

World's first new-build LPG FPSO vessel to be sited off Angola



LPG product transshipping (images of FPSO, right, and LPG carrier, left)

Mitsui & Co., Ltd. and Ishikawajima-Harima Heavy Industries Co., Ltd. (IHI) have signed the formal contract for the construction of a LPG FPSO (Floating Production, Storage and Offloading) vessel for Single Buoy Mooring Inc. of Monaco.

The FPSO vessel will be used for the Sanha Condensate Project at the Cabinda Block-0 located off Angola. The project is operated by a major oil group consisting of Sonangol (national oil company of Angola), ChevronTexaco, TotalFinaElf and Agip.

The LPG FPSO vessel will be completed at IHI Kure Shipyard in mid-2004 for the first shipping of product scheduled in the beginning of 2005. A joint venture company formed by Single Buoy Mooring Inc. and Sonangol will operate the vessel.

This will be the world's first newbuilding of a FPSO vessel for liquefied gas and has a daily production capacity of 6,000m³ and storage capacity of 135,000m³. These capacities are also ranked among the world's largest.

The vessel will continuously be operated for 20 years without dry docking. It will include LPG storage tanks and LPG production plants such as gas separators, gas refrigerators, and boil-off gas reliquefaction units on the upper deck.

This eliminates various costs required for laying pipes on the seabed, civil construction on land, and makes the construction period shorter and secures the clean environment.

Previously, associated gas produced at the offshore oil production platforms has been flared in the air, or sent to the LPG production plants on land. The use of the LPG FPSO system will make petroleum gas more available at a low cost as a fuel in the market.

The IHI SPB tank system (Self-supporting, Prismatic-shape, IMO Type-B) will be used for the storage tanks of the new LPG FPSO vessel, which is durable against the low temperature of LPG, minus 50°C. Other features are:

(Continued on page 2)



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JBIC Eyes Revitalization of Ship Export Finance: OECD Sector Understanding on Export Credits for Ships Revised

The Export-Import Bank of Japan (JEXIM), predecessor of the Japan Bank for International Cooperation (JBIC), supported in its capacity as an export credit agency the development of ship export trade and shipbuilding industry, which played a vital role in the postwar economic development of Japan. At the peak of its activities during the 1970s, JEXIM yearly provided almost 300 loans, totaling nearly ¥300 billion, for the purpose. However, as the OECD sector understanding on export credits for ships agreed upon in 1981 set the minimum applicable interest rate at 8% as far as official export credits for ships were concerned, irrespective of the currency used, ship export finance by JEXIM after this understanding became less competitive in comparison with the market interest level in Japan, resulting in the loss of attrac-

tiveness for Japan's official ship export finance.

However, the Working Party on Shipbuilding of the OECD Council and the parties to the export credit guideline recently revised the understanding regarding the ship export credit sector, and the revised understanding formally took effect on April 15 this year. The conditions of the newly revised understanding, as stated below, better reflect the realities of the market both in interest rate and in repayment period.

JBIC extended its first buyer's credit for a ship transaction last November, covering two large cruise ships built by Mitsubishi Heavy Industries, Ltd. This finance was an advance application of the new conditions ahead of the formal effectuation of the new guideline, following a notification to the OECD Secretariat. The



JBIC Tokyo Head Office

Japanese shipbuilding industry, having gone through a series of restructuring measures including mergers and assets cutbacks, still holds an important position in the world market based on its highly sophisticated technology developed in the so-called "matured industry." The industry is expected to continue to play a major role in technological innovation and sophistication in the world shipbuilding market. Following the recent formal effectuation of the OECD sector understanding on export credits for ships, JBIC wishes to take active initiatives to revitalize ship export finance in view of the expected increase in ship export deals.

Information available from JBIC URL
<http://www.jbic.go.jp/english/index.php>
 Contact:
 FAX: +81-3-5218-3955 (Tokyo Office)

	New conditions	Old conditions
Minimum interest rate	CIRR (Commercial interest reference rate: fixed rate determined monthly subject to the OECD Guideline; currently 5.3% for the US dollar from August 15 to September 14, 2002)	8%
Repayment period	Not longer than 12 years after delivery	Not longer than 8.5 years after delivery
Down payment	At least 20% of the contract price	At least 20% of the contract price

(Continued from page 1)

1. The IHI SPB tank system has no problems caused by wave-excited sloshing, permitting LNG/LPG handling at any liquid storage level.
2. The upper deck is flat, allowing free arrangement of the necessary installations on the upper deck, and the wind resistance is small.
3. Tough tank construction with superior fatigue strength is achieved by use of plates and webs.
4. Maintenance and inspection are easy since sufficient space at normal temperature is provided between the

vessel structure and LPG storage tanks.

Mitsui and IHI delivered the world's first new purpose-built LPG FSO vessel, *Escravos LPG FSO*, for the Escravos Gas Project (Phase-I) operated by ChevronTexaco in 1997. It has been operated without any down-time for more than 5 years. The *Escravos LPG FSO* was also built using the IHI-SPB liquid gas containment system. This proven technology will again be applied to the new LPG FPSO vessel for the Sanha LPG FPSO.

These achievements will encourage Mitsui & Co. and IHI to expand their business activities for offshore oil & gas development projects.

KHI new design enhances propulsion of medium-speed ships

Kawasaki has drawn upon its design technology and shipbuilding expertise to develop the optimum bow shape for medium-speed marine vessels such as LPG carriers. The new design significantly reduces the bow wave resistance drag and enhances the propulsive performance.

Conventional LPG carriers have tanks extending all the way to the forepeak of the hull to increase carrying capacity, while observing port regulations restricting the length of carriers.

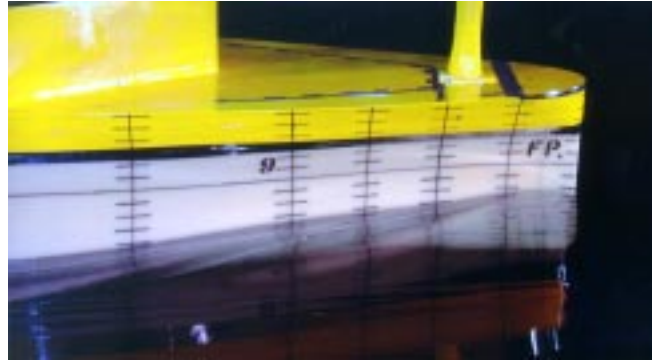
Therefore, the bows are wider than oil tankers and bulk carriers. However, this increased width, in combination with greater speed, creates high waves at the bow, which act against the ship's forward movement.

LPG carriers are required to have box-shape tanks arranged to the fore end of the hull because of necessity for efficient arrangement of LPG tanks as well as develop a faster ship speed than oil tankers and bulk carriers. LPG carriers are limited to the length due to facility limitation at the loading/unloading ports.

Under the restrictions, conventional LPG carriers have been designed to be relatively full in the bow part. This bow shape generates high waves around the bow during navigation, causing large resistance.

Kawasaki has solved these problems by designing a bow that dramatically reduces the bow wave-generated resistance inherent to LPG carriers and improves the propulsive performance. The new design, called the SEA-ARROW (Sharp Entrance Angle bow as an Arrow), retains the effect of the bulbous bow (bulb) while eliminating the protrusion from the bow.

The SEA-ARROW effectively halves the bow wave resistance drag, allowing the vessel to maintain the same speed as the conventional LPG carrier at 6 to 10% less horsepower, or a 0.3 to 0.5 knot speed increase when operating at the same horse-



The new bow (above) has no bulb as seen in the previous bow (below)



power. This development has led to a drastic reduction in fuel consumption and a shortening of shipping schedules.

Kawasaki has been contracted to build two SEA-ARROW vessels, with one vessel already under construction, and also plans to integrate the design into larger LPG carriers.

IHI completes 6,400TEU overPanamax container carrier for MOL

Ishikawajima-Harima Heavy Industries Co., Ltd. (IHI) has completed construction of the overPanamax container carrier, *MOL Priority*, at the Kure Shipyard for Mitsui O.S.K.

Lines, Ltd. of Japan. The carrier has a container capacity of 6,400TEUs.

The *MOL Priority* is the third overPanamax container carrier built for MOL, which will operate the ship. IHI

has constructed 13 overPanamax container carriers including the *MOL Priority* since 1994, and will continue to build 11 large container carriers at the Kure and Yokohama shipyards of the company.

Principal particulars of the *MOL Priority*

L (o.a.) x B x D x d: 284.56m x 40.00m x 24.20m x 14.00m

DWT/GT: 74,453t/74,071t

Main engine: DU-Sulzer 11RTA96C diesel x 1 unit

Output: 60,390kW

Speed, max. trial: 27.8kt

Container carrying capacity: 6,400TEUs

Complement: 30

Classification: NK

Completion: June 17, 2002



MHI-build LNG carrier, *Abadi*, obtains LR's Environmental Protection notation



Lloyd's Register's Environmental Protection (LR's EP) notation has been applied to four LNG carriers being constructed by Mitsubishi Heavy Industries, Ltd. (MHI), the first ship for a joint venture between the Brunei Government, Mitsubishi Corporation and Shell at the Koyagi Shipyard, Nagasaki. This is the first time that the LR's EP notation has been applied to ships built in Japan.

The LR's EP standards are for the environment-conscious owner who wants to manage and demonstrate

Abadi, an environment-conscious ship environmental performance more effectively. MHI has worked closely with the Owner and Lloyd's Register to comply with the stringent design requirements for the notation that promotes the environmental performance standards beyond those required by ISM and MARPOL stipulations, both in terms of design and ship operation at sea.

All vessels are required to undergo a comprehensive process of plan appraisal, survey and audit for the LR's EP notation which covers NO_x and

SO_x exhaust emissions, refrigeration gases and fire-fighting systems, oil pollution prevention, garbage management, sewage treatment, hull antifouling systems and ballast water management.

The first of the four LNG carriers is the *Abadi* (HN: 2163) completed in June 2002. The *Abadi* is a 135,000m³ class with the MOSS spherical five-tank system, which has great safety, reliability and propulsive performance. Special features based on the latest technologies are added to the conventional standard for more economical transportation.

The remaining three ships are scheduled for delivery from September 2002 through to March 2004 and will be delivered to Shell.

Principal particulars of the <i>Abadi</i>	
Length (o.a.):	290.00m
Length (b.p.):	276.00m
Breadth:	46.00m
Depth:	25.50m
Design draft:	11.00 m
Corresponding DWT:	68,673t
Gross tonnage:	111,461t
Cargo capacity:	136,912m ³
Main engine power:	21,320kW
Service speed:	19.0kt

Kawasaki Heavy Industries, Ltd. (KHI) has completed construction of the 185,820DWT bulk carrier, *Cape Future* (HN: 1512), for Cape Future Shipping S. A. at the Sakaide Works.

The *Cape Future* is the first of two vessels jointly designed by Mitsui Engineering & Shipbuilding Co., Ltd. and is the first large bulk carrier built by the Sakaide Works after a 6-year gap. The carrier is now servicing coal and iron ore transport mainly from Australia to Japan.

Main features are:

- Simple and rationalized material handling devices
- Measures for reducing NO_x and SO_x emission from the main engine
- Foam fire extinguisher system provided instead of the CO₂ type
- First ship to comply with the new regulations for safety of bulk carriers

KHI completes bulk carrier, *Cape Future*

- Designed with minimum propulsive resistance, and propelled by a main diesel engine of the latest type featuring low fuel consumption, and equipped with a high-efficiency propeller

Principal particulars

L (o.a.) x L (b.p.) x B x D x d: 290.00m

x 280.00m x 47.00m x 24.40m x 17.95m
 DWT/GT: 185,820t/92,993t
 Cargo hold capacity: 205,722m³
 Main engine: Kawasaki-MAN B&W 6S70MC (Mk VI) diesel x 1 unit
 Output (MCR): 16,860kW x 91rpm
 Complement: 28
 Classification: NK
 Completion: July 5, 2002



New company established for TSL service

Techno-Seaways Inc. was established as a new company between private companies of the shipping and shipbuilding, physical distribution, trading, and banking businesses on June 18, 2002.

The new company is a ship-holding and leasing company for the Techno Superliner (TSL: super high-speed ships) based on the R&D achievements conducted for TSL during the first half of the 1990s.

The first TSL ship will be put in service between Tokyo and the Ogasawara Islands in the spring of 2005. Upon commencement of the service, the present 26-hour trip (one way) will be decreased by 10 hours. This will greatly contribute to accessibility between Tokyo and Ogasawara as well as revitalization of the islands.

The new company also has targets to develop high-speed transport networks and technological upgrading of marine physical distribution based on the TSL expertise and will open up new businesses, while starting the business of owning and leasing of the TSL for the Ogasawara route,

Techno-Seaways Inc. will also carry out feasibility studies on the other main domestic coasting routes and Asian routes. It is expected to successively develop high-speed marine transport routes and new business areas for the high technology ships including TSL.

Company outline

Registered name: Techno-Seaways Inc.

Capital, paid: 3,280 million yen

Address: 12-10, Hamamatsu-cho 1-chome, Minato-ku Tokyo

President: Yasukatsu Yamauchi



Businesses:

- Development of marine transport systems (market research, environmental assessment for business setup)
- Total support system (comprehensive technical support required for TSL operation)
- Owning and leasing of new type ships

Principal particulars

Length, o. a.:
Breadth:
Gross Tonnage:
Speed:
Hull material:
Propulsion systems
Passengers
Time required for one way
Navigations/year

Outline of Ogasawara TSL

Ogasawara TSL

(Planned ship)
Approx. 140m
Approx. 30m
Approx. 14,500t
70km/hr
Aluminum alloy
Gas turbines (waterjets)
725
Abt. 16hr
92 round trips

Ogasawara Maru

(Existing ship)
131m
17m
6,679t
40km/hr
Steel
Diesel engine (propeller)
1,031
Abt. 26hr
59 round trips

To our readers

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MES achieves world record output of 40 million ps in total MAN B&W diesel engine production

The Tamano Works of Mitsui Engineering & Shipbuilding Co., Ltd. (MES) has achieved the world record output of 40 million ps in aggregated diesel engine production of MAN B&W engines, which was boosted by the 6S70MC (Mk VI) type delivered to NKK Corp. This engine was installed on the 176,000DWT Capesize bulk carrier being built at the NKK Tsu Works.

MES first entered into a technical license agreement with Burmeister & Wain of Denmark in 1926 and built the first engine in 1928. Since then the company has attained the records of 10 million ps in 1976, 20 million ps in 1987, 30 million ps in 1996, and 40 million ps in July 2002. In recent years, marine diesel engines have be-

come larger ever due to demand for larger output engines for large container carriers and others.

This contributed to the achievement of engine production of 10 million ps in six years, which is four years shorter than previous achievements. On the shop trial basis, MES aims at engine production of 2.6 million ps in fiscal 2002, which will exceed 200,000 ps over the output in 2001.



Pythagoras

Owner: Rising Sun Maritime S. A.
Builder: Hitachi Zosen Corp.
Hull No.: 4993
Ship type: Bulk carrier
L (o.a.) x B x D x d: 217.00m x 32.20m x 19.15m x 13.82m
DWT/GT: 39,709t/75,162t
Main engine: Hitachi Zosen-MAN B&W 6S60MC (Mk VI) diesel x 1 unit
Speed, service: 14.5kt
Classification: LRS
Completion: July 11, 2002



European Highlander

Owner: P&O European Ferries (Irish Sea) Ltd.
Builder: Mitsubishi Heavy Industries, Ltd.
Hull No.: 1069
Ship type: RoRo Passenger Ferry
L (o.a.) x B x D x d: 162.7m x 23.40m x 7.61m x 5.50m
DWT/GT: 4,428t/21,188GT
Main engine: Wartsila 12V38 x 4 units
Speed, service: 22.5kt
Classification: LRS
Completion: May 31, 2002



Aventurero Dos

Owner: Aventurero Dos Navigation Ltd.
Builder: Mitsui Engineering & Shipbuilding Co., Ltd.
Hull No.: 1547
Ship type: Bulk carrier
L (o.a.) x L (b.p.) x B x D x d: 189.80m x 181.00m x 32.26m x



16.90m x 11.90m
DWT/GT: 50,206t/27,993t
Main engine: Mitsui-MAN B&W 6S50MCC diesel x 1 unit
Speed, service: 14.5kt
Classification: NK
Completion: July 2, 2002

Shinsei Maru

Owner: Nippon Oil Tanker Corp./ Showa Yusosen Co., Ltd.
Builder: NKK Corp.
Hull No.: 221
Ship type: Tanker
L (o.a.) x L (b.p.) x B x D x d: 243.04m x 233.00m x 42.00m x 20.70m x 14.73m
DWT/GT: 56,212t/106,361t



Main engine: DU-Sulzer 6RTA58T diesel x 1 unit
Speed, service: 14.5kt
Classification: NK/JG
Completion: May 17, 2002

Queen Zenobia

Owner: Constellation Gas S. A.
Builder: Namura Shipbuilding Co., Ltd.
Hull No.: 228
Ship type: LPG carrier
L (o.a.) x L (b.p.) x B x D x d: 156.03m x 148.00m x 25.00m x



16.50m x 9.77m
DWT/GT: 19,621t/16,770t
Main engine: B&W 6S50MC (Mk 6) diesel x 1 unit
Speed, trial max.: 19.43kt
Classification: BV
Completion: June 28, 2002

Vega Pioneer



Owner: Vegabulk Shipholding S. A.
Builder: Sanoyas Hishino Meisho Corp.
Hull No.: 1199
Ship type: Bulk carrier
L (o.a.) x L (b.p.) x B x D x d: 189.90m x 182.00m x 32.26m x 17.10m x 12.041m
DWT/GT: 52,466mt/29,369t
Cargo hold capacity: 66,597m³ (grain)
Main engine: MAN B&W 6S50MC-C diesel x 1 unit
Speed, service: about 14.5kt
Classification: NK
Completion: Aug. 2, 2002

Akebono



Owner: Solar Shipping and Trading S.A.
Builder: Shin Kurushima Dockyard Co., Ltd.
Hull No.: 5138
Ship type: Product Tanker
L (o.a.) x B x D x d: 179.88m x 32.20m x 18.70m x 12.022m
DWT/GT: 46,001kt/28,099t
Main engine: 6S50MC-C diesel x 1 unit
Speed, service: 14.6kt
Classification: NK
Completion: Aug. 22, 2002