



Shipbuilding White Paper



**Bringing safety onboard
through better cabling solutions**
(New Update: December 2008)

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Synopsis

This report is intended to give an update of global shipbuilding, and provide information about how Nexans is serving this market.

It opens with a brief introduction explaining the continuing high level of shipbuilding activity worldwide, the major trends in 2007–8, the shifting lineup of shipbuilding nations, recent orders according to ship type, and other market drivers, like naval shipbuilding and offshore topside vessels. It then focuses on some major challenges and lists some customer expectations of the cable industry. The third section presents Nexans' overall product offer and explains Nexans' service approach.

This report is followed by an Appendix containing some recent success stories, and some helpful facts and figures from the 2008 orderbook for global shipbuilding.

I. INTRODUCTION: THE NEWBUILDING WAVE CONTINUES TO ADVANCE

"Innovations are always developed by the 'shipbuilding industry system' intended as a whole, shipyards plus suppliers. In fact, we must not forget that a lot of key technologies and related improvements are developed by suppliers."

Corrado Antonini, CESA Honorary Chairman
SMM International Shipbuilding Fair, Hamburg, Sept 2008

A crest in the orderbooks

After having been dominated for nearly two decades by excess capacity, closures and poor profitability, the shipbuilding industry has been enjoying the biggest and longest boom of its history. Since 2003 newbuildings have seen exceptional growth on the order books. 2006 confirmed this trend, and 2007 was another exceptional year for shipyards. Worldwide new orders grew by more than 40%. The global orderbook has doubled in tonnage terms within three years, with more than 10,055 ships currently on order at the beginning of 2008.¹

What has driven this maritime expansion is the fact that international trade has nearly quadrupled in the past three decades, with a third of the world's population undergoing rapid development, especially in the B.R.I.C. countries (Brazil, Russia, India, and China). Barring a catastrophe of global proportions, the World Bank's projected growth figures seem to promise a rosy future for the industry and its suppliers. Average economic growth in developing countries is estimated at over 6% annually, and world trade is predicted to further triple over the next 25 years. The emerging middle classes should then comprise 15% of the world's population which means three times the numbers of consumers as today (i.e. 1.2 billion).

Spectacular economic growth has repercussions on shipbuilding for two reasons: first, high consumer demand means higher freight rates which justify and indeed provide the investment needed for new shipbuilding. Although predicting future freight rates is always uncertain, cargo shipping still remains the most cost-efficient way of moving goods over long distances (especially in terms of energy efficiency and reduced pollution). Secondly, because of past uncertainties, the world fleet has inevitably aged, and a renewal is in order, especially with new regulations concerned with creating a safer, non-polluting shipping industry. The introduction of the IACS regulations in 2006 to create "more robust and safer ships" will no doubt oblige builders to come up with new designs to optimize size and reduce energy consumption, a development which will affect all suppliers, and especially cable manufacturers. As always, product innovation helps stimulate demand.

At present, nearly 25% of the world's existing fleet is being replaced, and in some sectors, that figure is close to 50%.² However, despite full order books stretching well into 2011, new orders are likely to fall short of 2007's peak levels for several reasons:³

1. At the end of 2010 over 90% of the world's tanker fleet will be modern (i.e. less than 10 years of age).

¹ According to Lloyd's Register Fairplay.

² These figures are taken from *The shipbuilding market in 2006-7* published by Barry Rogliano Salles 2007.

³ According to Craig Marston of CEM Marine: "Shipbuilding orders likely to start moderating in 2008"; consult www.glgroupp.com

2. A number of Capsize dry bulk carriers and post-panamax carriers will exist. The recent (autumn 2008) economic crisis has already raised the question of temporary overcapacity. Container rates on Asia-Europe routes have fallen by three-quarters this year, putting pressure on the profitability of container shipping; and already there is talk about laying up giant vessels to weather the financial storm. In early November, at least 20% of Capesize bulkers were lying idle, and dozens of container ships are waiting in ports empty. Some experts call it a Tsunami in the shipping world. The temporary downturn in global container shipping means that shippers are looking at ways to raise productivity, while reducing operating, as well as overhead costs.⁴
3. There is already an excess of LNG carriers for existing demand, and the renewal for offshore support vessels is well underway.

Increasing demand for offshore oil & gas is one of the only bright spots in the post-2010 future, while with 12.6 million passengers booked on luxury cruise liners in 2007 (a 4.6% increase over 2006), this sophisticated shipbuilding segment also looks to be stable.⁵

As a major supplier to both commercial and naval shipbuilders, Nexans estimates the overall cable market in shipbuilding to be around 1 billion €, with Nexans representing around 25% of the global market share.⁶

Further major trends in a record year

According to the longstanding Paris-based shipbrokers, Barry Rogliano Salles, the current shipbuilding climate can be qualified by four major trends which will have an impact on the evolution of the market:⁷

1. Demand exploded in 2007, with more than 300 million dwt of new orders (4,900 ships) placed. This was significantly up from the 169 million in 2006. This now represents 50% of the world fleet. What this means in practical terms is that shipyards are fully booked for the next three, four or even five years. Japanese yards are talking about deliveries for 2013.
2. If 2006 was marked by a strong demand for tankers, 2007 was dominated by an interest in bulk carriers and containerships (as mentioned above). As previously, new regulations, like the CSR (Common Structural Rules) developed for tanker and bulk carrier structures which came on line as of 1 April 2006 stimulated demand for tankers and bulk carriers.
3. Korea maintained its rank as the number one shipbuilding in the world in 2007. The country's order book increased by 60% during the year. However China has now outstripped Japan with a portfolio that more than doubled in 2007. Japanese shipbuilding has nevertheless progressed, while the orderbook of European builders has remained stable. Meanwhile the rest of the world has seen its order book grow by some 60%.

