Prof. J. Fukuda, D. Eng., M. Eng.

Resistance and Propulsion of Ships

Prof. K. Ueno, D. Eng., M. Eng.

Lecturer, K. Nakatake, M. Eng.

Technical Theory of Shipbuilding; Equipment of Merchant Ships

Prof. J. Suhara, D. Eng., M. Eng.

Asst. Prof. I. Tsuji, D. Eng., M. Eng.

### Graduate Course

#### Master Course

Advanced Theory of Structure; Advanced Course of Strength of Ships; Advanced Course of Vibration of Ships

Prof. M. Yamakoshi, D. Eng., M. Eng.

Advanced Hydrodynamics

Prof. S. Inoue, D. Eng., M. Eng.

Prof. F. Tasai, D. Eng., M. Eng.

Asst. Prof. R. Yamazaki, D. Eng., M. Eng.

Advanced Course of Stability of Ships

Asst. Prof. R. Yamazaki, D. Eng., M. Eng.

Advanced Course of Oscillation of Ships; Advanced Course of Turning of Ships

Prof. S. Inoue, D. Eng., M. Eng.

Advanced Theory of Ship Design

Prof. J. Fukuda, D. Eng., M. Eng.

Advanced Course of Resistance of Ships; Advanced Course of Propulsion of Ships

Prof. K. Ueno, D. Eng., M. Eng.

Applied Mechanics for Naval Architecture

Prof. J. Suhara, D. Eng., M. Eng.

Asst. Prof. I. Tsuji, D. Eng., M. Eng.

Advanced Theory of Plasticity

Prof. J. Suhara, D. Eng., M. Eng.

Dynamics of Welding

Asst. Prof. I. Tsuji, D. Eng., M. Eng.

Ship Drawing

Prof. J. Fukuda, D. Eng., M. Eng.

#### Doctor Course

Strength and Vibration of Ships (Seminar)

Prof. M. Yamakoshi, D. Eng., M. Eng.

Hydrodynamics and Dynamics of Ships (Seminar)

Prof. S. Inoue, D. Eng., M. Eng.

Structure of Ships; Design of Merchant Ships (Seminar)

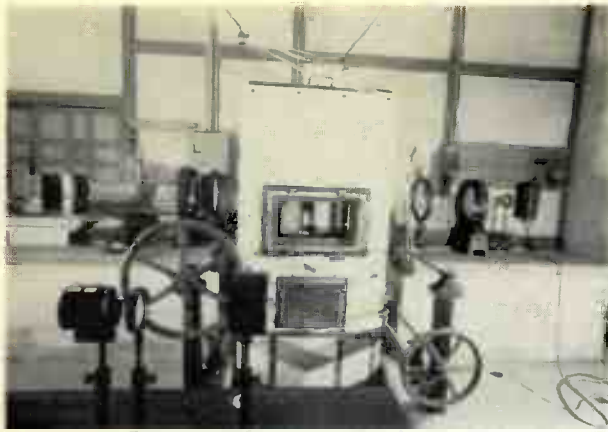
Prof. J. Fukuda, D. Eng., M. Eng.

Resistance and Propulsion of Ships (Seminar)

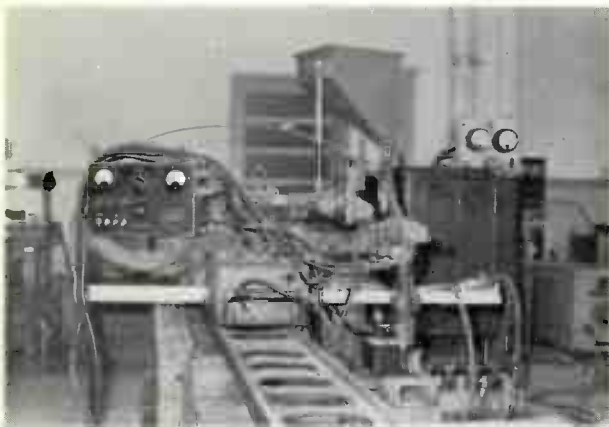
Prof. K. Ueno, D. Eng., M. Eng.

Technical Theory of Shipbuilding; Equipment of Merchant Ships (Seminar)

Prof. J. Suhara, D. Eng., M. Eng.



Photoelasticity Experimental Apparatus.



Submerged Arc Welding Machine SW-3A  
(Ship Welding Laboratory)

### Professors Emeriti

Y. Watanabe, D. Eng., M. Eng.  
S. Hasegawa, M. Eng.

### Student Capacity for One Class

Undergraduate Course	35
Graduate Course	
Master Course	11
Doctor Course	6

### Activity of Graduates

Since its foundation, the department has turned out 970 graduates (including 21 persons with the degree of doctor of engineering under an old system, one person under a new system and 56 persons with the degree of master of engineering under a new system), and the greater part of them are now

playing leading roles in government offices, educational schools, shipbuilding and other civil companies and factories in Japan.

