

Diamond concept sparkles for Graig

One of the first shipowners to realise the potential of Chinese yards, Graig has supervised more than 25 newbuildings on behalf of itself and major shipowning groups, and is currently engaged in the supervision of a further 20 projects in China

Established around 85 years ago in Cardiff, Graig Shipping has grown from its Welsh roots to become a global marine services group with interests in shipowning, ship management, ship design, newbuilding supervision, shiprepair, IT support and ship finance. Some 350 staff are now employed at bases in Cardiff, Hamburg, London and Shanghai.

Graig joined forces in 2001 with Carl Bro of Copenhagen to create Graig Carl Bro Ship Design, based in Shanghai. The two partners had previously collaborated in China for five years, building Confidence-class multipurpose tonnage at Zhonghua Shipyard.

'Future-proof' specification

An innovative result of the joint venture, the double-hulled Diamond 53 class Ultra-Handymax bulk carrier (see page 24), has attracted numerous orders for production in Chinese and Vietnamese yards. The 'future-proof' specification focuses on safety and environmental protection as well as cost-effectiveness.

Valuable savings for both owners and charterers are promised by lower capital costs, quicker hold discharge and cleaning times, and significantly reduced inspection and maintenance costs. In addition, the double hull creates a strong and robust structure using smaller quantities of high tensile steel, capable of withstanding the arduous demands of the bulk shipping trades.

Among the operational advantages is that there is no need to use one of the holds for ballast in heavy weather, facilitating ballast water exchange and avoiding the controversy and cost of fitting/retrofitting the water ingress detection and alarm systems required for single-hull bulkers.

"Adapting European concept designs to Chinese detailed designs, and doing that work in China, is the best way to get a good ship at a good price," suggests Wu Ye, senior naval architect at Graig Carl Bro. "In the case of the Diamond 53, we took a team to Denmark so that they could fully understand the concepts, and then did all the detailed work in China."



The double hulled Diamond bulk portfolio will be extended by a China-based design, finance and build package for Panamax and Capesize tonnage.

"Our strategy is based on building partnerships with key investors, other owners, shipyards and end-users to create value throughout the shipping chain," explains Graig chief executive officer Hugh Williams.

In March this year, Graig had 27 Diamond 53 bulkers on order or building at Chinese and Vietnamese yards. Five firm orders and 10 options were placed by Graig in February with the Vietnam Shipbuilding Industry Corporation (Vinashin). A strategic alliance aims to expand the range and strengthen the quality of the country's production, injecting Graig's experience with Chinese yards.

"We see significant potential in Vietnam and will be working with our Vinashin partners to meet the growing demand for modern bulk carriers," says Hugh Williams. "We can help the yards with design, procurement, finance and the all-important quality control that will give confidence to our partners that Vietnam can provide them with high quality tonnage."

Hugh Williams:
"Our strategy is based on building partnerships with key investors, other owners, shipyards and end-users to create value throughout the shipping chain"



The concept of partnering has been a hallmark of Graig's growth in China

Series-production of a full range of modern bulk carriers, from Handysize to Capesize, is anticipated in Vietnamese yards, with Vinashin committed to investing heavily in capacity, and Graig contributing to ensuring quality with good prices and attractive delivery dates.

