# ANNUAL REVIEW 2008

ABS

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## Welcome to ABS and its Affiliated Companies

Throughout its existence, ABS has dedicated its activities to promoting the security of life, property and the environment. The traditional focus of those activities has been the provision of classification services to the builders, owners and operators of ships and marine-related facilities. This core classification activity continued at a high level throughout 2008 with the ABS classed fleet reaching record levels and the ABS organization expanding to meet the increased demand for its services.

ABS also offers clients a portfolio of related services, primarily in the risk management sector, that fall outside of its traditional core classification activity. These services are provided through operating subsidiaries of the ABS Group of Companies, Inc., which is a wholly owned affiliate of ABS, subject to separate Board oversight and management. The activities of ABS Group continue to grow, with 2008 being its most successful year of operation.

Headquartered in Houston, ABS and its affiliated companies provide services to clients in all parts of the world through a network of offices in 70 countries. This review of the activities of ABS covers the sectors in which the organization participates and is intended to provide an overview of its performance in 2008 and highlight some of the notable achievements recorded during the year.

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#### **ABS ACTIVITY**



#### MARINE

ABS is the third largest classification society in the world based on the gross tonnage of its fleet. Its classed fleet comprises more than 10,600 vessels of various types, aggregating in excess of 144m gross tons. The ABS-classed fleet has shown an unbroken pattern of growth over the last 18 years and a record orderbook at the end of 2008 will mean a continuation of the current high level of activity through the end of the decade.

#### **OFFSHORE & ENERGY**

ABS is the leading provider of classification services to the offshore industry. 2008 was one of the industry's busiest periods and ABS secured a significant number of new MODU contracts and the leading share of new production unit contracts, confirming its position within the industry.

#### GOVERNMENT

2008 marked further development of the relationship between ABS and the US Navy based on the ABS Naval Vessel Rules. These Rules are the result of a multi-year collaboration between ABS and the US Navy to extend classification beyond military support vessels, to encompass the hull and machinery of combatant vessels. This is proving to be a significant growth area for ABS.



#### ABS AFFILIATED COMPANY ACTIVITY

#### FLEET MANAGEMENT SYSTEMS

ABS Nautical Systems LLC, an affiliate of ABS, offers an off-the-shelf suite of software modules that provides a globally-standardized, integrated fleet management solution for shipowners, operators and managers and for the offshore industry. 2008 saw a significant expansion in the ABS Nautical Systems level of activity as it increased its client base across all sectors – commercial, government and offshore.

#### **ABS GROUP ACTIVITY**



#### **MARITIME SERVICES**

ABSG Consulting Inc. (ABS Consulting) a subsidiary of ABS Group of Companies, Inc. and an affiliate of ABS, is a leading provider of maritime-related services to the international energy and transportation sectors. This activity is designed to help clients go beyond required compliance and gain competitive advantages in a challenging environment. 2008 saw sustained growth in the demand for these services.

#### NUCLEAR UTILITIES

ABS Consulting provides technology-based solutions for managing the operational risks faced by the nuclear and utilities sectors. It helps clients address the risks stemming from natural catastrophes and man-made hazards, and to address the complex regulatory requirements that govern their activities. Demand for these specialized services remained high in 2008.

#### **PROCESS INDUSTRIES**

ABS Consulting helps clients in the process industries to meet compliance and institute procedures that promote sustainable process safety as part of an organization's culture. The approach encompasses the full range of a facility's operations, from design, to the testing and maintenance of equipment, and the establishment of effective response procedures, taking into account human factors.



#### PUBLIC SECTOR

Governments rely on the sophisticated risk analysis capabilities of ABS Consulting to guide their preparedness strategies for improving security, mitigating natural and man-made hazards and effectively managing the many diverse risks that threaten their nation's citizens, assets and environment. 2008 brought increased demands for services in this area.

#### CORPORATE SECTOR

By combining ABS Consulting's engineering capabilities with its proprietary catastrophe modeling software and alternative risk transfer expertise, the company is able to help improve the operational and financial performance of its clients. The technologybased approach addresses the management of the financial consequences of natural hazard, operational and security risks.

#### QUALITY MANAGEMENT SYSTEMS

The ability to demonstrate conformance to an accredited quality management system that encourages continuous improvement is a requirement for companies across a broad range of industries. ABS Quality Evaluations, Inc. (ABS QE) is established as a respected third-party auditor of management systems to international standards and is also a contributor to the development of industry, national and international standards.