⁴ For a sobering view of the future, please consult *The Shipping News* 17 and 22 November, available at www.shippingtimes.co.uk

⁵ See "Record order book for global shipbuilding for SMM 2008" at www.hamburg-messe.de

⁶ Nexans figures compiled by Salvatore di Giorgio for Shipbuilding Seminar, 2007, Turku, Finland.

⁷ These recent trends are outlined in Barry Rogliano Salles *Shipping and Shipbuilding 2008* at www.brs-paris.com

4. Exceptional demand, a rise in construction costs, a depreciating dollar and an exuberant freight market, in particular for dry bulk, have pushed newbuilding prices up to new historic heights. (However, recently falling freight rates, mentioned in point 2 on page 4 have created a current climate of uncertainty).

Regional shipyard investment also reveals a sea change in shipbuilding capacity. According to Clarkson Research Services⁸, while back in 1996 investment in shipyard infrastructure was predominantly in Japan (36%) and Europe (30%), today the major investments are now in Korea (39%) and China (25%).

With the Draft Development Policy for China's Shipbuilding Industry aimed at turning China into the world's largest builder by 2020, some 35 greenfield expansion plans and 12 expansion plans to existing yards are well underway, including the COSCO facility and Qungdao Haixi near Beijing, Chongming Island and Changxing near Shanghai, and Long xue near Hong Kong. China has benefited from the strong demand for tankers and big-sized bulk carriers which it has been able to deliver at more competitive prices than their Korean or Japanese competitors.⁹ Vietnamese shipyards, too, have made amazing progress, tripling their orderbook in recent years, and moving from 12th to 6th place in world rankings; and India, with its 15 shipyards is positioning itself to compete with its Chinese counterparts. Singapore's dozen shipyards are doing well, especially on small offshore units, platform supply vessels (PSVs), and tugs, but also containerships and ro-ros.

Meanwhile European builders are full until 2010-11, but unlike their Asian counterparts, few shipyards can deliver more than five or six ships per year. One really positive piece of news for European shipyards is a reaffirmation of customer confidence and loyalty:

Higher market prices and better delivery dates have given them the opportunity over the course of the past three years to recover clients that had deserted them in favor of Asian shipyards. Their goodwill, their expertise, a capacity to understand and take into account the particular requests of their clients, the quality of the finished product and the respect of contractual undertaking remain their strength. Outside big American cruise shipowners, the clientele of European shipyards is essentially European.¹⁰

In the EU Commission's Working Document, the **LeaderSHIP 2015 Progress Report**, the healthy state of the European shipbuilding industry was reaffirmed when the EC Vice-President, Günter Verheugen stressed the innovative strengths of European ship manufacturers. They were not just delivering "off-the-shelf" products favored by many of their Asian competitors; they were, above all, providing custom-built solutions to meet their clients demanding requirements.¹¹

Faced with the drying up of ship orders in Europe and declining newbuilding prices, Verheugen confidently stated that the eight fundamental aims of LeaderSHIP 2015 were vindicated by a surge in sales:

Ships produced in Europe are of the highest quality in terms of complexity, safety and environmental impact – frequently surpassing the relevant regulatory requirements. European yards have seen the value of their new orders more than triple between 2002

⁸ Once again, consult "Long Term Trends in Shipbuilding" Stephen Gordon, Clarkson Research, 17 January 2007

⁹ See the fore-mentioned Barry Rogliano Salles 2007 report for figures on China, Vietnam, India and Europe.

¹⁰ *The Shipbuilding Market in 2006-7* published by Barry Rogliano Salles, 2007.

¹¹ The original document, *LeaderSHIP 2015 : Defining the future of the European shipbuilding and shiprepair industry* was originally published in 2003. The Progress Report was issued on 25 April 2007, and was largely commented on at the two-day European Shipbuilding Conference in Nuremberg in mid-June. Both documents are available on the Internet.

and 2005, growing in 2004 and 2005 at a faster rate than in any other region of the world. They have further increased by more than 40% in 2006, on the back of a 20% increase in output. European shipyards are almost all booked well in advance, often into 2010 or even beyond. Early indications are that these positive trends are continuing and that 2007 should be another good year for Europe's worldclass shipbuilding industry.¹²

Whether in serving its Asian Pacific customers by providing them with timely deliveries, local manufacturing presence, industrial offsets and technology transfers, or in working closely with its European partners to add value to its products and services, Nexans is determined to be a truly global supplier in both senses of the word: we operate worldwide to serve an international industry and supply virtually every kind of cable used in today's shipbuilding industry.

