Shipbuilding & Ocean Development
Business Operation

June 16, 2008

MITSUBISHI HEAVY INDUSTRIES, LTD.

Shiro Iijima
Director, Executive Vice President,
General Manager,
Shipbuilding & Ocean Development Headquarters
March 12 Business Briefing Summary

1. Outline of the Shipbuilding & Ocean Development Business
   (1) Structure, Employees, Facilities
   (2) Major Products

2. Market Environment
   (1) Projected Volume of Seaborne Goods Transported
   (2) Change in Volume of Completion and in the future supply-demand balance

3. Business Strategy for the Age of Mega-Competition
   (1) Further Enhance Technical Capabilities
   (2) Bolster Cost Competitiveness
### 1. Outline of the Shipbuilding & Ocean Development Business

#### (1) Structure, Employees, Facilities

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

#### Technical Headquarters

- **Nagasaki Research & Development Center**
- **Nagasaki Shipyard & Machinery Works**
- **Shimonoseki Shipyard & Machinery Works**
- **Kobe Shipyard & Machinery Works**
- **Yokohama Dockyard Machinery Works**

#### Shipbuilding & Ocean Development Headquarters

- **Nagasaki Research & Development Center**
- **Nagasaki Shipyard & Machinery Works**
- **Shimonoseki Shipyard & Machinery Works**
- **Kobe Shipyard & Machinery Works**
- **Yokohama Dockyard Machinery Works**

* Employees relating to the Shipbuilding & Ocean Development segment

#### Major shipbuilding facilities

<table>
<thead>
<tr>
<th>Site (m²)</th>
<th>Dock Length (m) x width (m)</th>
<th>Capacity (deadweight tons)</th>
<th>Crane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koyagi</td>
<td>1,200,000</td>
<td>990.0 x 100.0</td>
<td>375.0 x 56.0</td>
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<tr>
<td></td>
<td>1,000,000</td>
<td>400.0 x 100.0</td>
<td>350.0 x 56.0</td>
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<tr>
<td></td>
<td>500,000</td>
<td>276.6 x 38.8</td>
<td>95,000</td>
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<tr>
<td>Tategami</td>
<td>350,000</td>
<td>225,000</td>
<td>80,000</td>
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<td>300,000</td>
<td>300,000</td>
<td>33,000</td>
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<td>82.8 x 16.3</td>
<td>40,000</td>
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<td></td>
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<td>185.9 x 53.2</td>
<td>136.0 x 12.0</td>
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<td></td>
<td></td>
<td>305.0 x 61.4</td>
<td>310,000</td>
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<td>301.5 x 43.7</td>
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<td>164.1 x 23.8</td>
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<td>400.0 x 100.0</td>
<td>375.0 x 56.0</td>
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<td>105,000</td>
<td>324.0 x 56.0</td>
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<td>33,000</td>
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<td>136.0 x 12.0</td>
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</table>

#### Towing tank
- Seakeeping & maneuvering basin

#### Number of employees

<table>
<thead>
<tr>
<th>Site</th>
<th>Research</th>
<th>Design</th>
<th>Manufacturing</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koyagi</td>
<td>562</td>
<td>137</td>
<td>287</td>
<td>12</td>
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</tr>
<tr>
<td>Tategami</td>
<td>2,222</td>
<td>516</td>
<td>797</td>
<td>169</td>
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<tr>
<td></td>
<td>33</td>
<td>22</td>
<td>21</td>
<td>5</td>
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</tr>
</tbody>
</table>

#### Total number of employees at headquarters
- 1,020
- 3,704
- 146
- 4,870

#### Employees for research and design
- 1,100 employees
1. Outline of the Shipbuilding & Ocean Development Business
   (2) Major Products

   - **Large Ship**
     - (Nagasaki Koyagi) 45%

   - **Medium-size ship**
     - (Nagasaki Tategami, Kobe) 25%

   - **Small Ship**
     - (Shimonoseki) 10%

   - **Defense force ship and other**
     - 20%

   - **Mega container vessel**
     - (larger than 8,000TEUs)

   - **Passenger vessel**

   - **Pure car and truck carrier**

   - **Submarine**
     - (kobe)

   - **Ferry**

   - **Escort ship**
     - (Nagasaki Tategami)

   - **Moss type LNG carrier**

   - **Membrane type LNG carrier**

   - **VLCC**

   - **Mega container vessel**
     - (larger than 8,000TEUs)
2. **Market Environment**

(1) **Projected Volume of Seaborne Goods Transported**

Projected overall volume of goods transported by 2020 is **1.7 to 1.8 times** that of 2006, representing an annual growth rate of **3.9 to 3.2%** across all ship types.

(Note) Five Major Bulk Trades: Iron ore, Coal, Grain, Bauxite and Alumina, Phosphate Rock
2. Market Environment
(2) Change of volume of completion and in the future supply-demand balance

Supply capacity in 2010 will be 85 million tons.
Supply capacity in 2015 will be 125 million tons.

Supply capacity in 2015 will be 2.3 to 2.8 times demand.