## **ROBERT D. SOMERVILLE**

Chairman & Chief Executive Officer ABS

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Successful, frustrating, challenging, surprising: these and a host of other adjectives could not begin to describe 2008. As the year opened, it would have been impossible to predict just how extraordinary 2008 would turn out to be. It began with a dawn raid on IACS itself and several IACS members by the European Commission, pursuing possible anti-competition allegations against the major class societies; it included a favorable ruling on the Prestige case; record charter rates by mid year, together with a record orderbook of newbuildings contracted to ABS class; and strong activity within each of the organization's affiliates.

Yet the year concluded with the world facing the most severe economic crisis in more than 60 years, the freight markets in free fall and shipyards in search of anyone prepared to place an order for a new ship when more vessels of all types were languishing in hot lay-up than at any time since the early 1980s. Extraordinary, frustrating, challenging and yet, for ABS, remarkably successful.

ABS exists to promote the safety of life, property and the marine environment. It is a clear mission and mandate that guides our broader strategy and everyday activities. We operate in a competitive market that forces us to constantly look at how we operate and question if we can do so more efficiently. It requires us to constantly evaluate our portfolio of products and services and guides our decisions on developing new products and enhancing our service delivery to our clients if we are to remain not merely competitive but successful. Our goal is, and will always remain, to be viewed by industry and by our clients as the best classification society and the provider of the most innovative risk management services.

Given the competitive nature of our activities, the investigation of the IACS members by the European Commission was unexpected. The implications of an adverse ruling by the Commission's Directorate General for Competition strike at the heart of classification as it currently exists and carries the risk of grave financial penalties. Our response to that investigation became a major preoccupation throughout 2008 as we considered the future of class, and of ABS, to be at stake.

It is ironic that this investigation should occur at exactly the same time as class was being subjected to increased pressure by other government entities to work collaboratively to develop and implement ever higher standards.

Nowhere was this dichotomy more pronounced than within the European Commission itself. At the same time as the Commission's DG COMP was launching the investigation into class that could pull apart its existing fabric, the Commission's Directorate General for Energy and Transportation (DG TREN) was working assiduously to expand the Directive and associated Regulations that govern the authorization of Recognized Organizations (class societies) by the European Union.

Those efforts were to culminate at year's end in consolidated text of a new Directive, to be adopted by the European Parliament in early 2009, that will demand that class societies work more closely together in harmonizing their standards as this is considered by the agency to benefit maritime safety. As the books were closed on 2008 ABS and the other class societies were wrestling with the practical application of these apparently conflicting directives from the same governmental body.



In response to the adoption of the language in the revised Directive, ABS immediately launched a comprehensive review of its approach to the certification of materials, equipment and systems to determine how the new requirements could foster the development and implementation of new approaches to such certification.

It is of great concern to me that so much of my review of the most important developments of 2008 should have to be devoted to the foregoing political considerations. I believe the single greatest challenge that continues to confront class is the lack of understanding that appears to exist within certain governmental circles with regard to our activities. Although class is the self-regulating mechanism for the industry, it is inevitable that it should, itself, be subject to a certain degree of necessary oversight. These latest efforts, however, appear to go beyond any test of reasonableness.

It is incumbent on class to continue its efforts to educate key government officials around the world. Their interests and those of class are synonymous – to promote the security of life, property and the natural environment. That symbiosis is evident in the way that more than 100 governments around the world rely on ABS to carry out statutory inspections and certification on their behalf. It is that disconnect between the maritime Administrations, which appear to understand, appreciate and rely on class, and the more political, and ultimately powerful, echelons within government which appear to be pursuing a contrarian course, that gives rise to our concern.

I have said many, many times that the best public accounting of a class society's performance lies in its Port State Control record. In that respect, the average record of the ten IACS societies far outstrips that of the many other inspection and survey organizations, a performance that, again, appears to be largely overlooked by those intent on further regulating our activities. I am pleased to report that ABS' own performance in this respect in 2008 continued to place this society among the best performing of the IACS members and towards the very top of the performance lists in the principal port State administrations.

Such a performance is evidence of our continuing strong emphasis on training. The last several years has seen a rapid expansion in the ABS fleet size and orderbook, necessitating an equally rapid expansion in our engineering and survey staff. Throughout, we have maintained an extremely aggressive training program to fasttrack these new members of the ABS family, regardless of the extent of their academic or professional qualifications, to the levels of competency required to fulfill their roles within ABS. This program has seen a significant expansion of the ABS Academy to handle not only the new-hire courses but also the increased number of courses that we require our experienced surveyors and engineers to undertake on a periodic basis to keep them apprised of new rule and regulatory requirements.

Ultimately, it is the quality and responsiveness of the service that these, and all our other staff members provide that determines the level of success that this organization is able to achieve. In that respect, 2008 proved to be an exceptionally strong year for the entire organization. The ABS-classed fleet grew to a new record of just over 144m gt by the end of the year and the orderbook also reached a new record of more than 51m gt for which formal requests for class had been received.