Commercial orders according to ship type¹³

STANDARD SHIPS

Bulk carriers: With more than 180 million dwt ordered against 46 million the previous year, demand for bulk carriers defied all reason. This figure represents more than the total order book for 2006. This represents 55% of the active fleet, against 23% a year earlier.

Containerships: By the end of 2007, the order book had reached 85 million dwt (compared to 58 million dwt at the end of 2006). Tonnage under construction represents 61% of the active fleet, which is the highest percentage for any ship category. Korean shipyards have been hyperactive in containership building. This segment is still dominated by the race for ever-larger Post-Panamax sizes. From, 4,500 teu¹⁴ at the beginning of the nineties, 14,000 teu is now the norm, allowing for substantial economies of scale. The projected enlargement of the Panama canal (by 2014) is likely to support this trend.

Tankers: After an exceptional year in 2006, 2007 still recorded the industry's second highest figure with more than 54 million dwt of new orders. IMO regulations and deadlines (by 2010) for replacing single-hull ships with double hulls have stimulated this building activity which is dominated by Korea, Japan and increasingly by China. In fact, new gigantic yards in China (Jiangnan and Rong Shjeng) have been able to obtain sizable orders at very advantageous terms for shipowners.

SPECIALIZED SHIPS

Stainless-steel chemical carriers: After recovery in demand in 2006, new orders fell sharply from 97 units to 46 units. Tonnage under construction represents 27.5% of the active fleet. Tank and pipe complexity and the high price of stainless steel make these specialized carriers both complex to build and expensive. Owners are trying to find new solutions, like ships with coated tanks that use resistant coatings which can carry diverse chemical products.

¹² Speech by Günter Verheugen at Nuremberg on 15 June 2007.

¹³ *Shipping and Shipbuilding 2008* published by Barry Rogliano Salles at www.brs-paris.com

¹⁴ Vessels which breach the Panama Canal maximum dimensions. teu refers to twenty-foot equivalent unit, the size of a container.

LNG carriers: Orders for LNGs continued to drop last year (from 32 to 26). The orderbook has moved from 135 ships to 125 ships, with the fleet under construction representing 68%. The majority of the orderbook is today Korean (96 out of 125) and Japanese (23 ships).



LPG¹⁵ and ethylene carriers: Orders dropped in 2007 with 64 ships contracted, compared to 84 the year previously. The fleet under construction represents 40% of the fleet in service. Most of the orderbook today is Korean (93 ships) and Japanese (57 ships); however, the Chinese have recently gained entry to this market.

Ferries and Ro-Paxes: The number of new orders for roll-on-roll-off passenger-ship/ferries has leaped forward in 2007, from 26 to 38 units. The market remains dominated by European builders, with 58 ships out of 75.

Ro-ros: Another breakthrough over previous years: 19 ro-ros were order compared to 13 in 2006 . The existing fleet is superannuated (average age is 20 years, with 40% over 25 years). European shipbuilders have dominated this market, but newcomers include China and Singapore.

Car carriers: Due to the continuing growth of the world automotive industry and international outsourcing, new orders have continued to climb from a total of 168 ships to 256 ships, mostly for Pure Car Truck Carriers (PCTC) to accommodate the movement of some 19 million vehicles by 2015. Most of the orderbook is today Japanese, Chinese, Korean and recently Vietnamese. However, future car sales worldwide will surely impact this market.

Cruiseships: 2007 was another excellent year for cruiseships, with 18 firm orders, all placed with the three big European specialized builders. However, the event of the year was the surprise entry of the Korean shipyard STX in the capital of Aker Yards.

¹⁵ Liquefied Petroleum Gas



MSC MUSICA

(Copyright : AKER)

Nexans is involved with the development, manufacturing, delivery and service of virtually all of the above standard and specialized ships by supplying both off-the-shelf and customized cables. In many cases, through its own research and its participation on maritime standards boards, Nexans has been able to make a contribution to performance (increased data capacity for maritime LANs), safety (enhanced fire-performance cables) and specialized needs (Cryoflex cables for carrying liquefied natural gas).

Naval shipbuilding

Naval shipbuilding is a completely different market sector, and is definitely growing apace worldwide.

In the US, the production of warships is a largely protected, self-sufficient, national industry. However, there has been a trend towards more subcontracting of sub-components and systems, including cabling. The US has even looked overseas for both shipbuilders and suppliers.



However, this overture towards outsourcing has been brought to an abrupt halt by the recent call by Navy Secretary Donald Winter for the navy to “reassert its control over the entire shipbuilding acquisition process.”¹⁶ Following overruns of the speedy Littoral Combat Ship for close-to-shore operations and the design of the stealth DDG-1000 destroyer, Winter has been calling for a “tough love” scenario for the American military shipbuilding industry. Meanwhile, the six major shipyards that built the US Navy’s largest ships (aircraft carriers, amphibious assault ships, cruisers, destroyers and submarines” have seen two seven year cycles of lean years, with a loss of 24,000 jobs since 1991.

