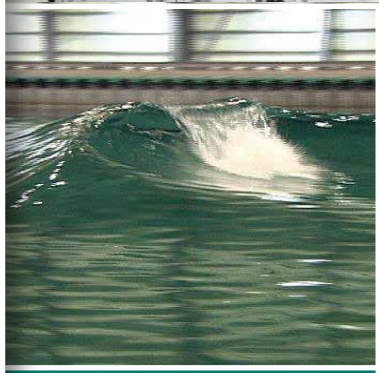
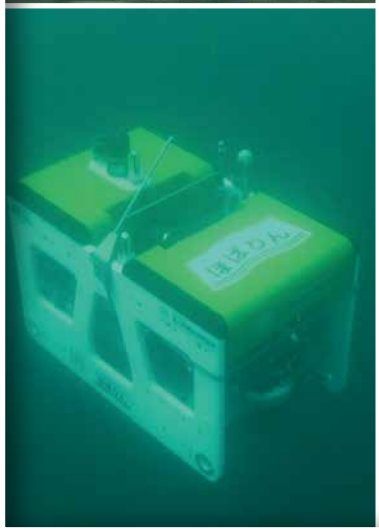
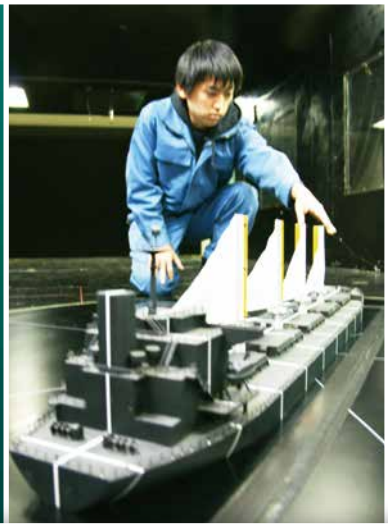
National Maritime Research Institute

NMRI



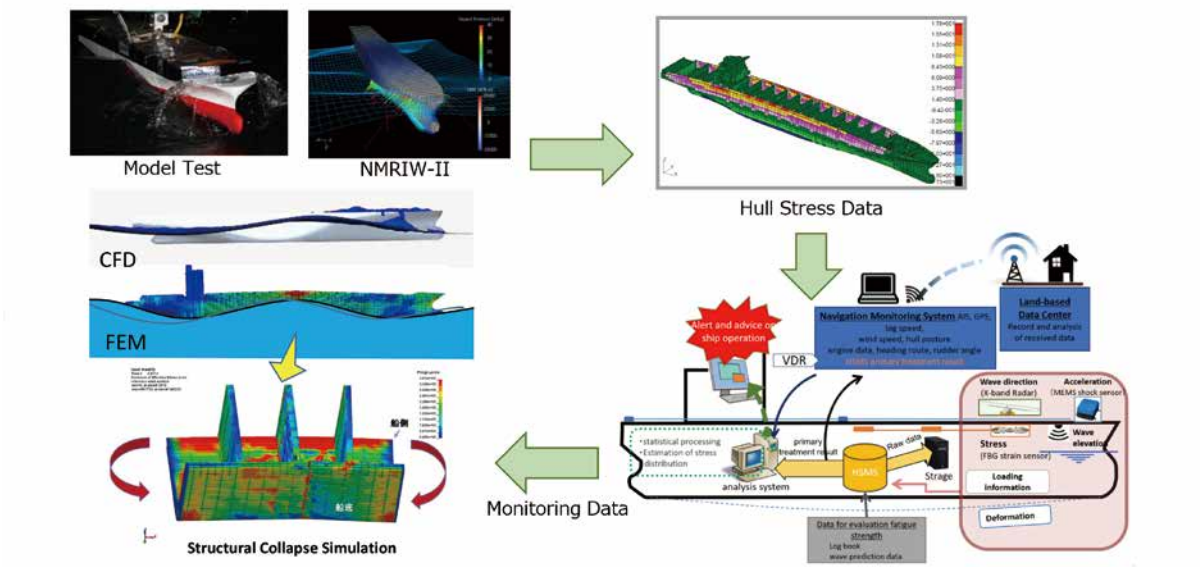



1. Securing safe marine transportation

Research on Structural Safety of Ships

We are developing the total system based on load and structural strength evaluation method and the cooperative hull monitoring system by which, the contribution to the safety ship operation, ship damage analysis and rational design rule making can be desired.



