Kawasaki Shipbuilding Corporation has completed construction of the pressure build-up type 2,500m³ LNG carrier, NORTH PIONEER (HN: 1571), for the co-owners, the Japan Railway Construction, Transport and Technology Agency and Japan Liquefied Gas Transport Co., Ltd. The carrier is the second ship built by the company for coastal LNG transportation in Japan.

Kawasaki built the cargo tanks that are the core facility of the carrier, and installed them on the hull, which was subcontracted to Shin Kurushima Dockyard Co., Ltd.

Kawasaki developed the NORTH PIONEER as a coastal carrier suitable for small quantities of LNG. The carrier uses the pressure build-up type LNG cargo tanks designed with Kawasaki’s rich experience and technical expertise related to LNG carrier construction. The tank system has sufficient capacity to endure rising pressure due to heat ingress without releasing boil off gas. (Heat from the outside is accumulated in LNG, as a result, LNG temperature and vapor pressure rise gradually.)

The LNG cargo tanks consist of two metallic cylindrical containers, which are horizontally installed in the cargo compartments of the carrier. The heat insulation and support system separates the containers from the ship hull, permitting contraction of the containers due to low temperature.

Cargo compartments are designed with double hull construction for the ship bottom and sides. This ensures safety in the event of collision or stranding. The compartments are also shielded with tank covers from the open air as in a large LNG carrier.

The popular small marine diesel engine is used as the main engine because there is no need for BOG treatment as on a large LNG carrier.

**Principal particulars**

L (o.a.) x L (b.p.) x B x D x d: 89.2m x 83.0m x 15.3m x 7.2m x 4.3m

DWT/GT: 1,938t/3,056t

Cargo container capacity: 2,513 m³

Main engine: Akasaka A38S marine diesel: single-action, 4-cycle, trunk piston, non-reversible type with a turbo charger and stern clutch

Output: 2,206kW x 250rpm (MCR)

Builder: Akasaka Diesels Limited

Speed, service: 13.3kt

Complement: 15

Classification NK
Mitsubishi Heavy Industries, Ltd. (MHI) completed construction of the ARCTIC PRINCESS (HN: 2184), a Moss type LNG carrier with a tank capacity of 147,835m³, and delivered the vessel to Joint Gas Ltd. at the Nagasaki Shipyard & Machinery Works on Jan. 13, 2006.

High propulsive performance with less vibration is achieved by the refined hull form and optimum design of propeller based on CFD and model experiments. The comfort class notation is DNV COMP-V(1);C(2). The hull structure is designed based on advanced ship structural analysis and the stringent structural design notations of DNV CSA-2, PLUS-2 were the first application to a LNG carrier.

Resistance measures against cold of minus 18 degree C, for example the enclosed type bridge wing and heating underneath the working area of mooring deck, are adopted considering operations in high latitudes. The Schilling Rudder (high lift type rudder) and a bow thruster are fitted to improve maneuvering performance in harbor. Double side fuel oil tanks provide environmental protection and the oil pollution prevention notation is DNV OPP-F.

Principal particulars

- **L (o.a.) x L (b.p.) x B x D x d:** 288.0m x 274.0m x 49.0m x 26.8m x 11.5m
- **GT:** 121,597
- **Cargo tank capacity:** 147,835m³
- **Main engine:** Marine steam turbine x 1 unit
  - **Output:** 27,600kW x 81rpm
  - **Service speed:** 19.5kt
- **Classification:** DNV

MES completes world’s largest class DH VLCC, YUFUSAN

Mitsui Engineering & Shipbuilding Co., Ltd. has completed construction of the 311,389DWT double hull VLCC, YUFUSAN (HN: 1601), for Infinity Shipping Navigation S. A. of Panama at the Chiba Works. YUFUSAN is the second vessel designed with the new hull form called the Mitsui Malacca Doublemax.