From nearly 600 ships under the Reagan era, the US Navy’s fleet has shrunk to 276 ships. Navy Secretary Winter emphatically maintains that National Defense Strategy requires 313 ships, but that acquiring them calls for a definite plan to avoid the demise of a shrinking, aging navy.

In the Far East and Europe, naval shipbuilding is far less national, and there is a strong trend towards multinational naval conglomerates and alliances to promote the sale of warships worldwide. In Southeast Asia two significant naval developments are likely to re-shape the future of the maritime security environment.

As many as fourteen different classes of warships, including nuclear submarines, are under construction at various shipyards in China.¹⁷ These include destroyers, frigates, submarines, amphibious assault ships, littoral combat ships, and soon an aircraft carrier. Meanwhile, in India, the navy is reshaping its force structure. Forty-two naval platforms, including two aircraft carriers, six submarines and several destroyers and frigates are currently under construction. These new buildings are not just for littoral operations, but rather for power projection and designed to undertake long-range operations in the western Pacific Ocean through the Straits of Malacca into the India Ocean. Both China and India seem to have opted for a blue-water fleet not only to protect their territorial and maritime interests, but above all to safeguard their energy sea-lanes.

According to Jane’s, “the Asia-Pacific region will overtake Europe and the US as the world’s single largest market for new-build naval platforms and systems within the next five years [i.e. by 2010].” China, India and South Korea are seen as the key drivers of this continued growth.¹⁸

As for Europe, apart from their sales to the Asia-Pacific region (for example Armaris/DCNS sale of six Scorpene submarines to the Indian Navy), the largest single European contract was the classification of seventeen European multi-mission FREMM frigates and the HORIZON-class frigates.¹⁹ These frigates, a cooperative effort between Italy and France, assure the protection of a group of vessels against high levels of threat and massive attacks by anti-naval missiles.

¹⁶ See the widely circulated article by AP writer David Sharp: “Navy Reasserting Control of Shipbuilding,” published 9 July 2007; for background of what was actually said, see D.C. Winter: “Navy Transformation: A Stable, Long-Term View,” Heritage Lecture delivered on 7 February 2007, and “Statement of Honorable Donald C. Winter, Secretary of the Navy, before the Senate Armed Services Committee, Subcommittee on Seapower, Shipbuilding and Force Requirements, 3 May 2007.

¹⁷ Consult Vijay Sakhuja’s article in *Opinion Asia* on “Emerging Contours of Asian Naval Power” available at www.pinionasia.org/articleéprinté186

¹⁸ From Jane’s “Naval market in Asia-Pacific on a Rising Tide” at www.janes.com/defence/naval.forces/news/ini/ini050520.1.n.shtml

¹⁹ Consult Bureau Veritas’ Maritime Division: “Marine Business Review 2006-2007”

Nexans provides a wide range of quality cables from a single source, which fully conform to the world's strict naval standards. Wherever possible Nexans applies proven commercial and interoperable solutions for easier procurement, maintenance and repair. Since every warship is made-to-order, it often customizes its cables (e.g. smaller and lighter cables) so that ship speeds and armament loads can be optimized. To keep pace with the information revolution, Nexans constantly innovates to improve data speeds, protect combat & control systems, reduce crew size, and ensure high operational efficiency and survival.

Offshore topside vessels

Another area which is positively influencing the shipbuilding industry is **offshore platforms and vessels** for the oil & gas industry. In fact, high energy prices and also fears about energy security in an unstable world have continued to drive the offshore market. Deepwater exploitation, a move from stationary platforms to floating vessels, and onshore remote management and support have created a new niche of topside vessels (some of which have been mentioned above under Specialized Ships). They include new generation deep-sea drilling ships and semi-submersible drilling platforms and Floating Production, Storage and Offloading (FPSO) vessels which take all of the oil or gas produced by a platform, process it, and store it until the oil or gas can be offloaded onto waiting tankers, or sent through a pipeline.

There are also a whole range of supply vessels, diving support ships, crew transportation vessels, crane and heavy lift vessels, dredgers and oil recovery vessels, research ships for seismic and other work, and ice-strengthened vessels for operation in Arctic conditions. As with the commercial and naval ships, these specialized oil and gas vessels have demanding cabling requirements, in terms of safety and performance, whether for Middle-Eastern, Gulf of Mexico, Pacific Rim, or North Sea conditions,

Nexans has developed an entire set of offshore solutions both for subsea and topside, which range from complex umbilicals to highly specialized mud-resistant cables and accessories. It has not only been an innovator in developing Remote Operated Vehicles (ROVs) for cable laying on the sea bottom, but also operates one of the world's most advanced surface cable laying vessels, the Skagerrak, which recently laid a 28 km cable across the Strait of Gibraltar and in 2008–9 will lay a 292 km subsea HVDC link providing power-from-shore for the Valhall field in the Norwegian North Sea.



II. CHALLENGES AND CUSTOMER EXPECTATIONS

For Nexans, the shipbuilding sector is primarily shipyards; but demand is also driven by the final customers themselves – i.e. shipowners – and engineers and subcontractors who provide materials and do turnkey installations, repairs, and so on. There are a wide variety of vessels being built today. The simplest vessel type is the barge. However, at the other end, exist highly complex ships, like Floating Production System and Offloading vessels (FPSOs), battleships, aircraft carriers and submarines. Between these two extremes are a whole range of bulk carriers, containerships, chemical carriers, tankers, ferries, ro-ros and cruise ships.