Total system for high precision structural strength evaluation(left) and the cooperative hull monitoring system (right)

2. Preserving the marine environment

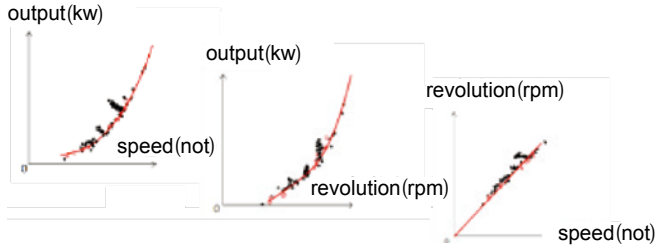
Research on Evaluation of Ship Performance in Actual Seas

For the purpose of creating a “scale” to accurately evaluate the ship performance in actual seas, such as ship speed and fuel consumption in winds and waves, OCTARVIA Project -Japan Maritime cluster Collaborative Research- has been launched since October 2017.

The participants are 25 companies; 3 shipping companies, 12 shipyards, 7 manufacturers, 1 weather consulting company, 1 classification society and 1 research institute.

The project is managed in an open innovation scheme.

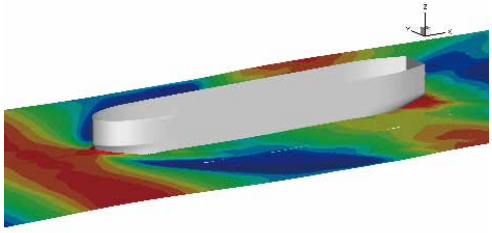
By means of the “scale”, construction and operation of a truly high-performance ship in actual seas can be achieved.



Analysis of on board monitoring data; output-revolution-speed

Development and operation of high performance ships

Validation by full scale ship



Tank tests in waves and CFD calculation

3. Ocean development

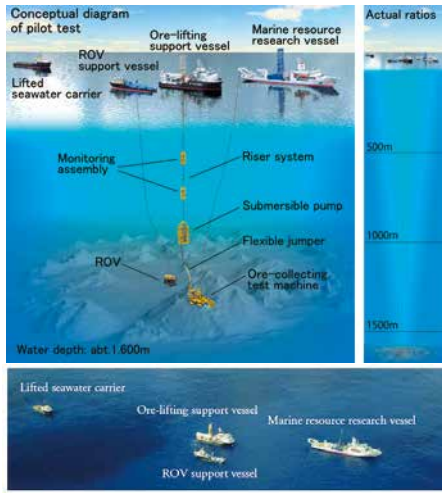
Development of Evaluation Technologies for Safety and Performance of Offshore Natural Resources Production System

NMRI is involved with technological development and safety assessment for exploitation and production of offshore natural resources such as oil, gas and minerals.

In 2017, Japan Oil, Gas and Metals National Corporation (JOGMEC) conducted the world's first ore-lifting pilot test for polymetallic sulphides, which was sponsored by the Ministry of Economy, Trade and Industry (METI), with great success under the sea near Okinawa Island.

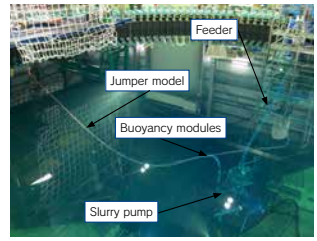
We participated in this test with Japanese private companies to assess the operability and safety of the test.