### Experimental Laboratories

Ship Resistance and Propulsion Experimental Tank  
(In charge, Prof. K. Ueno)

Basin: Length 118.58 m × Breadth 2.67 m ×  
Water depth (5.49 m of fore 36.58 m  
length—3.00 m of after 82.00 m length)

Carriage: Al alloy box-girder carriage, about  
2 tons in weight, driven by 15 KW DC  
motor, automatic speed control in range  
from 0.1 m/sec to 5.0 m/sec, acceleration  
in range from 0.1 m/sec<sup>2</sup> to 0.7 m/sec<sup>2</sup>,  
with an electromagnetic speed brake

Length of Models Used: 1.8 m~2.5 m

Wave Generator: Flapper type with 3.7 KW DC  
motor.

Ship Oscillation Experimental Tank (In charge,  
Prof. S. Inoue)

Basin: Length 36.58 m × Breadth 5.41 m ×  
Water depth 5.49 m

Length of Model Used: 1.8 m~2.5 m

Wave Generator: Flapper type with 11 KW DC  
motor.

Possible for manoeuvring test of about 1 m  
length ship model by the rotating arm system in  
this basin

Sea Behaviour and Manoeuvring Experimental Tank  
(In charge, Prof. S. Inoue)

Basin: Length 30.00 m × Breadth 25.00 m ×  
Water depth 1.80 m

Wave Generator: Flapper type, composed of 10-  
divided flaps (each 2.50 m length), with  
37 KW DC motor

Wave Period: 2.00 sec~0.50 sec

Highest Wave Height/Wave Length Ratio: 1/15  
Operation of Models and Measuring Apparatus:  
Wireless controlled

Rotating Arm: Rotating radius 10 m

Turning Circle Measuring Apparatus: Motion of  
models can be traced through the cinema-  
tograph from the gondola of 14 m height  
above ground.

Since the tank water is so small in quantity as  
less than 1,000 tons, discharging water from or  
filling water into this basin can be very speedily  
operated, and therefore the manoeuvring test in  
shallow water may be possible to be very easily  
carried out.

Wind Tunnel

Göttingen Type Wind Tunnel, test section  
circular, diameter 0.6 m, wind velocity 30 m/  
sec with 7.5 KW DC motor.

Ship Strength Experimental Laboratory (In charge,  
Prof. M. Yamakoshi)

Equipment:

100-Ton Hydraulic Universal Testing Machine  
THV-100 1 Set  
50-Ton Low Cycle Fatigue Testing Equipment  
THSP-400 1 Set

Photoelasticity Experimental Laboratory (In charge,  
Prof. J. Suhara)

Ship Equipment Laboratory (In charge, Prof. J.  
Suhara)

Ship Welding Laboratory (In charge, Asst. Prof. I.  
Tsuji)

Equipment: Submerged Arc Welding Machine  
SW-3A  
(capacity 1,200 Amp) 1 Set

## Past Researches in Laboratory

Past researches in the period of four decades from 1920 (the year of foundation of the department) to 1960 were mainly carried out by Prof. Emeritus Y. Watanabe, Late Asst. Prof. R. Asaba, Late Prof. S. Ogawa, Prof. K. Ueno, Prof. S. Inoue, Prof. J. Suhara, Prof. M. Yamakoshi, Ex-Asst. Prof. T. Jin-naka, and Asst. Prof. R. Yamazaki. Among them, the research career of Prof. Emeritus Y. Watanabe is specially prominent. In 36 years from 1923 (the year of appointment as assistant professor) to 1959 (the year retired), he issued 115 research papers, which covered so many fields of naval architecture as stability, oscillation, seakeeping, manoeuvrability, propulsion, strength and vibration of ships.

Main research results of the staff in the laboratory can be summed up as follows.

### In Fields of Resistance and Propulsion of Ships

By Prof. Emeritus Y. Watanabe

"Theory of Spiral Propellers and Its Design", unpublished paper, 1942

By Ex-Asst. Prof. T. Jin-naka

"On Ship Forms and Wave-Making Resistance", J.S.N.A.J., No. 84, Feb. 1952

"Some Experiments on the Exciting Forces of Waves Acting on the Fixed Ship Models", J.S.N.A.J., No. 103, July 1958

"Periodic Source and Its Application", J.S.N.A.J., No. 107, July 1960 and No. 108, Dec. 1960

By Asst. Prof. R. Yamazaki

"A Study of Screw Propellers", M.F.E.K.U., Vol. 19, No. 1, Jan. 1960.

### In Fields of Seakeeping of Ships

By Late Asst. Prof. R. Asaba

"Investigations on the Motora-Type Anti-Rolling Fin", J.S.N.A.J., No. 42, April 1928

By Prof. Emeritus Y. Watanabe

"Theoretical Analysis of the Rolling of a Ship with Negative-GM", J.S.N.A.J., No. 43, Oct. 1928

"On the Design of Anti-Rolling Tanks", J.S.N.A.J., No. 46, Oct. 1930

"On the Effective Wave Slope and the Motion of the Centre of Gravity of a Ship when Rolling on Waves", J.S.N.A.J., No. 49, April 1932

"On the Limiting Angle of Roll on Irregular Waves", J.S.N.A.J., No. 50, Oct. 1932

"On the Properties of the Rolling of a Ship on Waves", J.S.N.A.J., No. 56, June 1935

"Some Contribution to the Theory of Rolling", T.I.N.A., Vol. 80, 1938

"On Non-Harmonic Oscillations", 5th I.C.A.M., 1938

"An Investigation into the Shifting of Grain Cargo due to Ship Rolling", T.R.K.U., Vol. 16, No. 6, 1942 and Vol. 17, No. 5, 1943

"Safety Criterion of a Ship Considered from the Stability", J.S.N.A.J., No. 79, Dec. 1948

"On the Theory of Pitch and Heave of a Ship", T.R.K.U., Vol. 31, No. 1, Jan. 1958

By Prof. K. Ueno

"Theory of Free Rolling of Ships", M.F.E.K.U., Vol. 9, No. 4, 1942

"On the Tension of Towing Hawsers of Ships and Chain Cables of Mooring Buoys", J.S.N.A.J., No. 71, Dec. 1942

"Influence of the Surface Tension of the Surrounding Water upon the Free Rolling of Model Ships", M.F.E.K.U., Vol. 12, No. 1, 1950

By Prof. Emeritus Y. Watanabe, Prof. S. Inoue and others

"The Stability Standard of Seagoing Ships", J.S.N.A.J., No. 97, Aug. 1955

"A Proposed Standard of Stability for Passenger Ships", J.S.N.A.J., No. 99, July 1956

By Prof. S. Inoue

"The Longitudinal Motion of a High Speed Boat among Waves", J.S.N.A.J., No. 78, Oct. 1947.

### In Fields of Manoeuvring of Ships

By Prof. Emeritus Y. Watanabe

"On the Formula for the Decelerated Motion of a Ship When Screw Reversed", J.S.N.A.J., No. 55, Dec. 1934

"On the Transverse Inclination of a Ship When the Helm Is Put Over, or in Similar Cases", J.S.N.A.J., No. 58, June 1936

By Prof. S. Inoue

"On the Turning of a Ship", M.F.E.K.U., Vol. 16, No. 1, 1956.

### In Fields of Strength and Vibration of Ships

By Late Asst. Prof. R. Asaba

"Stresses in a Plate due to the Presence of Holes", J.S.N.A.J., No. 42, April 1928

By Late Prof. S. Ogawa

"On the Stress Distribution in a Deep Beam Having Two Circular Holes Subjected to Uniform Bending Moment", J.S.N.A.J., No. 52, Oct. 1933

By *Prof. Emeritus Y. Watanabe*

"Allowance Thickness of Shell Plating for the Corrosion and Wear", J.S.N.A.J., No. 72, June 1943  
"On the Slamming of a Ship", J.S.N.A.J., No. 93, July 1953  
"On the Causes of the Stern Vibration of a Ship", J.S.N.A.W.J., No. 20, Nov. 1960

By *Prof. J. Suhara*

"The Three Dimensional Theory of the Strength of Ship Hull Taking into Account of Mutual Interaction between Longitudinal and Transverse Members", J.S.N.A.J., No. 81, July 1949

By *Prof. M. Yamakoshi*

"Approximate Method of Calculation of Strength of Ship Hull Considering the Effect of Longitudinal Member", J.S.N.A.W.J., No. 5, Feb. 1953  
"A Study on the Damage of Ship Structure", M.F.E.K.U., Vol. 20, No. 3, March 1961.

#### **In Fields of Equipment and Construction of Ships**

By *Prof. J. Suhara*

"Simple Designing Method of Cargoing Appliances of Ships", J.S.N.A.W.J., No. 3, Sept. 1951  
"On the Strength of Fore Poppet of Launching", J.S.N.A.W.J., No. 7, Dec. 1953.

#### **Recent Researches of Staff**

##### **In Fields of Resistance and Propulsion of Ships**

By *Prof. K. Ueno* and others

"Some Experiments of Yawing Effect on Ahead Resistance of Ships", M.F.E.K.U., Vol. 22, No. 1, July 1962  
"Further Experiments of Yawing Effect on Ahead Resistance of Ships", M.F.E.K.U., Vol. 23, No. 3, March 1964  
"On the Flat Plate Experiments of Kyushu University", M.F.E.K.U., Vol. 23, No. 3, March 1964  
"Some Experiments of Rolling Effect on Ahead Resistance of Ships", M.F.E.K.U., Vol. 25, No. 4, June 1966

By *Asst. Prof. R. Yamazaki*

"On the Theory of Screw Propellers in Non-Uniform Flows", J.S.N.A.W.J., No. 28, Sept. 1964  
"On the Performance Characteristics of a Propeller in a Non-Uniform Flow", J.S.N.A.J., No. 117, June 1965  
"On the Performance Characteristics of a Propeller in an Oblique Flow", J.S.N.A.W.J., No. 31, Feb. 1966  
"On the Velocity Field near a Propeller Working Steadily in Still Water", J.S.N.A.W.J., No. 31, Feb. 1966

By *Lecturer, K Nakatake*

"On the Wave Pattern Created by Singular Points", J.S.N.A.W.J., No. 31, Feb. 1966  
"On the Interaction between the Ship Hull and

the Screw Propeller", J.S.N.A.W.J., No. 33, July 1967  
Ship Form", J.S.N.A.W.J., No. 34, July 1967.  
"On the Source Distribution Which Represents

##### **In Fields of Seakeeping of Ships**

By *Prof. Emeritus Y. Watanabe*

"Theoretical Treatment of the Anti-Rolling Tank of Flume-Type", J.S.N.A.W.J., No. 26, Sept. 1963  
"On the Shifting of Grain Cargo, and the Method of Calculation of the Safety of Ship", J.S.N.A.W.J., No. 30, Aug. 1965.

##### **In Fields of Manoeuvring of Ships**

By *Prof. S. Inoue*

"Maximum Heel When the Rudder is Put Over", J.S.N.A.W.J., No. 23, March 1962  
"The Non-Linear Term of Force Acting upon Turning Ships", J.S.N.A.W.J., No. 32, July 1966  
"A Calculation of Turning Motion in Regular Waves", J.S.N.A.W.J., No. 31, Feb. 1966.

##### **In Fields of Strength and Vibration of Ships**

By *Prof. Emeritus Y. Watanabe*

"An Approximate Expression for the Midship Wave Bending Moment", J.S.N.A.W.J., No. 24, Sept. 1962  
"On the Properties of Hydrodynamic Impact on Ship Bottom and Whipping", J.S.N.A.W.J., No. 32, July 1966  
"A Judging of Slamming Occurrence and Its Relation to Fore Draught", J.S.N.A.W.J., No. 32, July 1966.

By *Prof. J. Fukuda*

"Computer Program Results for Response Operators of Wave Bending Moments in Regular Oblique Waves", J.S.N.A.W.J., No. 32, July 1966  
"On the Families of Wave Spectra for Prediction of Wave Bending Moments", J.S.N.A.J., No. 120, Dec. 1966.

By *Prof. J. Fukuda* and others

"Determination of Fore and After Draughts of Ballasted Bulk Carriers Associated with the Criteria of Slamming and Propeller Racing", J.S.N.A.W.J., No. 33, Feb. 1967  
"Long-Term Predictions of Wave Bending Moments on Gigantic Tanker Hulls", J.S.N.A.W.J., No. 34, July 1967

By *Prof. M. Yamakoshi* and others

"Strength Calculation of Double Bottom Structure of Bulk Carrier", J.S.N.A.W.J., No. 25, March 1963  
"Shearing Deformation of Wing Tanks", J.S.N.A.W.J., No. 29, Feb. 1965 and No. 33, Feb. 1967  
"On the Coupling of Hull Vibration and Bottom Vibration of Ships", J.S.N.A.J., No. 118, Dec. 1965.

##### **In Fields of Equipment and Construction of Ships**

By *Prof. J. Suhara*

"Strength of Derrick Booms", J.S.N.A.W.J., No. 28, Sept. 1964

"Strength of Cargo Hooks Analysed by Theory of Plasticity", J.S.N.A.W.J., No. 29, Feb. 1965

"On Elasto-Plastic Analysis of Beams", J.S.N.A.W.J., No. 31, Feb. 1966 and No. 32, July 1966

By *Asst. Prof. I. Tsuji*

"Elastoplastic Stresses and Deformations in Mild Steel Plates Subjected to Thermal Cycles", M.F.E.K.U., Vol. 27, No. 2, Nov. 1967.

## Abbreviations

- M.F.E.K.U.: Memoirs of the Faculty of Engineering, Kyushu University
- T.R.K.U.: Technology Reports of Kyushu University
- J.S.N.A.J.: Journal of the Society of Naval Architects of Japan
- J.S.N.A.W.J.: Journal of the Society of Naval Architects of West Japan
- T.I.N.A.: Transactions of Institution of Naval Architects
- 5th I.C.A.M.: Proceedings of the 5th International Congress for Applied Mechanics.