To cut costs and improve efficiency, shipbuilders are modularizing processes and improving shipyard infrastructures. Computer-assisted design (CAD) is now integrated with Web-centric information sharing. Since electrical power and IT are vital, electrical and data cables must be reliable, efficient, and easy-to-install. In the integrated onboard environment, shipbuilders look for multi-system packages from a single source. They expect quality and conformity to the highest standards. They demand constant innovation and customized solutions. They want products delivered on time, and product availability worldwide for maintenance, upgrades, refits and modernization. Because ships are often floating “mini-cities,” every type of wire and cable present on land can be found somewhere onboard. A paramount concern for both commercial shipping and naval defense is safety for the ship, crew and passengers.

Today’s shipbuilding environment continues to face a number of challenges.

First, **cost saving programs** will continue to be important for both shipbuilders and their suppliers. As with other industrial sectors, buyers are looking for more competitive solutions based on a closer customer-supplier relationship. Bringing down costs will not be easy, especially when some shipbuilders are selling vessels at near to production costs. However, outsourcing cabling requirements, which requires a specific and ongoing expertise, can allow shipbuilders to cut costs and concentrate on core concerns.

Secondly, since shipbuilding is a world industry, suppliers must be able to **serve distant shipyards**. This will mean strong supply chain management, with the ability to deliver to far-flung points from multiple sources of provisioning. This can be achieved by new Internet-based supply management platforms. In addition, since local presence and technology transfer are important matters for governments (especially in China), first, second and third tier suppliers must have resources on the ground, including production facilities, to serve their customers.

Thirdly, shipyards expect consistent **quality and performance**. Since shipyards have vastly improved their productivity, they expect cable manufactures to find ways of keeping quality uniform, even though production is done in countries where labor conditions and costs can vary greatly. Also, while several years ago, shipyards produced one or two vessels a year, today they are producing more ships in parallel. Cycle times must be reduced, and that requires improved

efficiency. Quality standards and international certification are essential to a shipyard which can be building several kinds of vessel simultaneously.

Fourthly, **integration** is a must, not only from the point of view of product, but also in terms of cooperation among suppliers, and suppliers and shipyards. There is definitely a move from parts and products towards prefabricated modules and systems which can be easily mounted in the hull, thus gaining precious time. This more flexible approach requires an increasing exchange of information among the shipbuilding community, and means getting everyone involved early in the engineering and development process, long before production takes place. Supplier-shipyard integration is based on shared databases, Computer Assisted Design (CAD), and integrated supply-chain management systems.

The fifth challenge is **innovation**. As the recent "LeaderSHIP 2015 Progress report"²⁰ vigorously re-affirms, innovation is going to be extremely important for shipbuilding in the coming years in terms of manufacturing processes, logistics and the ships, themselves. In fact, in Europe, "one out of four deliveries is based on a completely new and innovative design or prototype." Given the longevity of the average ocean-going vessel, the next generation must make a quantum leap, not only to achieve energy savings and increase efficiency, but to prolong life-cycle and assure low maintenance.

The sixth challenge is **safety**. Given the autonomous floating environment of ships, safety, too, has to be self-contained and omnipresent. From the cabling point of view, this means the latest in fire-performance cables to protect passengers, crew and infrastructure. It also means full conformity with the EU's Registration Evaluation Authorization and Restriction of Chemicals (REACH) regulation.

III. NEXANS: EXPERTISE AND WORLDWIDE COVERAGE

With its global offer, Nexans is the worldwide cable leader on the shipbuilding market. Unlike its competitors who deal with separate suppliers and sub-contractors, Nexans, with production facilities in Europe, Asia and the US, has the capacity to produce every type of cable used on a modern vessel.

As a global supplier to shipbuilders, Nexans provides a wide family of onboard marine cables. Moreover, since standards are so important to this international, yet highly regulated industry, Nexans is compliant with most of the world's commercial and naval standards:

Commercial, offshore and naval compliancy

- International IEC 60092 series
- Japanese JIS specification
- IEEE 1580 Type P for offshore and UL 1309 & 1072
- Norwegian NEK 606 and BS6883
- German VG95218 for submarines
- Mil-Dtl-24643 and Mil-Dtl-24640 for naval vessels
- IEC advanced fire performance
- ABS, BV, CCS, DNV, GL, KR, LR, NK, RINA, RFMR, UL, ETL, VDE, US Coast Guard approved
- ISO 9001 quality standards
- Qualified Products List (QPL)

²⁰ See once again the "LeaderSHIP 2015 Progress Report" published 25 April 2007 (the quote is from p. 4)

Today, Nexans cables are being installed on ships around the world, including every shipyard in the US. In fact, Nexans and its subsidiary Kukdong supply 30% of the global shipboard cable market.