Source: METI and JOGMEC, Report of Comprehensive Assessment concerning Development of Seafloor Polymetallic Sulphides, 2018 (in Japanese)



Ore-lifting Test Diagram

Wind Tunnel Test



Model Test of Flexible Jumper

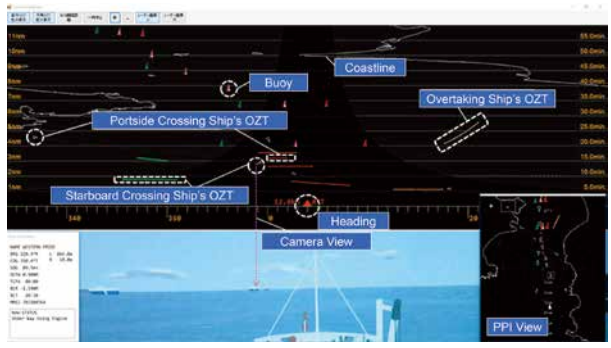
4. Developing fundamental technologies for marine transportation

Study on Navigation Support Technologies for Autonomous Vessels with ICT

Decision Support System for Collision Avoidance Navigation :

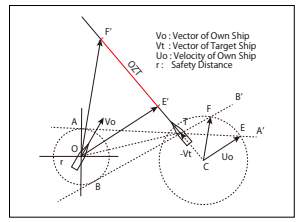
We are developing “Advanced Navigation Support System”, a tablet-type voyage support device that shows safe navigation courses by overlapping OZT (Obstacle Zone by Target), which is a measure of collision risk, with an image taken from a camera.

The tablet-type voyage support device, “Advanced Navigation Support System”, is developed in a joint research project with Mitsui O.S.K. Lines, Ltd., MOL Techno-Trade, Ltd., and Tokyo University of Marine Science and Technology.



Screen shot of tablet-type voyage support device, “Advanced Navigation Support System”

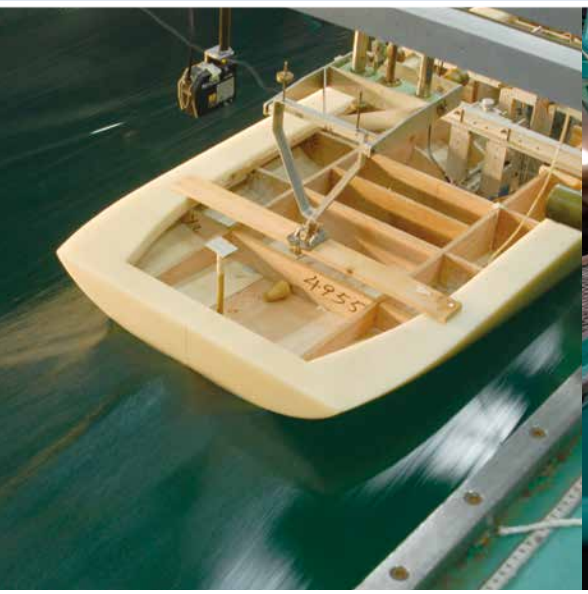
Usage situation of tablet-type voyage support device, “Advanced Navigation Support System”



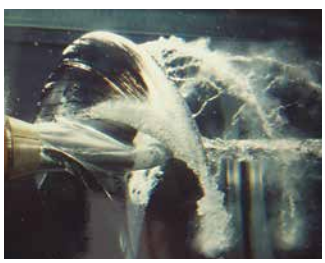
How to calculate OZT (Obstacle Zone by Target).

400m Towing Tank

One of the world's largest towing tanks
Length 400m Width 18m
Depth 8m Max. speed 15m/s