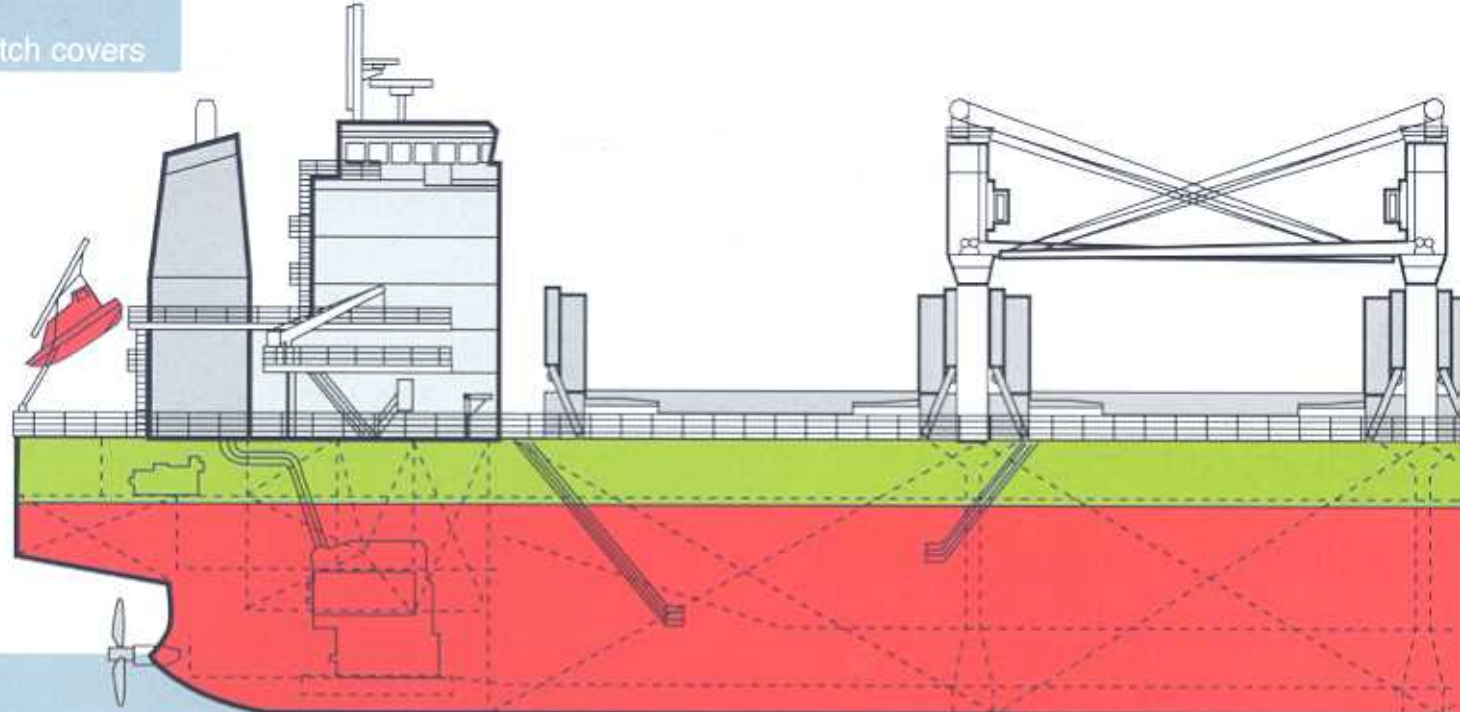
Graig Investments, a group subsidiary, is responsible for arranging long-term partnerships with key shippers and end-users of bulk carriers to secure stable employment for the newbuilding projects.

"The key to successful production of good ships at attractive prices is to work in partnership with yards that want to upgrade quality and productivity," asserts Hugh Williams. "The concept of partnering has been a hallmark of our growth in China and with the strategic alliance with Vinashin we look forward to significantly growing our business together. We can now provide owners, other end-users and ourselves with one-stop access to quality vessels, while helping our yard partners to develop."

Expansion into Germany

In April this year, Graig expanded into Germany, establishing a ship management company in Hamburg and selling and chartering back seven ships. Graig Shipmanagement (Germany) will initially manage the seven Confidence-class multipurpose vessels, part of a 19-ship series built by Graig in China between 1997 and 2002. The 8,874 dwt/650 TEU ships, equipped with combinable 300 to 400-tonne capacity heavy-lift cranes, are deployed in the Clipper Elite Carriers pool.

Access to a powerful and flexible source of equity finance in Germany will be used to back long term projects for building partnerships with end-users in shipping, maintaining Graig's impressive thrust. ■



Double-hulled Diamond

Responding to cross-industry calls for safer and stronger bulk carriers, the double-hulled Diamond 53 class was jointly developed by Danish naval architects Carl Bro and the Wales-based Graig shipping group, which have a joint venture design company in Shanghai, Graig Carl Bro.

By March this year some 27 of the class were on order or building at yards in China and Vietnam for prominent European owners attracted by significant operational cost savings and enhanced safety and environmental protection. Vessels specifying MacGREGOR hatch cover equipment outfits include four ships at New Century Shipyard – two for Thenamaris and two for Densan.

The geared, wide-hatched 53,000 dwt Ultra-Handymax design was evolved after extensive discussions with charterers on operational requirements and consultation with classification society DNV on structural and regulatory issues. The key considerations were:

- economical operation and maintenance
- loading flexibility and robustness
- safety and hull integrity
- environmental friendliness
- future IMO/IACS regulations for such tonnage.

Added safety

Numerous structural and operational merits are cited for the resulting wide-hatch design which features a complete double hull in the cargo holds, forming a second barrier against accidental water ingress and substantially strengthening the hull. Safer close-up surveying of the full hull structure is also fostered, even when the ship is in service.

Safety of the ship and crew is further enhanced by green water protection measures: the forecastle and breakwater design, and the protected under-deck passage to the fore deck area.

Safety features of the 53,000 dwt Diamond 53 include a double hull, good surveying access, a forecastle and a breakwater, and protected foredeck walkways

In a traditional Handymax bulk carrier with a single-skin side shell in the cargo holds, the side frames are exposed in the holds and cargo tends to become stuck between the frames, prolonging discharge and hold cleaning operations. Flush cargo holds in the Diamond 53 design, however, foster easier and faster discharge and cleaning.

A double hull providing a secondary barrier also contrasts with the single-skin shell, in which a crack might lead to flooding of a cargo hold and catastrophic consequences for the ship's safety. Water ballast capacity in double bottom and side tanks offers sufficient volume to avoid ballasting hold No 3 in heavy weather conditions (as required in traditional bulkers), although the hold and its covers are designed for ballast if required. Easier and safer water ballast exchange is also facilitated.

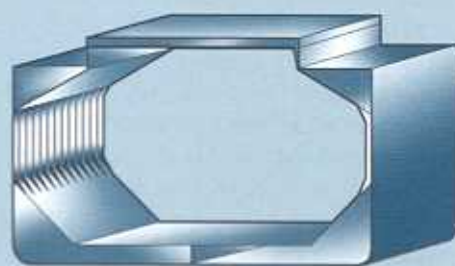
Ballast, stripping and bilge piping and valves arranged in a double bottom pipe duct minimise maintenance and provide permanent access for inspection and maintenance of piping and valves. In a traditional bulker, these systems are submerged in double bottom ballast tanks and hence subject to accelerated corrosion; and inspection and maintenance are impossible when the ballast tanks are loaded.

Fire main, hydraulic and compressed air piping and valves, together with electric cables, are protected in a wing tank pipe duct in the Diamond 53 design, rather than being located on the upper deck of a traditional bulker. The components, piping and cabling are thus protected from damage by cargo and grabs, maintenance is minimised and a clean

upper deck eases maintenance of the steel structure.

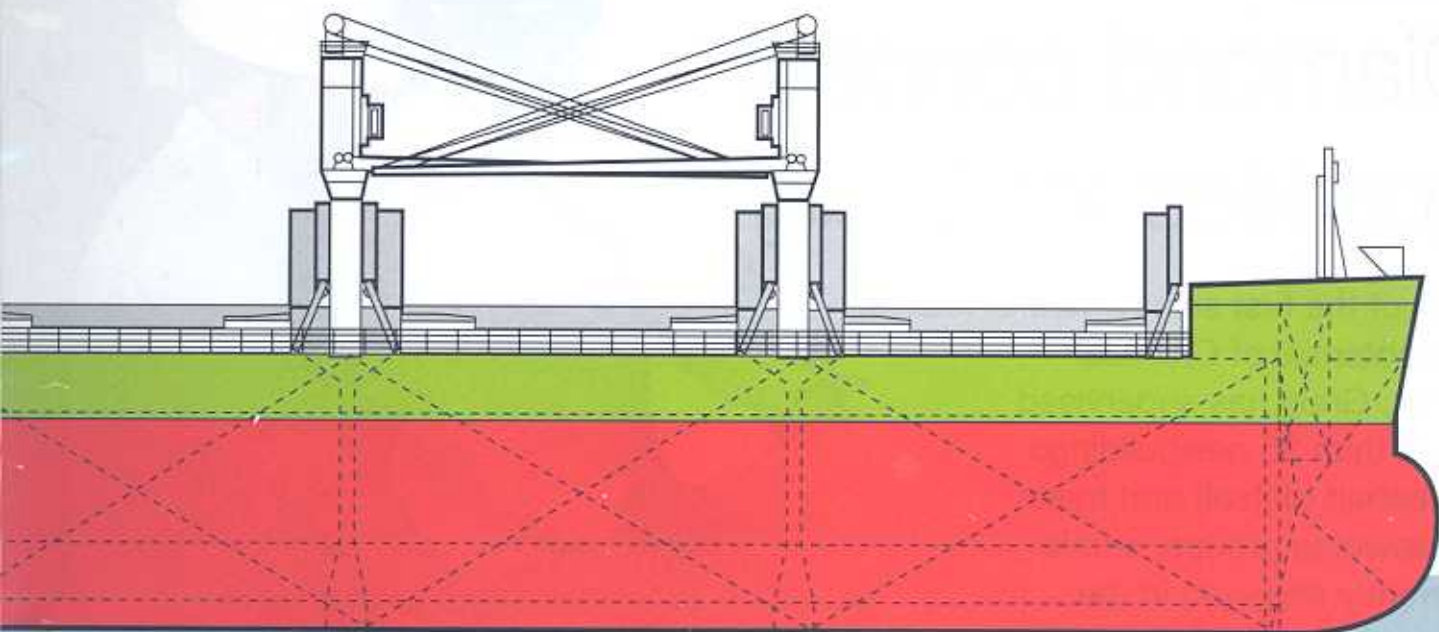
Advantages in cargo hold loading flexibility are also cited for the double-hulled ship, alternate loading (holds 1, 3, 5 loaded/holds 2, 4 empty) on the scantling draught being possible with even distribution of cargo. This reduces loading and discharge times, and calls for no special cleaning of the hold to allow water ballast intake in hold 3 (since no heavy weather ballast is required in that hold).

In contrast, strict and inflexible load limitations



Standard handymax bulker (above) with single side skin shell in cargo holds, and Diamond 53 (below), with complete double hull in cargo holds





53 bulkers start flowing

are commonly specified for a standard Handymax bulker; alternate hold loading on the scantling draught is only possible with uneven distribution of cargo. Typically, some 2,500 tonnes of cargo may have to be shifted from holds 1 and 5 to hold 3. Longer loading and discharge times result, along with an extended time for heavy ballast departure: hold 3 will be the last to be discharged and may even need cleaning before the heavy weather ballast intake.

The maximum allowable hull girder bending of the Diamond 53 design is 50 to 70 per cent higher than the class minimum, maximising loading flexibility and minimising the number of shifts in loading and discharge sequences to avoid exceeding hull girder bending limitations. The allowable uniform tanktop loading is 25 tonnes/m² in all holds.

With a maximum hull girder bending moment typically specified to class minimum standards, a standard bulker has reduced loading flexibility and requires a larger number of shifts in loading and discharge sequences to avoid exceeding the bending moment limitations. The allowable uniform tanktop loading is also reduced in holds 2 and 4.

Heavy steel coils are a common cargo for Handymax bulkers. Strict loading limitations for traditional designs mean that the maximum deadweight of coils cannot be loaded due to insufficient tanktop strength, which also prevents two tiers of coils (25 tonnes apiece) being stowed.

More flexible and safer loading of heavy steel coils is facilitated in the Diamond 53 design. Thanks to the increased tanktop strength, the maximum deadweight can be loaded and two tiers stowed on wooden dunnage in all cargo holds.

Graig Carl Bro plans to extend the design concept to Panamax (Diamond 75) and Cape-size bulk carriers. ■

Summarising the safety benefits of the Diamond 53 class with respect to future rules and regulations, in comparison with typical standard Handymax bulkers, the designers highlight:

Diamond 53 class

double hull forms a secondary barrier against accidental water ingress in the cargo holds

double hull fosters easy access for close-up surveying of all steel structures, even when the ship is fully loaded

forecastle adapted to protect deck cargo and hatches

breakwater adapted to protect forward stores hatch, air pipes and ventilation heads

wing tank pipe duct serves as protected access to the foredecks in heavy weather

increased vertical, transverse and longitudinal green water loading considered for the cargo hold hatch covers

Standard Handymax bulker

no double hull in traditional designs

close-up survey of side shell and frames is impossible when the ship is loaded and difficult even when empty

no forecastle

no breakwater

no protected heavy weather access to foredecks

these loadings increased

MacGREGOR hatch covers strengthen safety

Cargo handling efficiency and security can be enhanced by specifying MacGREGOR high-stowing end-folding hatch cover systems for Diamond 53 double-hull bulk carrier projects, an option exercised for some Graig Shipmanagement newbuildings on order. Each cover set comprises 2+2 panels arranged fore and aft of the holds to yield the following clear openings: 19.2m long x 20.8m wide (No 1 hatch) and 21.6m long x 22.4m wide (Nos 2-5 hatches). The weathertight covers are operated by external hydraulic cylinders and manually cleated.

A double-skin steel construction facilitates cleaning of the hatch covers, whose top and skirt plates are specified with scantlings greater than the minimum. Hatch cover loadings and corrosion allowances are in accordance with the UR S21 Revision 3 and IMO revised Load Line Protocol of 1988. The hatch covers are also designed to take a timber load of 2.5 tonnes/m².

A number of distinctive design features benefit the installation, operation and reliability of the hatch cover sets, notably:

- replaceable longitudinal stoppers/guides easing installation and compensating for wear
- end-hinge links compensating for hogging/sagging and keeping the meeting joint tight
- double row sealing securing tightness in the hinge joints
- double row sealing based on MacGREGOR's Omega seal, enhancing tightness in the meeting joints
- a new generation MacGREGOR FlexSeal which can cope with even larger hatch movements than before; long-lasting tightness is associated with the solid FlexSeal configuration, along with minimal compression set, no water absorption, corrosion prevention and a wide operating range
- for adapting to misalignments and deflections, easily-installed, non-sliding MacGREGOR FlexiPads (as chosen for the two Thenamaris ships) or low-friction/sliding Polypads (as specified for the two Densan/Graig ships).