Kukdong Electrical Wires Company, located in South Korea, was acquired in 2003. The company's business is predominantly dedicated to marine cables for the Korean and Japanese markets. According to Nexan's CEO, Gérard Hauser, *"This acquisition corresponds to two of our main strategic directions: of realigning Nexans towards high value-added products, and of developing high-growth markets in the Far East and Asia."*

Kukdong, a Nexans company, fully outfitted a 1,800 ton submarine being built by Hyundai Heavy Industries (Korea) according to strict VG-95218 German standards. Meanwhile, in France, Nexans provided 2,500 km of cables for the Queen Mary 2.

Of special concern for both commercial and naval vessels is onboard safety for the ship, crew and passengers. Nexans expertise in Halogen-Free Fire-Retardant (HFFR) cables is much appreciated by shipbuilders. These fire safety cables meet the highest standards of the International Electrotechnical Committee (IEC) and are approved by leading certification bodies. In the event of fire, the fire-resistant cables continue to supply the vital functions of the ship's safety systems. The flame-retardant cables prevent fire from propagating to the different parts of the ship, and ensure low smoke, and non-toxic gas emission, thus enabling evacuation operations to continue.

Besides the broadness of its product range and plant resources, Nexans is developing new products and services for the shipbuilding market, along five fronts. First, designing products to make them **easier to install onboard**. Secondly, increasing the **flexibility** of cables for fitting into tight places. Thirdly, continuing to increase the performance of **fire-safe HFFR** cables, to eliminate all risks of short circuits and to offer cables that will be able to continue function. These cables are tested at 1,000°C. Fourthly, Nexans is taking extended responsibilities along its entire supply chain to assure **full conformity to the EU's REACH program**: from tracking chemicals when importing raw and primary materials, to manufacturing processes and distribution, and keeping downstream users and customers fully informed. Managing the risk posed by chemicals in its products is just one expression of Nexans' commitment to protecting human health and the environment. Finally, beyond the product itself, Nexans is constantly improving its **just-in-time service**. The principle is to custom cut cables to customer needs in real time, to label them, and to pack them according to installation zones on the vessel under construction. For example, the logistics center in Lyons (France) delivers pre-cut cables directly to Aker France.

Current initiatives include the strengthening of the north Asian market, for which Nexans has set up a special China-based plant which is now working closely with local shipyards to further reduce lead times. A number of direct links between Chinese technical services, quality control and purchasing and the various European sites assures a push-pull dynamic: Nexans creates awareness of what its oversea plants can do, while gaining an understanding of the real needs of its Chinese customers. Nexans furnishes 200 types of cable to some 15 shipyards in extremely short timeframes.

A wide range of products for the shipbuilding industry

POWER CABLES

Nexans produces **medium-voltage cables** for power backbone and propulsion (1.8/3.6/6 kV, 6/10 kV up to 12/20 kV). Like all Nexans shipboard products, these stranded copper cables are Halogen-Free Fire-Retardant (HFFR). Once the cable route is known at the ship's design stage, Nexans can pre-cut and mark the cable (bulkhead point, beginning and end indicators) for faster, easier installation.

It also manufactures Halogen-Free Fire-Resistant (HFFR) **low-voltage energy cables** (0.6/1 kV) for onboard power distribution throughout the vessel. These quality copper cables come in a variety of insulations, sheaths and armoring. Also, special flat cables running along corridors make it possible to quickly add lighting and power outlets using Rapid Connection Boxes.

Special **FLEXISHIP® maritime cables** (0.6/1 kV), incorporating three compact triangular energy conductors, are used for general power and lighting. In addition to being halogen-free and low smoke, they can be installed in 30% less pulling time in tight spaces, using lower pulling force. They are also easy to strip and install. They have been fully approved by Norske Veritas for ships and offshore, and have obtained IEC qualification.

Nexans **Variable Frequency Drive (VFD) cables** are designed to improve EMC protection and the operating performance of variable frequency drive systems used for bow and side thrusters, movable pod propulsion systems, winches, lifts and drives on regular ships and FPSOs. Because of the excellent shielding design and grounding, Nexans' VFD cables have proven to be the best overall cables in independent tests of speed drives. They are also UL and ABS approved and 600-volt rated.

To reduce local harbor-pollution levels Nexans developed an innovative **hybrid ship-to-shore cable** which provides an alternative power supply, data transfer and telecommunications for quayside ships. Medium-voltage power supply, control cores and optical fibers are laid up in one flexible, rugged and easy-to-reel cable which fully protects the environment.

DATA CABLES

Nexans shipboard **Local Area Networks** use laser-certified multimode optical fiber for vertical onboard backbones and horizontal copper links to individual crew cabins based on DNV certified LANmark solutions with GG45 Marine connectors, in addition to maritime patch panels, patch guides and patch cords. Immune to shipboard interference, this robust, reliable and safe system can operate up to 10 Gbit/s.

HFFR **hybrid energy and data cables** provide power to surveillance cameras and transmit vital information for security, emergencies and fire-monitoring. They allow a command function to control camera movement, and guarantee non-stop surveillance.

MIL-C-17 **coaxial cables** are usually used for onboard high frequency data transmission (communication equipment, radar, and instrumentation) and also carry video signals for surveillance cameras. Flamex RG offers exceptional fire safety in a single cable. A coaxial cable is often combined with various conductors in a compact hybrid cable for piloting and powering CCTV cameras.