Cavitation Tank



Wind Tunnel

Actual Sea Model Basin

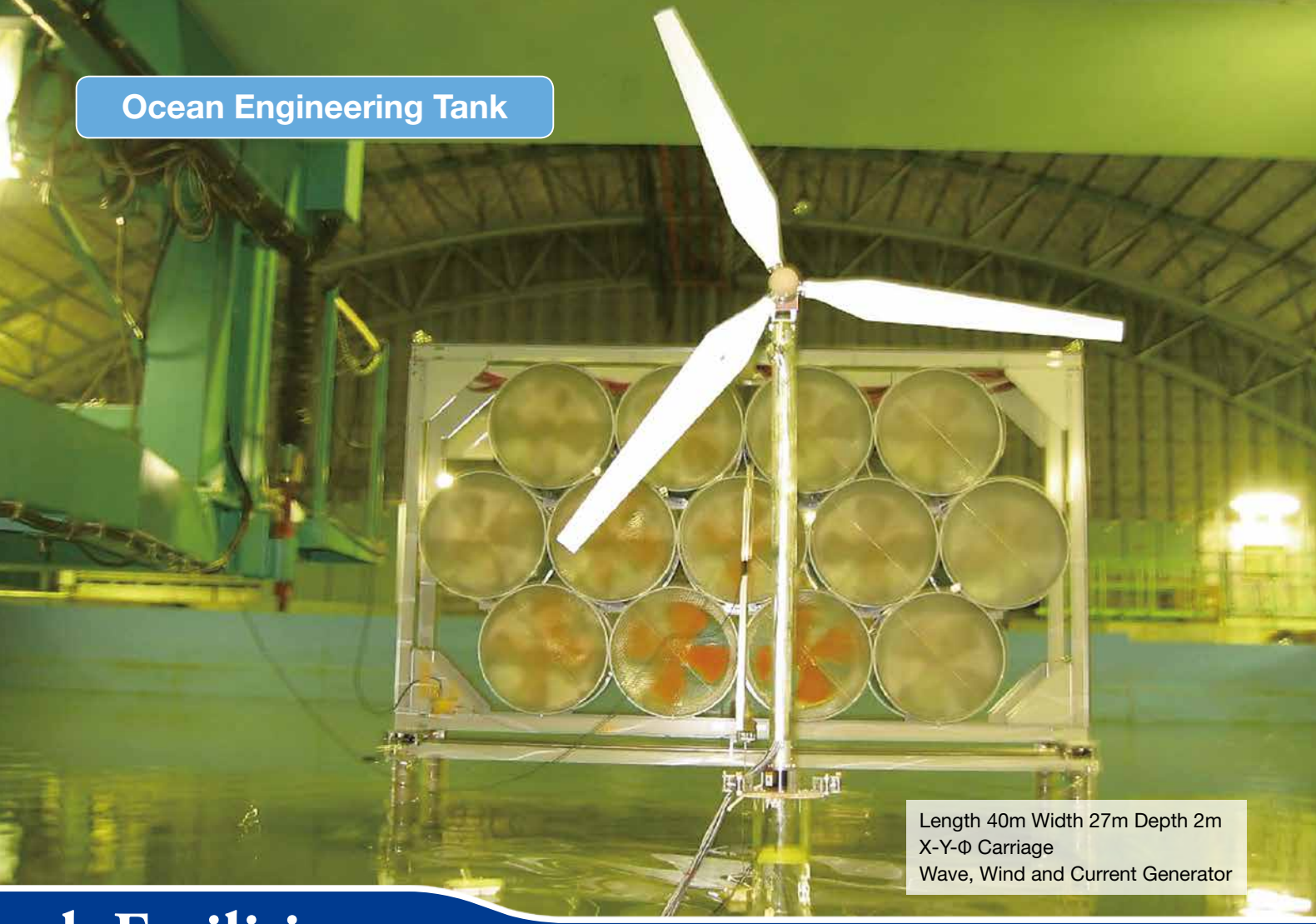
Length 80m Length 40m Depth 4.5m X-Y-Φ towing carriage
Wave generators around The Entire periphery of the basin
Wind generator

Main Resea

Bridge Simulator for Navigation Risk

Cylindrical screen r=6.5m Field of view (H×V) 240° × 40°
Bridge: Length 4m, Breadth 4m Height 2.2m
Bridge Motion Platform Pitch ±10°, Roll±15°

Ocean Engineering Tank



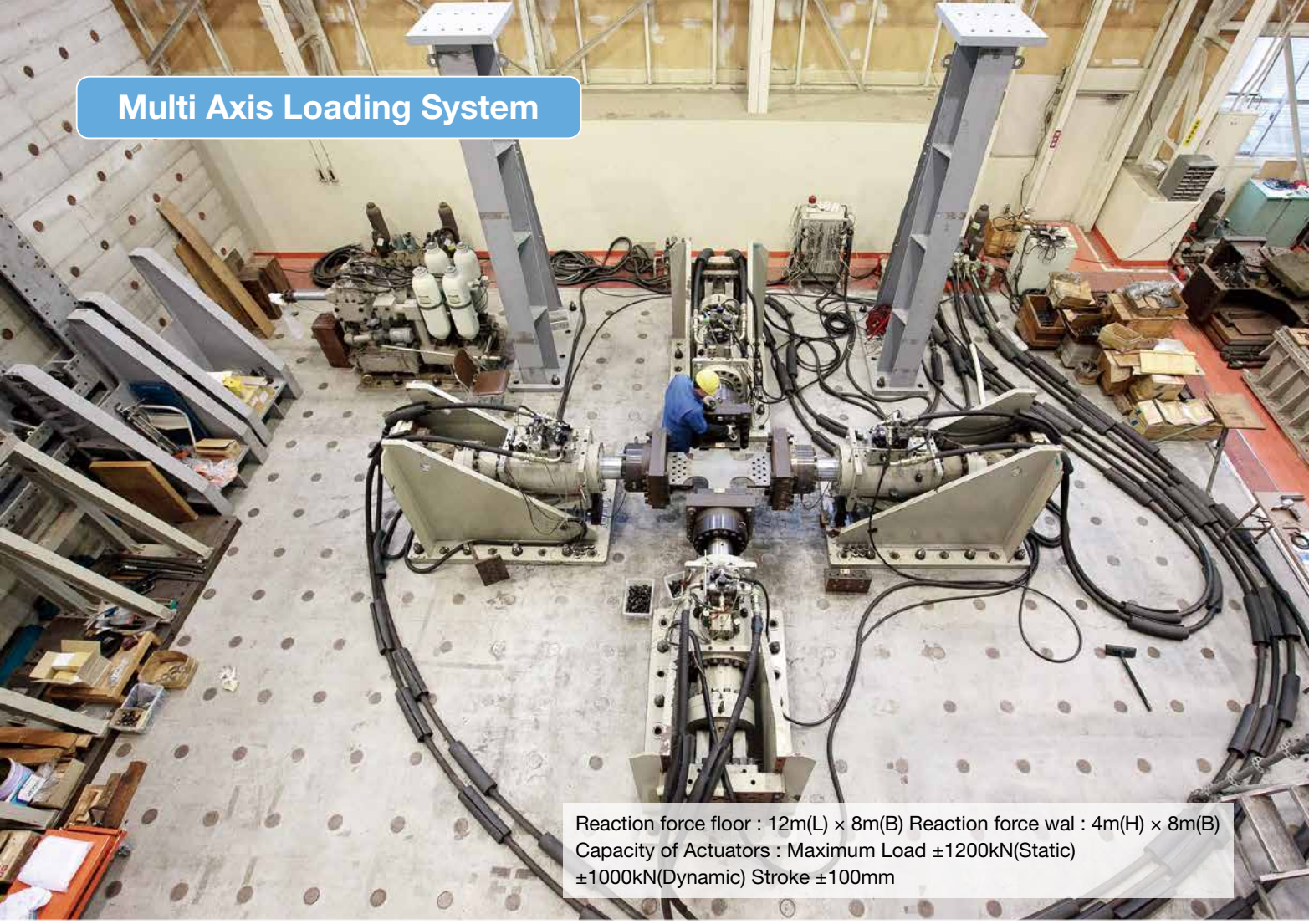
Length 40m Width 27m Depth 2m
X-Y-Φ Carriage
Wave, Wind and Current Generator

