IndustriALL Global Union
World Conference on Shipbuilding-Shipbreaking

Promoting Sustainable Industry: Green Technologies and Human Resource Development

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Japan's Effort for Sustainable Maritime Industry

1. Environment Protection
   (1) Framework and Technologies for Energy Efficiency
   (2) Technologies for Clean Energy

2. Human Resource Development and International Contributions

Environment Protection

Background

- Societal demand of environmental protection has been increasing.
  - For mitigating GHG / air pollution
  - For better energy efficiency
- Shipping sector accounts for about 2.2% of the global GHG emission. (Third IMO GHG Study, 2014)
- SOx/NOx emission is another big problem for sustainable development.

- Japan is keen and active on GHG/SOx/NOx emission reduction.
  - ✓ Contribution to the development of global framework
  - ✓ Promotion for technological innovation

Energy-saving ships

Clean energy

1. Environment Protection

(1) Framework and Technologies for Energy Efficiency

Ocean Environment Initiative (2008 – 2012)

Aimed to reduce 30% of CO2 emissions from ships through R&D support

R&D in line with the development of international environmental framework

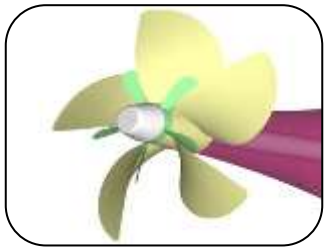
International Framework

Contributed to the development of IMO rules

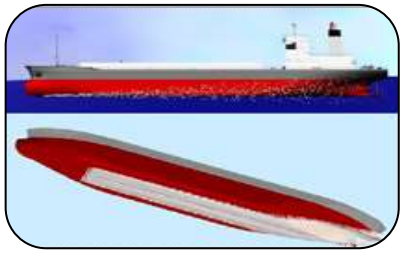
- Proposed Energy Efficiency Design Index (EEDI) for new ships and energy efficiency management plan (SEEMP) for all ships.
- Proposed market-based mechanism, which will encourage further R&D through incentive scheme.

R & D

Provided support for R&D for innovative energy efficiency technologies based on top-runner approach



Propulsion system



Friction reduction by air lubrication

Fuel Efficient Ships

- MALS (Mitsubishi Air Lubrication System) passes main engine's scavenging air (combustion air) from the turbocharger into the underwater from the vessel's bottom.
- MALS reduces CO_2 emission by 27%, by reducing friction between the vessel's bottom and the seawater.

General characteristics
- Capacity: 95,000 DWT
- Length: 237 m
- Builder: Oshima Shipbuilding

- MALS will be installed on a cruise ship, which is now being constructed by Mitsubishi Heavy Industries: 7% energy efficiency UP!

General characteristics
- Tonnage: 125,000 GT
- Capacity: 3,250 people
- Builder: Mitsubishi Heavy Industries

Fuel Efficient Ships

MV KOZAN-MARU, Coastal cement carrier

- Equipped with tandem hybrid propulsion system.
- Combination of a controllable pitch propeller (CPP) and a azimuth fixed pitch propeller (FPP).
- CPP is driven by a diesel engine while FPP by a motor.
- Fuel saving by 5-20%.

General characteristics

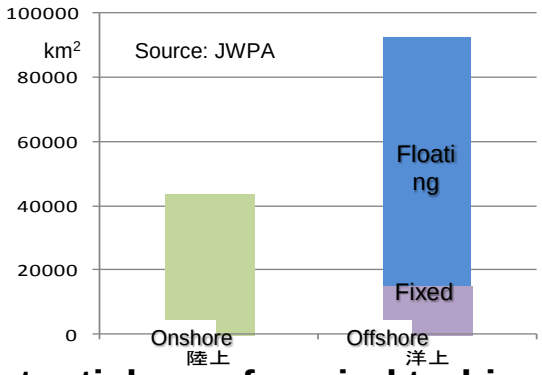
- Tonnage: 14,902 GT
- Capacity: 22,053 DWT
- Length: 161 m
- Builder: Kanda Shipbuiding

1. Environment Protection

(2) Technologies for Clean Energy

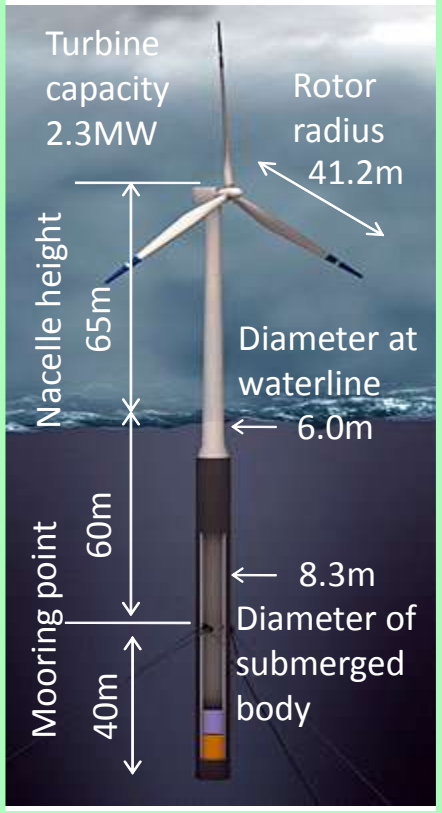
Floating Offshore Wind Turbine

- Japan is promoting wind turbines based on New Growth Strategy, etc.
- Because of limited land and shallow sea area, **Japan needs Floating Offshore Wind Turbine (FOWT).**
- After the Great East Japan Earthquake, renewable energy is expected to grow further.



Potential area for wind turbine

FOWT



Technical research on floating structures and anchorage

- ✓Weather conditions taken into account (typhoon, earthquake, etc.)
- ✓Structural integrity and stability
- ✓Evaluation of interaction among many FOWTs (mooring movement, etc)
- ✓Emergency preparedness and response (ship collision, cut of mooring lines, drifting, etc)

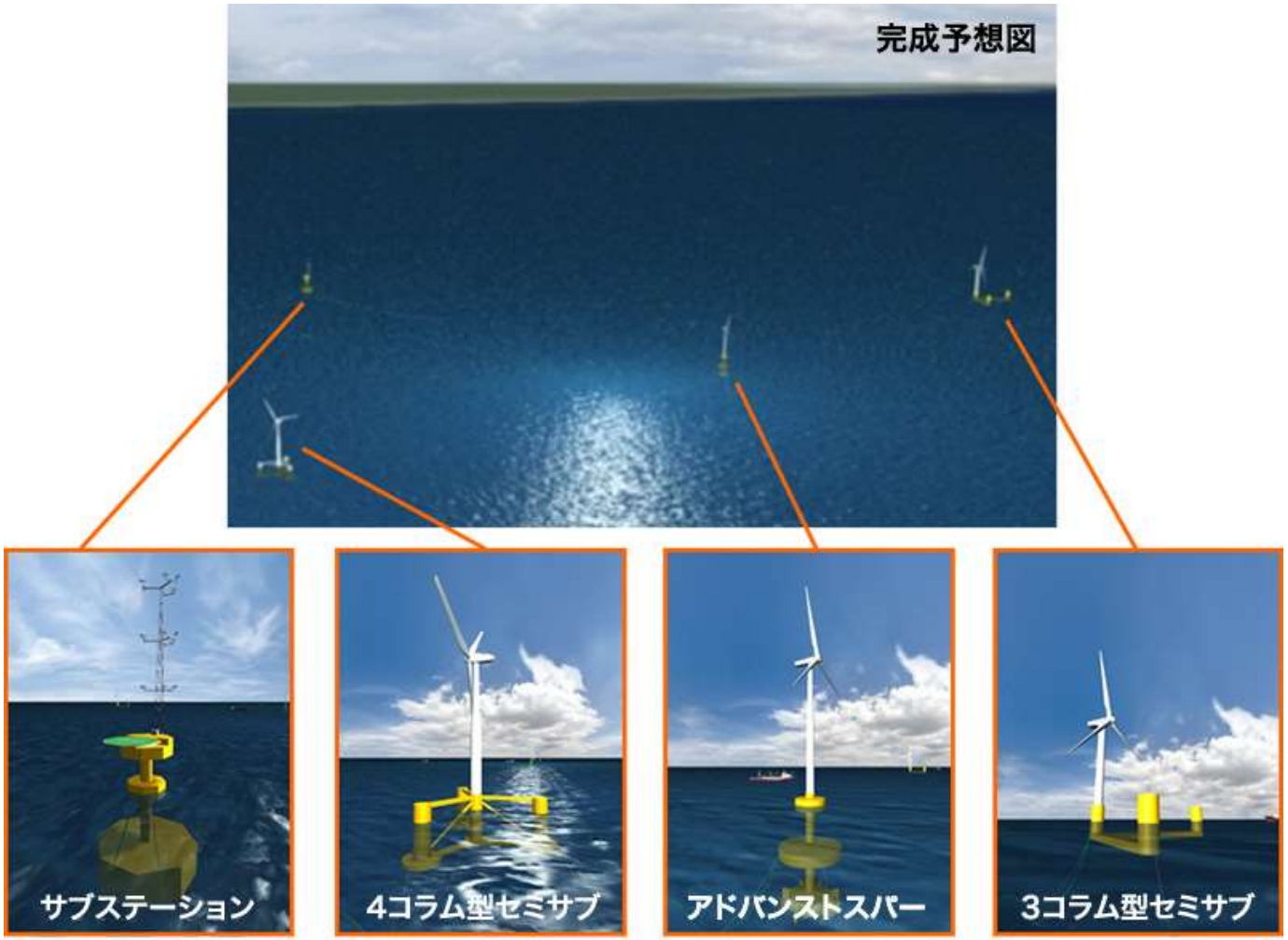
Established “Standards for Safety of FOWT” (2012)

Develop “Guideline for Safety of FOWT” | Lead international standardization

Support practical use of FOWT with METI and MOE

Promote FOWT &
Strengthen international competitiveness of relevant industries

Project : Fukushima Floating Offshore Wind Farm



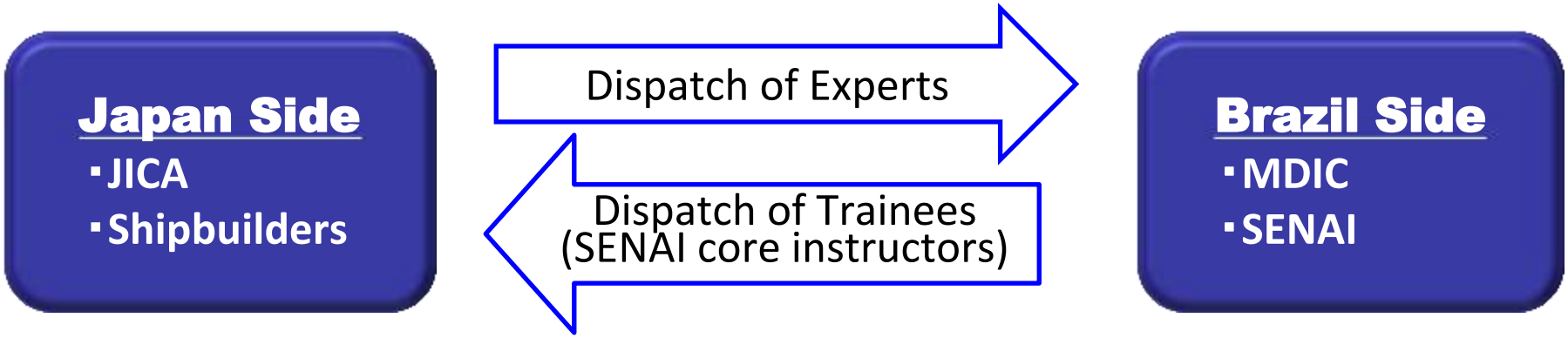
Substation | 4-column semi-submersible | Advanced spar | 3-column semi-submersible

METI (Ministry of Economy, Trade and Industry) is conducting a practical operation test during 2013-2015, by setting afloat three offshore wind turbines (2 MW * 1, 7MW * 2) and a transformer station off Fukushima, Japan. JMU, MES and MHI are the constructors off the floating structures.

3. Human Resource Development and International Cooperation

Human Resource Development in Shipbuilding <Case Studies>

- **<u>JICA project on technical cooperation in shipbuilding human resource development started in September 2014</u>**, in cooperation with JICA, Japanese shipbuilders, MDIC and SENAI.
- The implementation period is 2014 – 2018 (4 years).
- MLIT dispatched an expert on shipbuilding policy to MDIC and the project started in September.



JICA: Japan International Cooperation Agency
MDIC: Ministry of Development, Industry and Foreign Trade (Brazil)
SENAI: Serviço Nacional de Aprendizagem Industrial (Brazil)
(professional schools for providing training for specialized workers)