Nexans maritime **fieldbus cables** are Halogen-Free Flame and Fire-Retardant. With a fixed impedance, they can transmit an extremely precise digital signal to control all essential shipboard functions, like motors, rudder and hydraulic systems. Can Bus cable comes in a single or double pair, while Profibus cable is a single pair. Both can be supplied with SHF1 or SHF2 jackets, depending on specification. Adapted from the industrial plant, these high-performance cables are fully sea resistant and can operate safely in temperatures between -20°C to +70°C.

Our **instrumentation, communication and control cables** are twisted pairs with stranded conductors. These HFFR cables carry vital technical information for sensors, measurement, control panel, etc. This small and light cable is ideal for high-speed craft and express ferries, where weight is a determining factor.

To prevent fires onboard, Nexans provides a complete temperature sensor cable system: **LIST (Linear Sensing of Temperature)**. This flat, four-core cable with hybrid circuits contains an ASIC (Application-Specific Integrated Circuit) temperature sensor which can rapidly detect temperature increases that could be the source of fires on vessels so that fire-fighting equipment can be rapidly activated. Not only can they be used in harsh sea conditions, they can be deployed in lengths up to 2,000 meters to monitor heat conditions throughout the vessel.

The service dimension

Nexans operates as a full-service supplier, not just a producer. This preferred supplier-customer integration, based on shared databases and Computer Assisted Design (CAD) continues right through manufacturing and installation. Nexans also has the authority to qualify sub-suppliers on certain items not produced in-house. Nexans manages its supply chain completely, often coordinating the work of 40-50 other suppliers, while assuring consistent quality and variable delivery logistics. Not only does it deliver just-in-time to shipyards around the world, but takes into account changing vessel types by sequencing deliveries in-order so that customers can receive cables in the right sequence for a specific vessel during production.

In conclusion, Nexans' real force lies in combining manufacturing excellence with ongoing innovation, for a complete marine cables offer for commercial, naval and oil & gas ships. Cable performance is being constantly improved, while lowering the cost of primary materials. Innovation combined with advanced logistics has for many years been Nexans' winning combination.

IV. APPENDIX:

Some recent Nexans success stories

- Nexans Kukdong has recently designed a new ultra-cold-resistant rubber cable for shipboard and offshore applications. Not only can it maintain its properties down to -50° C, it is also fire-retardant and resists oils and aggressive chemicals and fluids. Developed especially for Hyundai Heavy Industries, this is the first marine energy cable on the market qualified for such low temperatures.
- A new rubber, halogen-free medium-voltage (12 kV) cable created for the German Navy consolidates energy supply in warships, while protecting them against shock impact from enemy fire up to 160 Gs. A new Defense Equipment Standard was adopted by the German Navy in 2007. Nexans helped create this standard, and co-developed the cable with the BWB (Federal Office of Defense Technology and Procurement) who carried out extensive military tests. Other navies also appreciate this tough, new design. Nexans is the only cable manufacturer worldwide to supply this cable and its termination kits.
- Nexans has provided cabling for a series of mega-yachts being built by HDW in Kiel, including the 140-meter Sigma yacht designed by the avant-guard French designer, Philippe Stark.
- Nexans LAN cables have been installed on a Norwegian research vessel, the G.O. Sars, the James Cook, operated by the UK's National Oceanography Center, and CroisiMer's new cruise ship, the MS Belle de l'Adriatique. The latter ship provides passenger and crew cabins with television, telephone and data on a single compact cable.
- To meet stringent insurance specification, nearly 100 km of Nexans hybrid cables for video surveillance have been installed on cruise ships being built by Aker Yards.
- Nexans supplied SHF2 sheathed fieldbus cables for the Umm Shaif FPSO project for Hyundai Heavy Industries (Korea).
- Besides the 0.6/1kV cables for power distribution and 250 V cables for data transmission and telecommunication networks, Nexans supplies the Meyer shipyard in Germany with medium-voltage cables (6/10kV and 8.7/15kV) for their latest cruise ship newbuildings: Celebrity, Disney and Aida.
- For the SEDCO 702 Project, Kukdong is supplying Trans Oceans Inc. (USA) and the Keppel Fels shipyard in Singapore with \$3.35 million of NEK 606 Low Smoke Halogen Free (LSHF) power, control and instrumentation cables for a semi-submersible drilling rig. Kukdong is also currently supplying NEK 606 for a series of jack-up rigs and other semi-submersible being built in Singapore for Patrojack, JackInvest, Petroprod, Petrorig and Seadrill.
- Kukdong is supplying MIL-C 24640 low-smoke, flame-resistant cable to Hyundai Heavy Industries who are building the world's third, and Korea's first 7,600-ton Aegis-class destroyer, the Sejongdaewang-Ham, named after the legendary king of the Chosun Dynasty. The destroyer will be delivered by the end of 2008 and deployed by the Korean

Navy after sea tests are completed. Design and building the destroyer took a mere two and a half years. After the U.S. and Japan, South Korea is the third country with this class of warship in its fleet.