rch Facilities

Deep Sea Basin

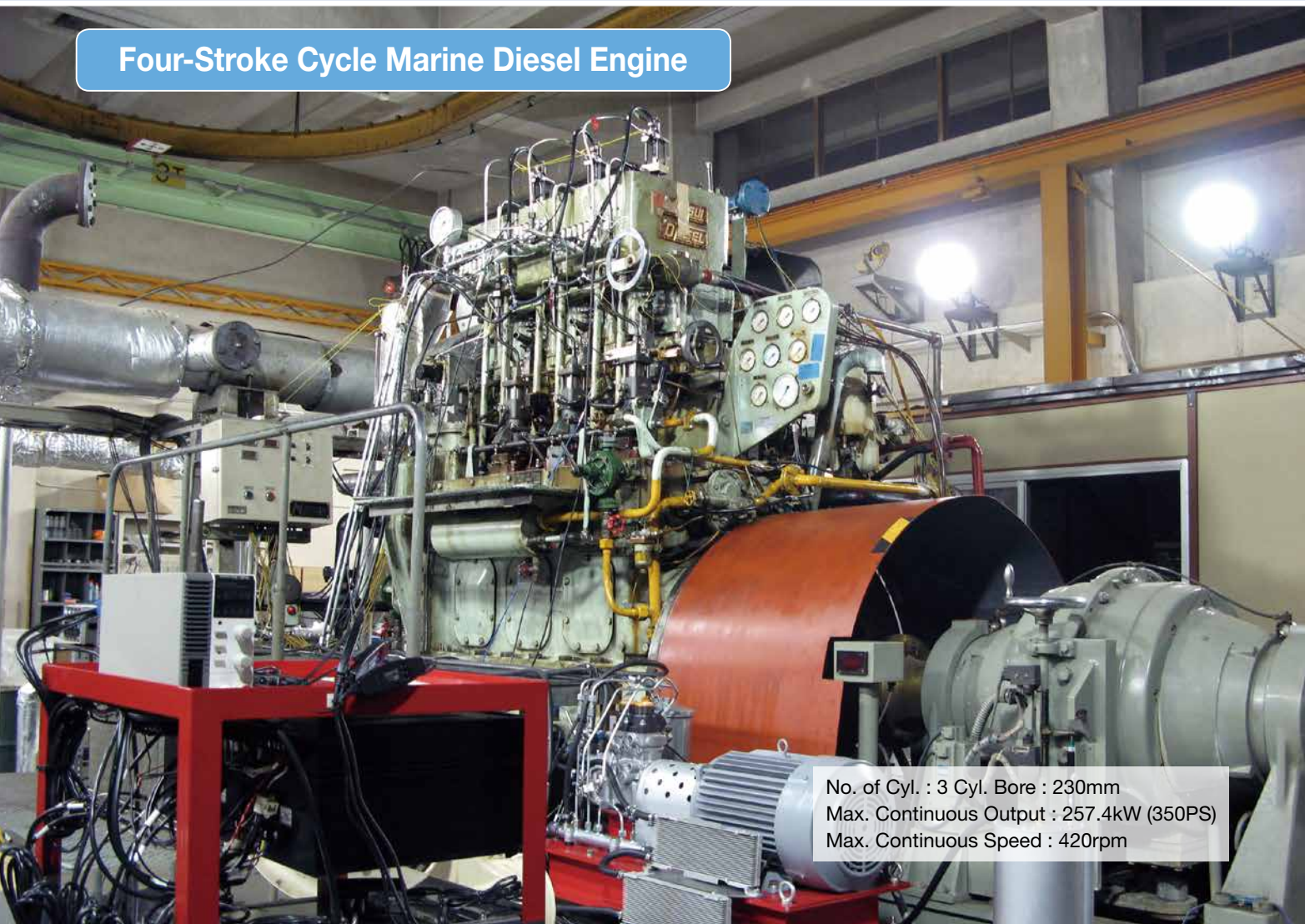
Max. water depth 35m Upper basin 14mø × 5m
Deep pit 6mø × 30m Wave & Current generators
Equipment for measuring 3-D behavior underwater

Multi Axis Loading System



Reaction force floor : 12m(L) × 8m(B) Reaction force wal : 4m(H) × 8m(B)
Capacity of Actuators : Maximum Load ±1200kN(Static)
±1000kN(Dynamic) Stroke ±100mm

Four-Stroke Cycle Marine Diesel Engine



No. of Cyl. : 3 Cyl. Bore : 230mm
Max. Continuous Output : 257.4kW (350PS)
Max. Continuous Speed : 420rpm

Organizations

NMRI　National Maritime Research Institute

The National Maritime Research Institute, known as NMRI is the major research center in maritime technology in Japan. NMRI conducts research and development in order to: improve marine safety; protect the environment; enhance competitiveness of maritime industries; and develop future technologies. With the world's top level experimental facilities, more than 160 researchers conduct researches to contribute to the society.

1916　The Ship Equipment Inspection Station

1950　Transport Research Institute

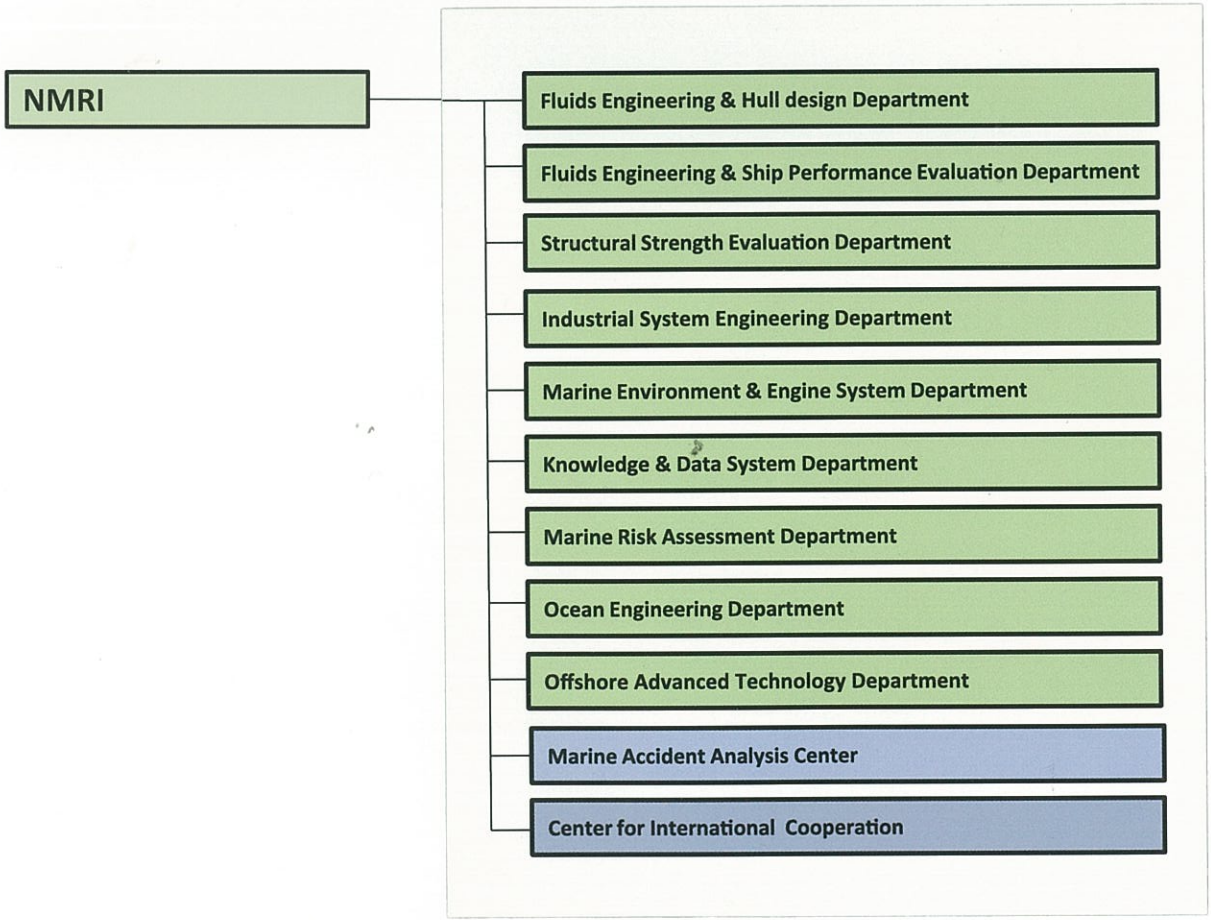
1963　Ship Research Institute

2001　National Maritime Research Institute, started as Independent administrative institution

2016　National Maritime Research Institute (NMRI), started as a part of new integrated institute, National Institute of Maritime, Port and Aviation Technology, consisting of NMRI and two national laboratories for port and aviation technology.

100th anniversary of NMRI

50th anniversary of 400m Towing tank operation



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