Both the deadweight and the cargo tank capacity are maximized for efficient transport of crude oil of typical density. In view of ocean and global environmental preservation, the double hull has been applied to both the vessel's hull and the fuel oil tank of the vessel, for which the double hull will become mandatory in the future regulations of International Maritime Organization (IMO).

The vessel equips the MIPB-Wing (Mitsui Integrated Propeller Boss with Wing), which is a newly developed device to improve propeller propulsion efficiency. The service speed and fuel oil consumption efficiency have been improved together with both advanced bow and stern form.

The main engine adopts the electronic control lubrication system for engine cylinders to decrease ship operation costs, and the steam turbo generating system is also employed, which recovers thermal energy from the exhaust gas of the main engine.

Other installations include the fixed type flammable gas detecting system arranged in the ballast tanks and the pump room to confirm a safe working environment; GPS and differential GPS for ship positioning by satellite; electronic chart display and information system (ECDIS) and automatic ship identification system (AIS) that ensure safe navigation and ship operation; and color CCTV system in the engine room, which includes an alarm function in case of fire for monitoring from the wheelhouse and the engine control room.

Principal particulars

- **L (o.a.) x L (b.p.) x B x D x d:** 333.00m x 324.00m x 60.00m x 28.80m x 20.90m
- **DWT/GT:** 311,389t/160,216t
- **Cargo tank capacity (100%):** 354,689m³
- **Main engine:** Mitsui-MAN B&W 7S80MC-C diesel x 1 unit
  - **MCR:** 27,160KW x 76rpm
  - **Complement:** 30
  - **Classification:** NK
  - **Completion:** Nov. 1, 2005
Koyo Dockyard Co., Ltd. of the Imabari Group delivered the MOL PARAMOUNT, a container carrier with a container carrying capacity of 6,350TEUs to Leo Ocean S. A. on Oct. 26, 2005. The MOL PARAMOUNT is the third of seven carriers now operated by Mitsui OSK Line (MOL).

The vessel can carry 2,912TEUs in container holds and 3,438TEUs on the upper deck. The holds can stow nine tiers (including two tiers of high cube containers) in 14 rows, and the upper deck can stack seven tiers and 16 rows of containers. The container holds are designed with the box girderless type to increase container stowage space and simplify construction of the hull. Each container hold has three hatch cover panels. 18 sets of lashing bridges are provided for the containers on the upper deck. The carrier can load 1,084 units of 45ft containers and has 500 plugs for air cooling type reefer containers on the upper deck. Moreover, container holds can carry dangerous goods without restriction.

Ship maneuvering for berthing and unberthing at a port is facilitated by two electric motor drive bow thrusters. The automatic heeling system is installed to adjust the heel of the ship during cargo handling. Fuel oil tanks are arranged below the design draft to prevent damage by a tug boat or berth fenders. The fuel oil overflow pipe is laid on the second deck passage space to avoid the overflow of oil on the upper deck. The second deck passage is arranged between Nos. 1 and 8 container holds to allow access to the bosun store, steering gear room and container holds.

Various measures are taken for economical ship operation and antipollution. The turbo generator assists economical navigation. The propeller boss cap fin improves propulsion efficiency. The Alfa system reduces the consumption of cylinder lubricant in the main engine. An air seal type stern tube sealing device is provided for prevention of marine oil pollution.

Principal particulars
L (o. a.) x B x D x d: 293.19m x 40.00m x 24.30m x 14.00m
DWT/GT: 72,968t/71,892t
Main engine: MITSUI MAN B&W  11K98MC (MARK 6) x 1 unit
MCR: 62,920kw x 94.0rpm
Speed, service: 26.0kt
Complement: 25
Classification: NK
Flag: Panama

IHIMU completes 300,000 MTDW type VLCC, TAKASAKI

IHI Marine United Inc. has delivered the 300,000MTDW type VLCC, TAKASAKI (HN: 3215), to Violeta Maritima Lines S. A. on Dec. 26, 2005 at the Kure Shipyard. The Takasaki is the seventh of IHIMU’s latest design VLCC with the maximum hull form and maximum draft to pass the Straits of Malacca, Malaysia, the so-called Malaccamax type.

The Takasaki has superior economical performance for worldwide trade and Persian Gulf - Far East trade with its cargo load ability at shallow draft condition to pass the Straits of Malacca. The low resistant and fuel efficient proprietary hull form with IHIMU LV Fin is adopted, and the service speed is achieved by the superior hull form and seven cylinder super-long-stroke diesel engine.

The reliable hull structure has been designed by advanced structural analysis technology, and the structure and fittings of the double hull water ballast tanks have been considered for easy inspection, gas detection, inerting and ventilation. In order to meet strict environmental guide-

Principal particulars;
L(o.a.) x B x D x d : 333.0m x 60.0m x 29.0m x 20.5m
DWT/GT: 300,390t/159,939t
Main Engine: DU-Sulzer 7RTA84TB x 1 unit
Output: 27,160kW at 74.0rpm
Speed, service: 15.55kt
Classification: NK
Completion: Dec. 26, 2005
Mitsui Engineering & Shipbuilding Co., Ltd. (MES) achieved the world record output of 50 million BHP in aggregated production of MAN B&W engines in October 2005, which was marked by the Mitsui-MAN B&W 6S60MC (Mark 6) type engine built in MES Tamano Works for Onomichi Dockyard Co., Ltd. This engine was installed on the 71,000DWT crude oil carrier being built by Onomichi Dockyard Co., Ltd. for Dynacom Tankers Management Ltd.

The diesel engine production at MES has greatly increased in line with the increase of new building ships and the enlargement of the engine size required for driving larger ships. MES took only three years and three months to produce 10 million BHP after the company achieved the record of 40 million BHP in 2002. This achievement means that MES has produced diesel engines totaling 50 million BHP since the company built the first Mitsui-B&W diesel engine (the former name of Mitsui MAN-B&W diesel engine) in 1928.

MES completed diesel engines corresponding to 3.48 million BHP on the shop test basis in fiscal 2004, and MES is expected to produce diesel engines of 3.70 million BHP in fiscal 2005 from April 2005 to March 2006, which is the largest annual record ever achieved by the company.

**Record Marker Engine Specifications**

- Type: Mitsui-MAN B&W diesel engine 6S60MC Mark 6
- Length: 8.29m
- Height: 10.12m
- Width: 3.48m
- Cylinder bore: 600mm
- Piston stroke: 2,292mm

Mean effective pressure: 1.80MPa

**History of records at MES**

- First Mitsui-B&W diesel engine: June 1928
- 10 million BHP: October 1976
- 20 million BHP: September 1987
- 30 million BHP: December 1996
- 40 million BHP: July 2002
- 50 million BHP: October 2005

Moreover, adoption of a special rudder facilitates ship maneuvering in a narrow port. Thus the ship operation efficiency has increased totally. The accommodation quarters are isolated from the engine casing to decrease noise and vibration. The crew can enjoy quiet free time in the accommodation quarters.

**Principal particulars**

- L (o.a.) x B x D x d: 179.90m x 32.20m x 19.25m x 11.65m
- DWT/GT: 46,843t/28,245t
- Cargo tank capacity: 55,159.3m³ (grain)
- Complement: 25
- Main engine: Hitachi-MAN B&W 6S50MC-C diesel x 1 unit
  - MCR: 9,480kW x 127min⁻¹
  - NCR: 8,530kW x 123min⁻¹
- Speed, max. trial: 16.311kt
- Speed, service: 15.7kt
- Classification: NK
- Completion: Oct. 25, 2005

Naikai Zosen Corporation has delivered the 45,900DWT product tanker, HIGH LIGHT (HN: 693), built at its Setoda Works to Ansei Shipholding S. A.