- Nexans supplied Lindoe Shipyards in Denmark with cabin cabling solutions for a 11,000 TEU ship, the Emma Maersk.
- Nexans is continuing to supply cables to the biggest cruiseships being built today: the Freedom-cruise class being built by Aker yards.
- For CNOPC (ConocoPhillips China, a joint venture with CNOOC) Nexans is supplying cable for the Bohai Bayu Phase II project in China. Seven large platforms, each servicing up to 14 subsea wellheads are being built at three shipyards in China, while the world's largest FPSO is being built in Singapore.
- With SAM Electronics in Hamburg (Germany) and Cavotec, a specialized reel designer, Nexans continues to promote its innovative hybrid ship-to-shore cables in busy ports and superports around the world, to meet the growing demands for a cleaner and safer seaside environment.
- Nexans Korean subsidiary, Kukdong, is fully outfitting a 1,800 ton submarine being built by Hyundai Heavy Industries (Korea) according to strict VG-95218 German standards. Nexans also provided 2,500 km of cables for the Queen Mary 2.
- Nexans is supplying cables for a FPSO (Floating Production Storage and Offloading) ship as part of the Russian Sakhalin oil pipeline project. Nexans Korean subsidiary, Kukdong, is providing the mud- and cold-resistant cables for the Pitum-B (PA-B) and Lunskeye-A (LUN-A) platforms in Sakhalin Russia, being built by Samsung Heavy Industries (Korea); and is also supplying advanced fire-performance cables (BS6387 CWZ) for FPSO ships being built by Hyundai Heavy Industries (Korea) for operation in BP's Greater Plutonio Fields located in Angola's deep-water Block 18 off West Africa.
- Nexans installed advanced Category 7 cable on the Norwegian research vessel, the G.O. Sars. This world first uses ISO/IEC cabling technology to provide 600 MHz broadband communication. EMC had to be handled carefully to ensure performance of all systems.
- For the World of ResidenSea®, a luxury liner in which residents either rent or buy their cabins, Nexans installed a shipboard broadband network which delivers everything for TV to videoconferencing. Nexans GG45 connector allows 3 applications to be shared on one Category 7 cable, thus reducing weight and the daily cost of running the ship.
- For Danfoss Marine, Nexans has designed a sensor cable used in tankers to measure crude oil level and pressure at high temperature during transport.
- For the French Navy's new Mistral Class LHD (Landing Helicopter Dock/Projection and Command Ship) Nexans supplied all onboard cables.
- Nexans delivered the first cables to the Hudong shipyard in China for a series of LNGs being built for Shell.

- Nexans has a worldwide contract to deliver complete cables to Aker shipyards producing commercial vessels, cruise ships, offshore supply vessels and tankers.
- Nexans Korean subsidiary, Kukdong, is supplying the cables for the offshore ice-resistant platform “priralzlomnaya” in accordance with Russian technical specifications which demand exceptional performance in freezing conditions.
- Kukdong, Nexans Korean subsidiary, delivered Type “P” cable according to IEEE Standard 1580 (100°C rating) and UL 1309 (110°C rating) for a Drill Rig in the Gulf of Mexico, USA, and is also supplying Type “P” cables for a platform in Bohai Bay, China.

Some facts and figures from the 2008 Orderbook for global shipbuilding

Data by ship type and builder country:

World Shipbuilding						
Data by ship type						
Ship type	Orderbook at end April 2008		2008 Contracts		2008 Deliveries	
	No.	CGT	No.	CGT	No.	CGT
Tanker	2,437	47,309,720	143	3,482,518	153	2,909,213
Bulker	2,799	54,853,930	265	5,262,146	87	1,513,273
Containership	1,333	38,032,510	63	2,250,957	123	2,986,473
Gas carrier	327	12,949,192	17	357,706	28	1,381,387
Other	2,567	29,485,748	145	2,037,719	102	1,169,896
Total	9,463	182,631,101	633	13,391,045	493	9,960,242

Data is correct as of 1st May 2008 Source: Clarkson Research Services

Data by Builder Country						
Builder country	Orderbook at end April 2008		2008 Contracts		2008 Deliveries	
	No.	CGT	No.	CGT	No.	CGT
South Korea	2,305	67,020,533	242	6,780,737	128	3,912,984
China P.R.	3,366	56,317,543	242	4,630,792	110	1,677,035
Japan	1,282	27,752,090	21	446,799	129	2,802,832
Germany	187	3,599,925	16	271,116	12	183,087
Italy	68	2,676,283	2	48,464	2	41,170
Vietnam	193	2,414,701	22	285,662	2	23,449
Turkey	215	2,260,490	0	0	20	195,744
India	220	2,034,937	0	0	5	37,926
Philippines	78	1,959,978	10	250,624	1	16,355
Taiwan	66	1,782,229	7	187,600	3	76,944
Other	1,483	14,812,391	71	489,251	81	992,746
Total	9,463	182,631,101	633	13,391,045	493	9,960,242

Data is correct as of May 1st 2008 Source: Clarkson Research Services

Community of European Shipyards Association Orderbook according to vessel type:

