Shipbuilding & Ocean Development
Business Presentation Meeting

March 12, 2008

Shiro Iijima
Director, Executive Vice President and
General Manager,
Shipbuilding & Ocean Development Headquarters
1. Positioning of the Shipbuilding & Ocean Development Segment
(1) Positioning of the Shipbuilding & Ocean Development segment

**2006**

**Shipbuilding & Ocean**

- Others: 10%
- Mass and Medium-Lot Manufactured Machinery
- Aerospace
- Machinery & Steel Structures
- Power Systems

**Shipbuilding & Ocean**

- Others: 8%
- Mass and Medium-Lot Manufactured Machinery
- Aerospace
- Machinery & Steel Structures
- Power Systems

**Consolidated orders received**

- Shipbuilding & Ocean Development: ¥314.2 billion
- (Figure for the entire company: ¥3,274.7 billion)

**Consolidated net sales**

- Shipbuilding & Ocean Development: ¥247.1 billion
- (Figure for the entire company: ¥3,068.5 billion)
(2) Changes in orders received, net sales, and operating income ratio

<table>
<thead>
<tr>
<th>Year</th>
<th>Orders received</th>
<th>Net sales</th>
<th>Operating income ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>2,074</td>
<td>2,226</td>
<td>-4.8%</td>
</tr>
<tr>
<td>2006</td>
<td>3,142</td>
<td>2,471</td>
<td>-2.1%</td>
</tr>
<tr>
<td>2007 (forecast)</td>
<td>3,400</td>
<td>2,800</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

(Unit: ¥100 million)
2. Situation of the Shipbuilding & Ocean Development Segment
(1) Structure of the Shipbuilding & Ocean Development segment

Head Office

Technical Headquarters

Nagasaki Research & Development Center
(Ship & ocean research)
(Vibration research)
(Strength research)
(Tribology research)

Shipbuilding & Ocean Development Headquarters

Nagasaki Shipyard & Machinery Works
Shimonoseki Shipyard & Machinery Works
Kobe Shipyard & Machinery Works
Yokohama Dockyard Machinery Works

Nagasaki Shipyard & Machinery Works
Nagasaki Research & Development Center
Shimonoseki Shipyard & Machinery Works
Kobe Shipyard & Machinery Works
Yokohama Dockyard Machinery Works
Head Office
(2) Employees in the Shipbuilding & Ocean Development segment

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Research</th>
<th>Design</th>
<th>Manufacturing</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 *</td>
<td>1,020</td>
<td>3,704</td>
<td>146</td>
<td>4,870</td>
</tr>
</tbody>
</table>

**1,100 employees for research and design**

<table>
<thead>
<tr>
<th></th>
<th>Nagasaki Shipyard &amp; Machinery Works</th>
<th>Shimonoseki Shipyard &amp; Machinery Works</th>
<th>Kobe Shipyard &amp; Machinery Works</th>
<th>Yokohama Dockyard Machinery Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of employees</td>
<td>2,817</td>
<td>675</td>
<td>1,105</td>
<td>186</td>
</tr>
</tbody>
</table>

* Employees relating to the Shipbuilding & Ocean Development segment
### (3) Overview of Plants and Facilities for the Shipbuilding & Ocean Development segment

#### Technical Headquarters
- Nagasaki Research & Development Center (Ship & ocean research)

#### Shipbuilding & Ocean Development Headquarters
- Nagasaki Shipyard & Machinery Works
- Shimonoseki Shipyard & Machinery Works
- Kobe Shipyard & Machinery Works
- Yokohama Dockyard Machinery Works

#### Facilities
- Towing tank
- Seakeeping & maneuvering basin

#### Major shipbuilding facilities

<table>
<thead>
<tr>
<th>Site (m²)</th>
<th>Koyagi Plant</th>
<th>Main Plant (Tategami)</th>
<th>Shipbuilding &amp; Ocean Development Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,200,000</td>
<td>350,000</td>
<td></td>
</tr>
<tr>
<td>Dock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length (m) x width (m)</td>
<td>990.0 x 100.0</td>
<td>375.0 x 56.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,000,000</td>
<td>225,000</td>
<td></td>
</tr>
<tr>
<td>Capacity (deadweight tons)</td>
<td>400.0 x 100.0</td>
<td>350.0 x 56.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500,000</td>
<td>300,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>276.6 x 38.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>95,000</td>
<td></td>
</tr>
<tr>
<td>Berth</td>
<td></td>
<td>324.0 x 56.0</td>
<td></td>
</tr>
<tr>
<td>Length x width</td>
<td></td>
<td>80,000</td>
<td></td>
</tr>
<tr>
<td>Capacity (deadweight tons)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crane</td>
<td>G: 1,200t x 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G: 600t x 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>J: 50t x 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>G: 300t x 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>G: 150t x 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 150t x 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 150t x 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 80t x 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 100t x 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 50t x 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 16t x 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 200t x 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 120t x 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 80t x 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 40t x 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 16t x 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>J: 305.0 x 61.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>310,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>136.0 x 12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24,500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>305.0 x 61.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>310,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>136.0 x 12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24,500</td>
<td></td>
</tr>
</tbody>
</table>

- Building Dry Dock
- Building Berth
- Repair Dry Dock
Nagasaki Shipyard & Machinery Works
-Koyagi Plant-

Site: 1,200,000 m²

- Steel treatment shop
- Steel cutting shop
- No. 3 south quay
- Midbody sub-assembly shop
- Bow & stern assembly shop
- Pipe shop
- No. 1 east quay
- Sewage disposal plant
- Panel shop
- Special painting shop
- Final assembly & outfitting shop
- 600-ton goliath crane
- Building dock
- No. 2 east quay
- Waste oily-water treatment plant
- Repair dock
- No. 3 east quay
- Wind turbine generator
Nagasaki Shipyard & Machinery Works -Main Plant (Tategami)-

Site: 350,000 m²

1 Port entrance
2 Steel unloading wharf
3 Assembly shop
4 Assembly shop
5 Assembly shop
6 No. 1 & No. 2 building berth
7 Special painting shop
8 Final assembly yard
9 No. 1 dry dock
10 No. 2 dry dock
11 Tategami quay
12 Unit module shop
13 Hachikenya quay
14 Hachikenya dock house
15 No. 3 dry dock
16 Pipe shop
17 Main gate
18 Main office
19 Mukojima quay
Kobe Shipyard & Machinery Works -Main Plant-

Site: 210,000 m²

1. Main building
2. Engineering center
3. Steel fabrication and assembly shop
4. No. 3 shipbuilding berth
5. No. 4 shipbuilding berth
6. No. 1 dry dock
7. No. 4 dry dock
Shimonoseki Shipyard & Machinery Works -Enoura Plant-

Site: 130,000 m²

1. Office
2. Berth
3. Dock No. 1
4. Dock No. 2
5. Assembly and welding shop
6. Interior shop
7. Aluminum-alloy boat shop
8. Unit cabin shop
9. Pipe shop
Yokohama Dockyard Machinery Works
-Honmoku Plant-

Site: 150,000 m²

1 Office
2 No. 1 dry dock
3 No. 2 dry dock
4 No. 3 dry dock
Nagasaki Research & Development Center

Fukahori Area

1 Seakeeping & maneuvering basin
   (LxBxD = 160.0 m x 30.0 m x 3.3 m)

Uragami Area

2 Towing tank
   (LxBxD = 285.0 m x 12.5 m x 6.5 m)
Nagasaki Research & Development Center

LxBxD = 160 m x 30 m x 3.3 m

- Ship & Ocean Laboratory
- Vibration Laboratory
- Strength Laboratory
- Tribology Laboratory
- Chemical Laboratory
- Combustion & Heat Transfer Laboratory

Total: 410 employees, of which 360 are researchers
**Major products**

- **Large ship**: Koyagi Plant of Nagasaki Shipyard & Machinery Works

<table>
<thead>
<tr>
<th>Shipbuilding</th>
<th>Special-purpose vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membrane type LNG carrier</td>
<td>Passenger vessel</td>
</tr>
<tr>
<td>LPG carrier</td>
<td></td>
</tr>
<tr>
<td>Moss type LNG carrier</td>
<td>Deep sea drilling vessel</td>
</tr>
<tr>
<td>VLCC</td>
<td></td>
</tr>
<tr>
<td>Mega container vessel</td>
<td>Kami-goto floating crude oil storage facility</td>
</tr>
<tr>
<td>(larger than 8000TEUs)</td>
<td></td>
</tr>
</tbody>
</table>
## Major products

<table>
<thead>
<tr>
<th>Shipbuilding</th>
<th>Special-purpose vessel</th>
<th>Japanese defense force ship</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Large container vessel</strong> (6000 to 8000 TEUs)</td>
<td><strong>Deep submergence research vehicle</strong></td>
<td><strong>Escort ship</strong></td>
</tr>
<tr>
<td><strong>Pure car and truck carrier</strong></td>
<td><strong>Deep sea cruising AUV</strong></td>
<td><strong>Submarine</strong></td>
</tr>
<tr>
<td><strong>Superferry</strong></td>
<td><strong>Oil recovery vessel</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Medium-size ship:** Main Plant of Nagasaki Shipyard & Machinery Works and Kobe Shipyard & Machinery Works
<table>
<thead>
<tr>
<th>Shipbuilding</th>
<th>Special-purpose vessel</th>
<th>Alteration, ship repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large ferry</td>
<td>Patrol vessel</td>
<td>Crystal Harmony</td>
</tr>
<tr>
<td>Pure car and truck carrier</td>
<td>Fishery patrol boat</td>
<td>Alteration</td>
</tr>
<tr>
<td>Domestic RO/RO ship</td>
<td>Oceanographic research ship</td>
<td>Asuka II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Membrane type LNG carrier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Escort ship</td>
</tr>
</tbody>
</table>
3. Outlook for the Shipbuilding & Ocean Development Business
The volume of ships expected to be needed in 2020 is 1.7 to 1.8 times that in 2007, representing an annual growth rate of 3.9% to 4.2% on average across all ship types.
Worldwide capacity will expand from 58 million GT now, to 85 million GT in 2010. When facilities being constructed or planned in South Korea and China begin operating by 2015, the capacity will increase to 125 million GT.
(3) Changes in volume of completion and in the future supply-demand balance

(Million GT)

- Supply capacity in 2010 will be **85 million GT**.
- Supply capacity in 2015 will be **125 million GT**.
- Supply capacity in 2015 will be **2.3 to 2.8 times** demand.
4. Business Strategy for the Age of Mega-Competition
(1) Changing market environment and changing strategies

- **Structural recession (1975 to 1984)**
  - Shipbuilding demand was minimal
  - Fuel cost: 100 to 200 dollars/ton
  - Environmental regulations: None
  - Shipyards in accordance with the environment

- **Age of mega-competition**
  - Demand is about twice that at the time of the shipbuilding boom
  - Fuel cost: 500 dollars/ton; customers emphasize fuel consumption
  - Tightening of regulations on CO2, NOx and SOx
  - Emerging shipyards account for the majority of the market

**Low-cost competition only**

- An environment favorable for the Company

- **Basic strategies**
  - Enhancing technologies (ability to respond to changes in performance, environment, and needs)
  - Bolstering cost competitiveness

- **High growth**

- **Structural recession**

- **Stability**

- **Maturation**

- **Kyoto Protocol: Reducing CO2 6% (by 2012)**

- **Tightening of environmental regulations**

- **Toyako Summit**

- **Tightening of environmental regulations**

- **Twice as tight**
(2) Technical strategy

Bolstering the overall ability of the Company to improve fuel efficiency and respond to environmental regulations

- **1,000-strong design-related employees → bolstering a development-oriented structure**
  - A structure consisting of product planning teams by ship type

- **Strengthening collaboration with other Company headquarters**
  - Technical Headquarters (obtaining support in basic technologies)
  - Power Systems Headquarters
    (collaboration in turbine technology, diesel technology, SCR (DeNOx), and desulfurization technology)
  - Machinery & Steel Structures Headquarters
    (collaboration in desulfurization technology)
### (1) Product planning

View rising fuel costs and the tightening of environmental regulations as opportunities to differentiate our technical capabilities from those of competitors.

- **Using and reinforcing technical resources**
  - Design staff: 1,020 employees
  - Research staff: 50 employees
  - Research facilities: towing tank etc.

- **Collaboration with other headquarters**
  - Power Systems Headquarters
    - (turbine, diesel, and SCR(DeNOx) technologies)
  - Machinery and Steel Structures Headquarters
    - (desulfurization technology)

### (2) Technical strategy (specific initiatives)

**Product planning team by ship type**

- **Sales**
- **Design** (Head office)
- **Manufacturing**
- **R&D centers**

(Note) Figures for 2005 and 2006 are results stated in financial reports. Figures for 2007 and afterwards are forecasts stated in financial reports.
(2) Technical strategy (specific initiatives)

(2) Fuel efficiency

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large ferry</td>
<td>Fuel efficiency competitiveness, Superior comfort</td>
</tr>
<tr>
<td>Pure car and truck carrier</td>
<td>Fuel efficiency competitiveness, Superiority in loading efficiency</td>
</tr>
<tr>
<td>Container ship</td>
<td>Fuel efficiency competitiveness, Superiority in heavy container ships</td>
</tr>
<tr>
<td>LNG carrier</td>
<td>Continue to build MOSS LNG carriers that offer superior safety, Competitiveness by enhancing fuel efficiency 15% or more</td>
</tr>
</tbody>
</table>
(2) Technical strategy (specific initiatives)

(3) Environmental action

★ CO₂ regulations
- IMO began examining regulations in 2003. Regulations will come into force as soon as the next few years

→ The Shipbuilding and Ocean Development Headquarters and Power Systems Headquarters plan to jointly start a project to achieve a 30% reduction.

★ NOx regulations
- Being tightened in stages from 2005 to 2015

→ The Power Systems Headquarters plans to develop an SCR system to be embedded inside the ship within a few years
The Shipbuilding and Ocean Development Headquarters is considering an efficient plant structure

★ Sox regulations
- Being tightened in stages in 2005 and in 2010

→ The Power Systems Headquarters and Machinery and Steel Structures Headquarters are considering the introduction of a desulfurization system to be embedded inside the ship.
(3) Cost competitiveness strategy

Transforming facilities and production processes and using external resources

● **Bolstering infrastructure**
  - Work in docks ➔ on the ground
    (Larger hull blocks ➔ bolstering the capacity of cranes)
  - Equipment in accordance with changes in rules (blasts and coating)

● **Production process transformation**
  (introducing MATES in manufacturing facilities)
  - Shipbuilding facilities: rough estimates ➔ eliminating losses through IT and digitization
  - Improving block dimensional accuracy ➔ laser cutting, welding, and measurement
  - Using external resources

● **Enhancing education**
(3) Cost reduction

(1) Making work instructions and understanding easier

Transforming production processes using MATES (i)

Product model (3D product information)

3D work instructions

Order of attachment

Pipe name
Valve name

Marking-off on steel plates
(automatic marking-off of work instructions on steel plates)

Assembly sequence

3D display

3D model database unique to shipbuilding

3D display

Main points in execution of work

Schedule
Target man-hours

Steel plate marking facility

Steel plate
(2) High precision production management

- Calculating standard hours per work element from the 3D model
  - Hull: Weld length by welding posture
  - Outfit: Number of outfits x standard time

(3) Cost reduction

Transforming production processes using MATES (ii)

<Prompt PDCA cycle>

- Instructions in day-to-day work for each person
- Monitoring progress in the plant using consolidated schedule management every day
- Production planning and manning management based on a highly accurate workload (Schedule for each stage)

Determining quantity and standard time

Product model (3D product information)

Production management innovation

Plant monitoring

Status of block mounting

Final assembly configuration

Hull

Vertical welding line

Downhand welding line

Outfit

Pipe/outfit Quantity by stage

Estimate of work time
(3) High precision manufacturing

🌟 **Improving dimensional accuracy**
Improving the dimensional accuracy of parts to shorten time for work within docks and reducing man-hours → aiming for high accuracy block manufacturing

- Improving cutting precision and high precision bending, and minimizing welding distortion

- **Introducing laser cutting machine**
- **Laser welding of hull**
- **3D measuring system**
- **Fast Just Fit-in**

Transforming production processes using MATES (iii)
A 3D shipbuilding system developed by the Nagasaki Shipyard & Machinery Works (design and manufacturing) over about 30 years

What is the difference between MATES and commercially available systems?

- MATES has a broad array of attributes (plate thickness, material types, cross-sections, etc.), and information on those attributes, needed for detailed design and production work support.

- Even with a broad array of attributes, and information on those attributes, data entry is practical. (Simple input has long been pursued.)

MATES can be a key tool for integration of design, production, and management.
(3) Cost competitiveness strategy

Transforming facilities and production processes and using external resources

● Bolstering infrastructure
  - Work in docks → on the ground
    (Larger hull blocks → bolstering the capacity of cranes)
  - Equipment in accordance with changes in rules (blasts and coating)

● Production process transformation
  (introducing MATES in manufacturing facilities)
  - Shipbuilding facilities: rough estimates → eliminating losses through IT and digitization
  - Improving block dimensional accuracy → laser cutting, welding, and measurement
  - Using external resources

● Enhancing education
Ship repair in Vietnam (Under FS)

- Operations are slated to begin in 2010
- Shipbuilding operations will be decided based on future market trends

Joint venture

- Mitsubishi Heavy Industry
- MOL
- Marubeni
- Using external resources
- Cost reduction
- Cost reduction

Image

Shipbuilding yard

Ship repair yard
(3) Cost competitiveness strategy

Transforming facilities and production processes and using external resources

- **Bolstering infrastructure**
  - Work in docks $\rightarrow$ on the ground
    (Larger hull blocks $\rightarrow$ bolstering the capacity of cranes)
  - Equipment In accordance with changing rules (blasts and coating)

- **Production process transformation**
  (introducing MATES to manufacturing facilities)
  - Shipbuilding facilities: rough estimates $\rightarrow$ eliminating losses through IT and digitization
  - Improving block dimensional accuracy $\rightarrow$ laser cutting, welding, and measurement
  - Using external resources

- **Enhancing education**
5. Direction of the Shipbuilding & Ocean Development Business

(1) Emphasizing business health

- The shipbuilding bubble, a period during which building more ships meant deriving more profits, will soon end. A distended stomach is associated with starvation.
- We aim to have a healthy, 300 billion yen business.

(2) Competing through innovation in manufacturing centered on technical capabilities

- We will bolster our resources and leverage them properly.
- Our customers will say, “Mitsubishi ships provide better performance and safety even though they cost more.”

(3) Developing operations overseas and consolidating businesses

- We will broaden our perspective and flexibly pursue a broad range of initiatives.