The HIGH LIGHT has the maximum beam to pass through the Panama Canal. It is designed with double bottom and double side shells, complying with the MARPOL requirements, and can carry various products: petroleum products (light and heavy oils), crude oil, and palm oil.

Total capacity of the cargo tanks is 54,000m³, which consist of 14 cargo tanks (including two slop tanks). The configuration facilitates simultaneous loading of four types of liquid cargoes by allotting 25% of the total cargo capacity for each cargo. Four electric motor drive screw pumps with a capacity of 800m³/h are provided for unloading cargoes.

The HIGH LIGHT has a slender hull to achieve high speed. A high forecastle is provided to prevent the bow from swashing and increases seaworthiness as a high-speed medium range product tanker, attaining energy saving.

Moreover, adoption of a special rudder facilitates ship maneuvering in a narrow port. Thus the ship operation efficiency has increased totally. The accommodation quarters are isolated from the engine casing to decrease noise and vibration. The crew can enjoy quiet free time in the accommodation quarters.

**Record Marker Engine Specifications**

- Type: Mitsui-MAN B&W diesel engine 6S60MC Mark 6
- Length: 8.29m
- Height: 10.12m
- Width: 3.48m
- Cylinder bore: 600mm
- Piston stroke: 2,292mm

Mean effective pressure: 1.80MPa

**History of records at MES**

- First Mitsui-B&W diesel engine: June 1928
- 10 million BHP: October 1976
- 20 million BHP: September 1987
- 30 million BHP: December 1996
- 40 million BHP: July 2002
- 50 million BHP: October 2005
MHI licenses low-speed diesel engine technology to state-owned Vietnamese shipbuilder

Mitsubishi Heavy Industries, Ltd. (MHI) signed an agreement under which it will license its UE low-speed diesel engine technology to Vietnam Shipbuilding Industry Corporation (VINASHIN). With the move MHI aims to further promote penetration of its UE engines into the Vietnamese shipbuilding industry, which is expected to grow rapidly amid the current boom in international shipping.

Under the agreement, MHI will provide VINASHIN with the licensing rights to manufacture its large diesel engines. The contract applies specifically to the Mitsubishi UEC-LA, LS, LSII and LSE engines with cylinder bores ranging from 330 to 680 mm. The licensing agreement also encompasses marketing and servicing of these engines in Vietnam. The period of licensing is from 2005 to 2014.

VINASHIN is a state-owned corporation, established in 1996, engaging in shipbuilding and production of ship-related machinery. Including more than 50 subsidiaries, VINASHIN has roughly 15,000 employees and generates annual sales of US$160 million (2004).

Mitsubishi UE engines are one of the world's three major brands of large marine diesel engine, along with offerings from MAN-B&W and Wartsila Sulzer. The UE models cover a wide range of power outputs from 1,520 to 63,600 PS (pferdestarke: metric horsepower).

Since the introduction of a market economy under the “Doi Moi” policy adopted in 1986, the Vietnamese economy has marked nearly steady development (the sole exception being during the Asian currency crisis of 1997). Since 2000 it has sustained close to 7% growth every year and investments from overseas have increased robustly, as illustrated by 14.3% growth in 2004 over the previous year. With the major shipbuilding countries - Korea, Japan and China - now producing at peak levels, the Vietnamese shipbuilding industry shows signs of rapid growth. By strengthening its relationship with VINASHIN, MHI aims to increase the share of its UE engines in the global market.

Sanoyas completes Panamax bulk carrier, KAVO ALKYON

Sanoyas Hishino Meisho Corp. has delivered the 75,409DWT Panamax bulk carrier, KAVO ALKYON (HN: 1231), to Falcon Ventures S. A. at the Mizushima Works and Shipyard of Sanoyas.

This carrier is the 33rd of the 75,500DWT class, which has the maximized deadweight as a Panamax bulker developed by Sanoyas. Seven cargo holds are provided in the center of the hull. The cargo hold has top side tanks and hopper bottom. The upper deck is the flat type, and the engine room and the living quarters are located aft. The hatch covers are the side rolling type, and opening and closing are achieved by chains and hydraulic drives.

The main engine is a low-speed, long-stroke, and 2-cycle diesel engine, and a large-diameter propeller is used. This combination achieves low fuel consumption. Principal particulars

L (o.a.) x L (b.p.) x B x D x d: 225.00m x 217.00m x 32.26m x 19.30m x 13.997m
DWT/GT 75,409mt/38,845t
Cargo hold capacity: 89,250m³ (grain)
Main engine: MAN B&W 7S50MC-C diesel x 1 unit
MCR: 12,200ps
Speed, service: abt. 14.5kt
Classification: ABS
Complement: 25
Completion: Nov. 22, 2005
**OTOWASAN**

**Owner:** Volts Shipping Navigation S.A.  
**Builder:** Kawasaki Shipbuilding Corporation  
**Hull No.:** 1570  
**Ship type:** VLCC  
**L (o.a.) x L (b.p.) x B x D x d:** 333.00m x 224.99m x 218.03m x 42.00m x 13.70m  
**DWT/GT:** 302,477t/160,292t  
**Main engine:** Mitsubishi-MAN B&W 6S60MC diesel x 1 unit  
**MCR:** 27,160kW x 76rpm  
**Speed, service:** 15.55kt  
**Classification:** NK  
**Completion:** Dec. 6, 2005

---

**GLOBAL WISDOM**

**Owner:** Global Eagle S.A.  
**Builder:** The Hakodate Dock Co., Ltd.  
**Hull No.:** 804  
**Ship type:** Bulk carrier  
**L (o.a.) x B x D x d:** 167.00m x 29.40m x 13.70m x 9.56m  
**DWT/GT:** 31,896t/19,789t  
**Main engine:** Mitsubishi-6UEC52LA diesel x 1 unit  
**Speed, service:** 14.4kt  
**Classification:** NK  
**Completion:** Jan. 11, 2006

---

**CAPE SOPHIA**

**Owner:** ISC1431 Shipping S.A.  
**Builder:** Imabari Shipbuilding Co., Ltd.  
**Hull No.:** 1431  
**Ship type:** Bulk Carrier  
**L (o.a.) x L (b.p) x B x D x d:** 249.94m x 225.00m x 43.00m x 29.00m x 12.89m  
**DWT/GT:** 99,047/55,285t  
**Main engine:** KAWASAKI-MAN B&W 6S60MC (Mark 6) diesel x 1 unit  
**MCR:** 12,240kW x 105rpm  
**Speed, service:** 15.5kt  
**Classification:** NK  
**Completion:** Nov. 1, 2005

---

**OCEANIC BREEZE**

**Owner:** South Stability Shipping Inc.  
**Builder:** Sumitomo Heavy Industries Marine & Engineering Co., Ltd.  
**Hull No.:** 1314  
**Ship type:** Tanker  
**L (o.a.) x L (b.p.) x B x D x d:** 239.00m x 229.00m x 40.00m x 21.30m x 12.19m  
**DWT/GT:** 105,400mt/56,500t  
**Main engine:** Diesel United-Sulzer 6RTA58T diesel x 1 unit  
**MCR:** 12,000kW x 103rpm  
**Speed, trial max.:** 15.2kt  
**Classification:** LRS  
**Completion:** Oct. 18, 2005

---

**SANKO BREEZE**

**Owner:** Lepta Shipping Co., Ltd.  
**Builder:** Universal Shipbuilding Corporation  
**Hull No.:** 026  
**Ship type:** Bulk carrier  
**L (o.a.) x B x D x d:** 225.00m x 32.20m x 19.15m x 12.40m  
**DWT/GT:** 75,250/39,643t  
**Main engine:** MAN B&W 6S60MC (Mk 6) diesel x 1 unit  
**Speed, service:** 14.5kt  
**Classification:** NK  
**Completion:** Oct. 26, 2005