Forecast

Completion performance

[Million GT]

2015: 125 million GT

Mega-competition

Supply capacity forecast

Demand forecast (high case)

Demand forecast (base case)

South Korea

China

Europe

Japan

Small ships etc.
PCTC/RORO etc.
LNG/LPG
Container ship
Bulker
Tanker

Other

Mega-competition

Tanker

Bulker

Container ship

Small ships etc.
PCTC/RORO etc.
LNG/LPG

[Year]
3. Business Strategy for the Age of Mega-Competition

- **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

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

- **An environment favorable for the Company**

- **High growth**

- **Structural recession**

- **Stability**

- **Maturation**

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

- **Toyako Summit**

- **Tightening of environmental regulations**

- **Low-cost competition only**

- **Competition in technologies and costs**

- **Twice as tight**
3. Business Strategy for the Age of Mega-Competition

**Further Enhance Technical Capabilities**

1. Improved fuel efficiency (lead of over 10%)
2. Develop technologies conducive to environmental measures

**Bolster cost competitiveness: Reduce manufacturing costs by 10%**

1. Production process transformation (utilizing the MATES shipbuilding system)
   - Modernization of management and manufacturing
     1) Shifting of management to IT and towards digitization
     2) Expansion of automation, robotization
     3) Improved precision in manufacturing

2. Maintenance and enhancement of infrastructure, modernization of equipment
   - Over five years from 2006 to 2010: Approx. 50 billion yen in capital investment

3. Using external resources (global expansion)
3. Business Strategy for the Age of Mega-Competition

(3) Using external resources (global expansion)

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

Ship repair in Vietnam (Under FS)

Image
June 16 Business Briefing Outline

[Changing Market Environment]

(1) Latest demand & supply forecasts

[Status of Major Initiatives]

(1) Progress of efforts to enhance technical capabilities

(2) Dealing with machinery and materials as a efforts towards cost competitiveness

(3) Impact of rising steel prices and countermeasures

(4) Progress of efforts in passenger vessel business
4. Last Demand Forecast

(1) Comparison of Provisional Demand Forecasts among Shipbuilders’ Associations

[Million GT]

Completion performance Forecast

<Provisional Demand Forecast in Each Country>
40 to 70 Million GT

South Korea
China
Europe
Japan
Other
Europe
China
South Korea
Japan
MHI (3/12)
5. Efforts to Enhance Technical Capabilities

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

- Efforts aimed at improving fuel efficiency: Set the new goal of holding the “No.1 spot in fuel efficiency”
- Efforts in response to environmental regulations: “Advanced Development in Environmental Technologies” initiative in collaboration with other MHI headquarters

[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 technologies)
- Machinery and Steel Structures Headquarters (SCR technology)
- Sustainability Energy & Environment Strategic Planning Department

[Product planning team by ship type]
- (Home office)
- Sales
- Design
- Materials
- Manufacturing
- R&D centers
5. Efforts to Enhance Technical Capabilities

(2) Estimated advantages to be gained due to improvements of fuel efficiency

**Rising Cost of Fuel**

Cost of Fuel: Over $500/ton …and still rising

**Advantages from Improvements to Fuel Efficiency**

[8000 TUE Container Vessel, when operating at 25 knots]

<table>
<thead>
<tr>
<th>Fuel Consumption</th>
<th>Cost of Fuel (500 dollars/ton)</th>
</tr>
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<tbody>
<tr>
<td>57,000 tons/year</td>
<td>2.85 billion yen/year</td>
</tr>
<tr>
<td>51,300 tons/year</td>
<td>2.57 billion yen/year</td>
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</tbody>
</table>

Improvement to Fuel Efficiency: -10%

[Advantages for Ship Owners]

Fuel Costs: 280 million yen/year saving

⇒ Over ship lifetime: At 20 years
Savings of approx. 5.6 billion yen

Equivalent of about 1/3 the tonnage value

Ship Owners: Even if a ship costs 2 billion yen more, the will embrace a fuel efficient ship
5. Efforts to Enhance Technical Capabilities

(3) Maintain the No.1 Position in Fuel Efficiency
(Through a redesign of ships, achieve a double-digit fuel efficiency differential of over 10%)

<table>
<thead>
<tr>
<th>Ship Type</th>
<th>Specific Efforts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large ferry</td>
<td>Expand fuel efficiency competitiveness Achieve superior comfort</td>
</tr>
<tr>
<td>Pure car and truck carrier</td>
<td>Expand fuel efficiency competitiveness Achieve superiority in loading efficiency</td>
</tr>
<tr>
<td>Container ship</td>
<td>Expand fuel efficiency competitiveness Secure superiority in heavy container ships</td>
</tr>
<tr>
<td>LNG carrier</td>
<td>Continue to build MOSS LNG carriers that offer superior safety Bolster competitiveness by enhancing fuel efficiency 15% or more</td>
</tr>
</tbody>
</table>
6. Dealing with Machinery and Materials

Breakdown of Costs (Example of LNG Carrier)

- Machinery and Materials Cost: Approx. 65%
- Labor Costs: Approx. 20%
- Others Costs: Approx. 15%

- Modular Design Project
- Technical Collaboration with Suppliers
6. Dealing with Machinery and Materials

(1) Modular Design Project

- Standardization of Structure, Devices and Fittings
- Fixing of Procured Parts and Procurement Sources

- Forge close ties with suppliers
  Eliminate suppliers’ tendency for over-specification
6. Dealing with Machinery and Materials

<Modular Design Project Example (1)>
Parts standardization regardless of hull size

165-type (295m x 50.8m x 27.5m)
Cargo Arrangement Standardized

175-type (300m x 51.9m x 28.0m)

Rate of Blueprint Standardization: 90%
Traditionally: Differences in customer requests were large, making this area difficult to standardize.

**Analysis and patterning of results and future needs**

→ **Efforts towards cataloging wheel houses in a straightforward manner for customers**
6. Dealing with Machinery and Materials

(2) Technical Collaboration

- Changes to environmental regulations, laws and rules such as CO2 emissions
- Enlarged supply capacity for marine equipment from overseas manufacturers

A technical collaboration that allows successful use of the MHI R&D Division

Development of devices and fittings with a high added-value (mutual benefit)

- Collaboration with Nippon Steel Corporation: Development of 47 kgf/mm² High Tension Steel
- Collaboration with Hitachi Plant Technologies, Ltd.: Development of Ballast Water Purification System
- Collaboration with Furino Electric Co., Ltd.: Crew safety management through onboard wireless LAN
- Currently proceeding with technical collaborations with eight other companies
7. Impact of rising steel prices and countermeasures

(1) Impact of rising steel prices

Steel Unit Price Increases: Will prices stop come to a stop at the 30,000 yen/ton level?

Rising Steel Prices

Impact of rising steel prices

[Japan Total] [MHI]

Steel Consumption:
Approx. 4 million tons/year
Approx. 350,000 - 400,000 tons/year

Amount Affected:
Approx. 120 billion yen/year
Approx. 10.5 billion - 12 billion yen/year

→ Will this plunge some businesses into the red?
Huge impact on shipbuilding industry

FY 2008 P&L Forecast (MHI)

Taking into account the effect of rising steel prices: 5 billion Yen
7. Impact of rising steel prices and countermeasures

(2) Topics for Further Discussion on Rising Steel Prices

1) Introduction of an escalating close surcharge

2) Promotion of Economical Design (MD)

3) Productivity improvements to shorten lead time (Construction of nearby berths)

4) Expand orders for ship types with a lower proportion of steel

5) Expansion of ship repair business
7. Impact of rising steel prices and countermeasures

(2) Status of Berth Constructions Across Companies

Korean shipbuilding yards have three years of outstanding construction orders, with three years for MHI and four years for Japan.

Line Representation of Berth Construction Status for All Shipbuilding Companies

 Completion Base as of March 2008

<table>
<thead>
<tr>
<th>Calendar Year for Delivery</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tbody>
<tr>
<td>Mitsubishi Nagasaki</td>
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<tr>
<td>Mitsubishi Kobe</td>
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<td>Mitsubishi Shimonoseki</td>
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<td>Company A.</td>
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<td>Company G.</td>
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<td>Hyundai Heavy Industries</td>
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<td>Samsung Heavy Industries</td>
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<tr>
<td>Daewoo Shipbuilding and Marine Engineering</td>
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</table>
7. Impact of rising steel prices and countermeasures

(2) Proportion of Manufacturing Costs Accounted for by Steel
8. Efforts in Passenger Vessel Business

(1) Appeal of Passenger Vessels

1) The proportion of steel, whose price cannot be locked in at the quotation stage, accounts for less than 4~5% of total production costs.

2) There is a potential for an increased scope of operations and increased profits
   
   Dry-dock period is approximately 1.6 times (seven months) that of LNG carriers, and four times the price

3) A greater amount of materials are dealt with, greatly contributing to regional development.

4) There is an increased demand for seakeeping performance, vibration absorption technologies, environmental technologies, decorating techniques, and recently also fuel efficiency in passenger vessels, requiring comprehensive engineering capabilities.

This business will stabilize provided there is an ongoing demand
8. Efforts in Passenger Vessel Business

(2) Review and Analysis of Passenger Vessel Construction

Though the ships have been graded as top caliber, planned costs have not been achieved and operations have become unprofitable.

[Features of Passenger Vessels and Introspection on MHI Performance]

1) Vast amount of materials and complex structure
   - Inadequate design accuracy, materials management production management precision
   - Advanced map reading techniques are required

2) Sheet metal structure
   - Construction techniques inadequate to cope with the ease of distortion

3) High-level interiors beyond that of commercial vessels
   - Collection of interior finishing work brought together at the shipbuilder
8. Efforts in Passenger Vessel Business

(3) Measures being considered to deal with Passenger Vessel Construction

1) Design using MATES (3D-CAD)
   - Error-free, high-precision design
   - Materials and logistics management, production management through full computerization.
   - Move away from the use of construction blueprints with the introduction of printing devices, etc.

2) Develop construction methods and tools to deal with sheet metal structures

3) Promote a GC and consortium framework for interior finishing work

Realize passenger vessel construction free from the need for post-adjustment or re-doing