The almost fevered activity in the shipyards, together with the larger existing fleet, meant that revenues remained strong, reaching an unprecedented level, although the increased staffing costs, in particular, provided a significant offset.

In one respect, classification societies are in an enviable position: the particular nature of our business means that our activities, and associated revenues, tend to lag several months behind a sustained downward reversal of both wider economic conditions and specific shipping markets. As a consequence, 2008 closed out with





our marine and offshore activities maintaining the extraordinarily high levels that had characterized the earlier part of the year before the global economic recession began to take effect, with its knock-on impact on the charter markets and containership demand.

However, the signals were clear and we had already begun to implement a range of specific actions that would allow us to transition to an organizational structure that will be appropriate for the expected market conditions that will prevail over the

next two to three years. In this respect, our past efforts to develop and implement computer-based management systems that govern all aspects of our activities, from providing survey information to our clients and field surveyors, to the fully electronic transfer and review of design and engineering drawings, to financial analysis and human resource management, began to demonstrate the financial benefits, in addition to more efficient service delivery, that they offer.

Looking forward, we could also see that the development and delivery of additional, integrated fleet management solutions to our clients would help to better differentiate our services within a crowded and competitive market. To this end, we developed and released a version of our hull inspection and maintenance program specifically tailored for fleet-wide use by the majority of our clients. The approach used the same engineering foundation as the more detailed hull maintenance programs that had been successfully developed and used by clients in the offshore sector, operating complex, sophisticated production units. The approach was welcomed by several key clients and it is expected to become a new industry standard as it is adopted by more operators.

Products such as this, although reliant on the engineering knowledge of the organization, dovetail neatly within the ABS Nautical Systems suite of integrated fleet management software. This affiliate of ABS returned another record performance in 2008, adding new clients and expanding the portfolio of products in use by existing clients. Since these products are directed at assisting fleet managers to operate more efficiently and cost effectively, it is expected that the market downturn will spark increased interest in the benefits that can ensue from the adoption of these advanced management tools.

Strengthening the integration between our traditional classification services, the fleet management programs of ABS Nautical Systems and the range of additional maritime consultancy services, particularly in the area of environmental compliance, offered through the Maritime Services division of the ABS affiliate ABS Consulting, is a primary strategic focus as we continue to listen to and respond to the expressed needs of our clients.

Other ABS Consulting activities – in the public, corporate, nuclear, process and quality and environmental certification sectors – also recorded strong year-on-year growth in 2008 and returned a record financial performance as a consequence. Their services were called upon by clients as diverse as the US Department of Defense, underwriters, oil majors, Fortune 500 companies, the US Green Building Council and operators of nuclear power facilities.

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The breadth and knowledge of the ABS Consulting team is unmatched when applied to the development and implementation of innovative products and services designed to assist their clients in managing the risks associated with their operations. Products such as the EQECAT catastrophe modeling software have been specifically developed to help improve the operational and financial performance of clients by providing technology-based solutions for managing the financial consequences of natural hazard, operational and security risks. Other products also found ready applications such as the latest version of THESIS Enterprise which was used for the analysis of process safety hazards for the handling and distribution of oil and LNG cargoes globally.

The diversification of ABS activities into these associated areas has provided the organization with a stronger base and greater technical capabilities that meet not only the needs of our traditional clients in the marine and offshore sectors but have expanded the reach of ABS into these new areas of activity that have immeasurably strengthened our capabilities. Although the economic downturn could have been expected to adversely impact these ancillary activities, ABS Consulting finished out the year on a very strong note and with a forward orderbook of projects and commitments that was even larger than at the same time a year earlier.

An Annual Review encourages hindsight. It is an opportunity to look back over the activities and financial performance of the past year. The entire organization and every one of the employees can do so with pride and a great deal of satisfaction. The success of ABS is wholly attributable to the efforts, commitment and dedication of those employees.

At the same time, an Annual Review demands a stock-taking for the future. It is a view that is tinged with caution and clouded by uncertainties that are beyond our control. What we can control is how we prepare to weather the expected difficulties that will arise from a global economy in turmoil and serious weakness in our core markets. Those preparations were already at an advanced stage as we closed the book on 2008 and I am confident that the management team and the employees in every division, department and affiliate of ABS are well armed and more than ready to confront and surmount these challenges as we move confidently forward.

Robert D. Somerville Chairman



The extraordinary challenges posed in 2008 were clearly evident in the core shipping activities of ABS. It was a year of continued steady growth – in the number of surveyors, engineers and support staff to handle the high level of new construction activity and the survey of the constantly growing ABS-classed fleet. This growth necessitated organizational restructuring in both China and Korea to address the growing number of shipyards in both countries and to provide more responsive service and closer oversight of our engineering and survey activities. By the close of the year, there were more than 200 ABS surveyors and 22 site offices in Korea, numbers never previously reached, while in China the combined engineering and survey staff exceeded 400.

The increase in staff placed a comparable increase on the importance of training. Efforts in this area included an expansion of the New Hire Accelerated Training (NHATS) program, an increased use of Korea as a training base in new construction for surveyors, the opening of a formal branch of the ABS Academy in Shanghai and increased training activities in Houston, Busan, Singapore and London.

Many of our clients also looked to ABS for assistance with their training needs over the course of the year and the ABS Academy facilities were used to provide training to more than 2,000 members of the global maritime community. Courses covered a broad spectrum from risk assessment and incident investigation, to ISM auditor training and technical subjects such as marine coatings, hull inspections and shaft alignment.

These formal courses were supplemented by a large number of technical and informational seminars held in the principal shipping centers. A primary focus of these sessions was the increased number of environmentally related regulations. Shipowner interest lay in areas as diverse as the latest ballast water treatment requirements and pending restrictions on greenhouse gas emissions. As an active participant at IMO, both through IACS and as members of national flag delegations, ABS was in a position to provide attendees with up to date information on these regulatory initiatives. Topics also included practical advice on trading in US waters, in association with representatives of the US Coast Guard, and the implementation of the new Performance Standard for Protective Coatings (PSPC) among many others.

Much of the material for these seminars was developed and presented by members of the Technology Department which maintained a very active program of research and development



## **Making History in China**

to provide prompt service. And some of the society's most experienced surveyors were moved into leadership positions at the larger



yards to provide additional guidance. Two of the most important projects that were concluded during the year were the delivery of the first LNG carrier and the largest containership to have been built in China, both to ABS class standards. Shanghai's Hudong-Zhonghua shipyard delivered the 147,000 m<sup>3</sup> LNG carrier DAPENG SUN to China LNG Shipping (International) Ltd. for service between Australia's North West Shelf and China's first receiving terminal in Guangdong Province. Fitted with the GTT No. 96 membrane containment system, it was the first of a five-ship series, to be delivered over an 18-month span, all of which were to be dual classed by ABS and China Classification Society.

This historic milestone was quickly followed by the delivery of the 10,000 teu COSCO OCEANIA by the Nantong Cosco KHI shipyard to COSCO Container Lines. The first in a four-ship series of ABS-classed ships, the project was tightly planned with less than seven months elapsing between keel laying and delivery, providing further evidence of the rapid evolution of Chinese shipbuilding capabilities.

throughout the year. Activities covered issues such as the impact of high loading rates on the structure of large bulk carriers, conducted in cooperation with Intercargo, and the use of thick, high tensile steel on ultra-large containerships. Another important research project was the instrumentation of a large containership trading between Asia and Europe to better understand the structural responses of these vessels in service.

A particular focus of attention was the application of advanced technology to better understand both the structural and operational aspects of vessels trading in the harsh, polar environments. Much of this work was undertaken in conjunction with industry partners, including the Russian Maritime Register of Shipping, and was providing valuable information that is expected to influence the establishment of expanded criteria for the expected new generation of tankers, gas carriers and offshore units that will be built for Arctic trading in the near future.

Attention was also given to developing products and services that dovetailed with the overall life cycle of a ship. Principal among these was the release of the complete package of software, training and manuals associated with the Hull Inspection and Maintenance Program (HIMP) notation. Tailored for use by the crew to guide them through the inspection and maintenance of the compartments on the ship, the program also provided an easy-to-use tool for shore superintendents to monitor trends on a ship or across a fleet of ships. The program was enthusiastically received by clients in both the marine and offshore sectors.

Despite the general economic and shipping industry slowdown in the fourth quarter, ABS marine activity remained at an exceptionally high level to meet the sustained demand for engineering and survey services for both new and existing vessels. An excellent Port State Control record appeared to confirm that the actions taken in terms of improving the administration of these services and the training of our staff were successful in maintaining our core commitment to setting standards of excellence.



# **OFFSHORE & ENERGY**

hile the first half of the year saw a continued robust pace of activity in the offshore and energy sectors, global economic concerns cast a shadow as the year closed. With oil prices fluctuating wildly, offshore operators could be forgiven a degree of hesitation in firming plans for the capital intensive projects that would result in new orders for ABS-classed exploration and production units.

Even so, ABS classification and certification services remained in high demand in 2008, as the society continued to hold the leading position for the classification of both exploration and production units. 26 jackups, four semisubmersibles and two drillships were delivered into ABS class during the year and new orders for 19 jackups, nine semisubmersibles and 15 drillships were received. OSV activity also remained steady, with almost 600 of these specialized craft on order to ABS class by the end of the year.

The offshore sector is renowned for its technical innovation. ABS continued to work to stay ahead of the technical challenges involved by developing new or enhanced technical criteria for MODUs, offshore installations and FPSOs. For semisubmersibles, ABS developed and released the ABS Eagle Offshore Structural Assessment Program (OSAP) specifically designed for the analysis of these drilling rig designs. Also released during the year was the new ABS *Guide for Crew Habitability on Workboats*, developed after extensive collaboration with several of the leading OSV operators.

Additionally, several new concepts were brought to ABS for technical review, including floating LNG concepts, innovative gas offloading systems and subsea cryogenic pipes. ABS' evaluation of such novel concepts can lead to the issuance of an Approval-in-Principle (AIP) for a design for which direct empirical experience does not exist. It draws upon engineering, testing and risk assessments to determine if a concept provides acceptable levels of safety that are considered to be equivalent to existing offshore and marine industry standards.



## **Rethinking Drillship Design**

n 2008 Noble Drilling Corp. signed contracts for the construction of the first of a new, four-ship series of harsh environment, dynamicallypositioned, ultra-deepwater drillship, to be built to ABS class. The HuisDrill 1000/Globetrotter design has been developed by Dutch design firm, Huisman Equipment BV with the hull to be built by South Korea's STX Heavy Industries at its Dalian shipyard in China. Huisman itself will handle the topsides and equipment fit-out with final delivery scheduled for 2011. Where the design differs from traditional drillships is the placement of the engine room forward, underneath the accommodation, freeing the entire aft end of the ship for drilling equipment and tubular storage.



The design also incorporates an optimized integration of drilling equipment resulting in a more compact vessel and lower building costs.

It displaces only 54,000mt yet the designers expect it to have operational capabilities equal to units with a displacement of 100,000mt. It is suitable for both Marine Drilling Riser (MDR) and Pressure Riser Drilling (PRD) in unrestricted waters including ice-infested waters.

A compact box type drilling tower is used instead of a conventional derrick. The drilling capabilities however are for a maximum water depth of 10,000 ft and 43,000 ft pipe storage capacity. In addition, it offers improved operational efficiency as a result of the different equipment layout. The drill floor is located only 5 m above the main deck, reducing sideways motions at the drill floor and lowering the center of gravity of the drilling equipment. The 620 ft vessel will be fitted with a DP-3 station-keeping system.

Notable energy projects in which ABS was involved in 2008 included certification of Shell Exploration and Production Co.'s Perdido project in the Gulf of Mexico. The truss spar is located in 8,000 ft of water and has a production capacity of 130,000 barrels of oil equivalent per day. Also in the Gulf of Mexico was the ABS-classed *Shenzi TLP*, constructed by South Korea's Samsung Heavy Industries and going into service in the Green Canyon field, at a water depth of over 4,300 ft. Chevron's *Blind Faith* deep draft semisubmersible for the Mississippi Canyon field was reviewed by ABS. The design included a new approach to hull subdivision and ballasting, intended to improve operational efficiencies.

Other significant contracts included classification of the pilot FPSO unit for the Tupi field off Brazil and of Petrobras' *P59* and *P60* FPSOs. Off Africa, the society was selected by MODEC to class the first FPSO for Tullow Ghana Ltd.'s Jubilee oil project. Slated for completion in 2010, it is designed to handle up to 120,000 barrels of oil and 170 million cubic feet of gas per day. Two other significant awards included the FPSO *Saxi Batuque* for ExxonMobil's Kizomba C development and the FPSO *Gimboa* for Sonangol, both off Angola.

Elsewhere, ABS was selected to class the second FPSO to go into service off New Zealand, the Horizon-operated *Raroa*. In the Caspian, the floating storage and offloading unit (FSO) for the Yuri Korchagin field for Lukoil featured ABS class. And a newbuild FSO, the ABS-classed, 350,000 barrel capacity *Rang Dong FSO*, was installed offshore Vietnam.

Of particular note was completion of the first offshore jackup rig to be built in the Middle East. Sharjah's Maritime Industrial Services Co. Ltd. Inc. (MIS) built the *Oritsetimeyin*, a Friede & Goldman Super M2 design, to ABS class, the first in a series of these units. In the US, the ABS-classed *Rowan Mississippi*, was the first in the new series of four 240C Class deep drilling jackups for Rowan Companies, Inc., to be delivered by LeTourneau. And Singapore's Keppel Shipyard, the world's leading jackup builder, continued its heavy delivery schedule of ABS-classed units throughout the year.



# GOVERNMENT

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N aval ship classification activity for ABS continued to evolve in 2008 as both sides – the various navies of the world and ABS – gained a more assured understanding of each other's needs and capabilities. In the US, the relationship between the US Navy and ABS now includes classification of combatant vessels and patrol craft, in addition to the traditionally classed Sealift fleet.

Conducted through the ABS Government Operations Office, the incorporation of classification into the government shipbuilding process has been subject to a learning curve. However, the progress is identifiable and the relationship continues to strengthen. For example, in 2008 the US Navy agreed to retain combatant vessels that are built to ABS class standards in class after delivery, maintaining them to the applicable class Rules and subjecting them to class survey.

This growing relationship is founded on two key elements. The first has been the establishment of appropriate technical criteria. The ABS Rules for Naval Vessels address elements for both large and small vessels that are unique to their naval service. The establishment of an ABS Naval Technical Committee has been an important factor in maintaining and updating the Rules to reflect the latest technologies associated with naval ships.

It has been equally important to develop and train a core technical staff of engineers and surveyors within ABS that are responsible for verifying compliance with the Rules, and to provide training on the substance and application of the Rules to Navy personnel, the designers and shipyard staff. In this way, all organizations gain a thorough understanding of the standards and the applicable classification processes.

By including personnel from the various Navy organizations in this training and familiarization process wherever possible, it promotes a better understanding of each other's needs. As an example, ABS held a Naval Vessel Classification Seminar



## **Classing the Next Generation of Warships**



ork began in earnest at ABS during 2008 on reviewing and approving the drawings for the next generation, DDG 1000, series of destroyers to be built for the US Navy at Northrop Grumman Ship Systems sector's Pascagoula and Gulfport, Mississippi, facilities and at General Dynamic's Bath Iron Works yard in Maine.

The DDG 1000 (Zumwalt class) will join the ABS-classed LCS series of littoral combat ships as part of the US Navy's multi-mission surface combatant fleet, tailored for the littoral, air and subsurface warfare. With the



lead ship scheduled for delivery in 2013, it will operate as part of a joint maritime fleet, assisting Marine strike forces ashore. DDG 1000's flexible design, stealth and precision volume strike are expected to make this ship an important component within the US Navy's fleet of the future. The DDG 1000 class of destroyers displaces approximately 14,500 tons, is 600 feet long, has a beam of 80.7 feet, a navigational draft of 27.6 feet and a ship's crew of 142, including the aviation detachment.

It is the largest and most sophisticated naval combatant vessel to be built to the classification standards established in the ABS *Rules for Building and Classing Naval Vessels* and will be retained in class, subject to periodic survey, after delivery and in service. ABS worked closely with the US Naval Sea Systems Command (NAVSEA) and the shipyards throughout the year as the design elements were finalized prior to scheduled full rate production in early 2009.

in New Delhi, India in 2008 to further the understanding of the application of the concept to both Indian naval and Coast Guard vessels. Representatives from Indian shipyards also attended the seminar.

Since the primary focus of ABS is on hull structure, stability, machinery, propulsion systems, auxiliary systems, fire fighting systems and habitability requirements, the establishment of a Certification Matrix to define the technical requirements for each element of the ship has been determined to add considerable value to a project. In particular it helps to identify the primary certification organization for each element. For example, a naval organization will certify the weapons system. However, ABS would be responsible for the standards for the supporting structure, hydraulic system and electrical system loads.

Throughout the process of bringing a new naval vessel into class, and maintaining the vessel in class, ABS looks for ways to improve the Rules and procedures used in the classification process. A major component of this approach is to capture lessons learned from the initial concept design, throughout the life cycle of the warship, up to the time of its scrapping. Such an analysis may lead to Rule changes or focus research and development in areas that may minimize the likelihood that problems persist.

Increased confidence in the classification process by the US Navy led them to award a contract to ABS in 2008 to perform a life assessment pilot for the Navy's fleet and determine its capability to meet its expected service life. This pilot involved applying analytical services using a class Finite Element Model (FEM) and other calculations to predict remaining fatigue life.

On the basis of the evidence to date, ABS firmly believes that the classification of naval vessels will continue to contribute to a reduction in the cost of naval shipbuilding and through-life maintenance. It is proving to be a very effective marriage between the classification process that is grounded in commercial shipbuilding approaches and the high technical standards required for naval vessels. By year's end the dedicated team of ABS engineers and surveyors working on naval projects had neared 100 staff members.



# **CLASS ACTIVIT**

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espite the abrupt slowdown in new ship ordering in the final quarter of the year, 2008 was again characterized by a very strong demand for new ships with the ABS orderbook surging by 12 percent to a new record of 3,309 vessels of all types. However, the increased number of contracts did not translate into a comparable increase in tonnage on order which declined slightly to a still very strong 51.5m gt.

A large volume of additional new tonnage was ordered to ABS class but for which formal requests for class had not yet been received by year's end. The economic uncertainty and collapsing freight markets that heralded the new year could be expected to jeopardize some of these prospective contracts although there were no indications of cancellations as 2008 came to a close.

The existing fleet was steadily bolstered by new deliveries, increasing every month to finish the year at yet another record level of 144.1m gt. This represented an increase of 8.7m gt over the previous year with a further growth through at least the early part of 2009 predicted on the basis of orders either under construction or in-hand.

ABS continued its traditional strength in the tanker sector, holding a clear market lead with a 33 percent share of all tanker tonnage on order at end-December. This represented more than 500 oil and chemical carriers aggregating over 21m gt. The strength was particularly notable in the vlcc, aframax, product and chemical sectors, in each of which ABS held the leading share of new orders based on tonnage.

Not surprisingly, given the almost fevered pace of ordering of new dry bulk tonnage in the first half of 2008, the ABS orderbook for bulkcarriers grew substantially, closing out December with 540 vessels aggregating more than 21m gt on order to ABS class, an increase of 142 vessels and 5.5m gt over what had been considered to be a very successful orderbook in the previous year. Owners at both ends of the bulkcarrier spectrum showed particular support for ABS resulting in a 23 percent share of the capesize orderbook and a remarkable 38 percent share of the handysized bulkers on order.



#### ABS FLEET SIZE (1990-2008)



Although national fiscal policies continued to distort the classification opportunities within the containership sector, ABS did have firm contracts for 59 of these ships on its books at the end of the year and continued to receive loyal support for its services in this sector from select Asian and European owners.

High oil prices mid-year helped sustain a prolonged bull market for offshore related equipment and ABS, as the traditional leader in this sector, benefitted from the activity.

It retained its leading position for both exploration units (MODUs), including firm orders for 87 jackup units and 14 drillships, and for floating production units. The demand spilled over to the offshore support vessel sector with a significant number



#### VESSELS REMOVED (2004-2008)



of orders being placed for these increasingly specialized vessels. At end-December, firm orders for almost 600 of these workhorses had been placed with ABS.

The emergence of China as a potent force within international shipbuilding was evidenced by the orders for 1,404 vessels, placed with Chinese shipyards that specified ABS class. These aggregated almost 27m gt, confirming ABS as the clear market leader in providing classification services within the country. Korea, however, maintained its preeminent position as the world's largest shipbuilding nation and, by the end of 2008, ABS had reclaimed the leading position among classification societies serving this market.

ABS also retained its traditional position as the class society of choice for owners building in US, Singaporean and Taiwanese yards and made significant inroads with the emerging shipbuilding nations of India and Vietnam.

#### SHARE OF WORLDWIDE ORDERBOOK (2008)



#### EXISTING FLEET AGE PROFILE (2008)







An expected consequence of the recent spate of new deliveries is that the average age of the ABS fleet continued to drop in 2008. By year's end, 58 percent of the ABS existing fleet was aged 10 years or younger, with almost 30 percent of the fleet under five years of age. Almost 800 of the total fleet of 10,636 vessels were delivered during the year. With the looming 2010 mandatory phaseout of single hull tankers and the weak freight market likely to send an increased number of older vessels, particularly bulk carriers, to the scrapyard, this age profile is expected to further improve over the immediate future.

#### OFFSHORE EXPLORATION UNITS\* SHARE (2008)





43%

Other

ABS

#### **OFFSHORE PRODUCTION UNITS\* SHARE (2008)**



\*Existing Fleet Classed and/or Certified by ABS

## CLASS ACTIVITY SUMMARY

	Vessels in Class 31 Dec 2008		Vessels on Order 31 Dec 2008		New Vessels Classed in 2008	
VESSEL TYPE	NO.	GROSS TONS	NO.	GROSS TONS	NO.	GROSS TONS
Barge	2,746	8,437,635	589	2,164,385	339	997,460
Barge Carrier	7	261,780	7	311,300		
Barge Type Unit	33	111,996	7	82,473		
Bulk Carrier	713	25,648,075	545	21,136,214	36	1,764,914
Bulk Liquid Carrier	9	59,708	1	3,000		
Chemical Carrier	322	5,764,393	219	3,694,917	70	922,402
Column Stabilized Unit	150	2,304,347	31		2	30,147
Container Carrier	514	21,744,767	59	1,500,356	30	1,753,594
Dredge	26	105,652				
Drillship	21	620,759	14	760,626	1	59,626
Ferry	67	778,383	8	5,685	5	65,401
Fishing Vessel	17	37,189	2	2,646		
Fixed Platform	180	23,363	26	16	6	
Floating Dry Dock	18	192,268	3	3,808		
FPSO/FSO	76	7,536,862	1	80,000	1	83,245
Gas Carrier	94	5,408,996	23	2,529,300	7	673,176
General Cargo Carrier	288	2,686,043	15	104,490	3	71,416
Heavy Lift Ship	13	373,776	2	12,000	1	32,060
High Speed Craft	221	65,173	123	26,805	38	11,726
Offshore Supply Vessel	957	1,034,796	128	266,859	68	131,026
Offshore Support Vessel	381	674,163	468	947,622	4	88,662
Oil Carrier	897	48,828,424	330	17, 364,139	53	2,712,227
Passenger Vessel	37	325,979	38	64,915		
Refrigerated Cargo Carrier	28	305,855				
Self Elevating Unit	418	2,510,242	87	7,354	21	189,027
Ship Type Unit (excl. FPSO/FSO)	18	1,447,820				
Single Point Mooring	53	1,169	21		6	
Spar	13	126,771	1			
Special Purpose Vessel	476	1,254,682	41	108,743	9	6,235
Subsea Pipeline	12		3			
Swath Vessel	8	24,972	1	800		
Tension Leg Platform	8	19,117	1			
Tug/Towboat	1,156	515,229	291	198,150	120	147,412
Underwater System	52	93,852	28	16,545	2	4,666
Vehicle Carrier	114	4,619,501	2	5,455	1	5,488
Yacht	493	164,883	194	64,914	46	16,838
TOTALS	10,636	144,103,620	3,309	51,463,517	869	9,766,748

## FLEET MANAGEMENT SYSTEMS ABS NAUTICAL SYSTEMS LLC



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NS5 CONTROL CENTER

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FLEET MANAGEMENT SYSTEMS ABS NAUTICAL SYSTEMS LLC

Previously operating as a majority-owned, affiliated company, ABS Nautical Systems LLC (ABS NS) came under full ABS ownership in late 2008. It is the first step in a strategy that will more closely align its activities with those of ABS and the Maritime Services division within ABS Consulting. It is expected to enhance communication between ABS and the common client base of all three organizations, and advance the delivery of synergetic products to the marine and offshore industries.

A leading provider of integrated fleet management software, ABS NS offers a suite of modular products (NS 5) designed to more efficiently manage key operational areas such as maintenance and repair, dry dock administration, regulatory requirements, purchasing and inventory, vessel drawings and crew management and payroll.

The ABS NS portfolio broadened in 2008 to include a new program developed to support the ABS Hull Inspection and Maintenance Program (HIMP) notation and the requirements of the ABS *Guide for Hull Inspection and Maintenance Program*. The software helps track the condition of a vessel's structure throughout its service life. Designed for owners and operators, the program provides a vessel-specific hull maintenance module that identifies the compartments to be inspected, provides a simple to follow rating system to be used by the inspector, lists critical areas that

should be examined and provides the tools needed for an administrator to track trends occurring on an individual ship or offshore rig, or across a fleet of vessels.

Other enhancements to the NS 5 product suite in 2008 included the addition of business intelligence tools, such as personalized dashboards and on-demand reporting capabilities, which give users a more prominent seat at the developers' table.

Reducing the daily administrative duties within a user's organization, the new "My Tasks" module collects the outstanding duties, alarms and internal system messages of an individual user and displays them in a single control center. Personalization will also be available through NS 5 Insight, an on-demand reporting tool that taps a separate reporting database, safeguarding company data while still giving endusers the ability to create custom reports.



## **Using IT to Gain Competitive Advantage**



Thoresen Thai Agencies Public Company Limited (TTA) believes IT is becoming a key differentiator between ship operators. It considers cost control and improved efficiency as essential if it is to compete successfully in a strong market and not just survive, but continue to prosper, during the cyclical downturns. As a consequence, the organization completely overhauled its IT infrastructure in 2008.

This massive project upgraded nearly all the hardware and software throughout the Dry Bulk Shipping Group,



and ABS Nautical Systems (ABS NS) was there to support the deployment of NS 5 across the 43-vessel fleet. An embedded ABS NS consultant in TTA's Bangkok branch worked closely with Thoresen staff to set up system configurations and identify enhancements to the software that would enable the company to meet its two primary goals; streamlined work processes and management reporting based on defined key performance indicators (KPIs).

Establishing a thorough understanding of the shipboard staffs' needs proved the key to a successful implementation. Extensive shoreside and onboard training sessions fostered buy-in from the projected users on the ships and in the various shore offices and created a feedback loop for continued support and needs requirements.

Once the NS 5 software was fully deployed, the project continued with the development of interfaces from the NS 5 Maintenance and Purchasing modules to the SAP accounting system used by TTA. In late 2008, TTA further strengthened its partnership with ABS Nautical Systems with the purchase of two additional NS 5 modules: Quality & Compliance and Crewing & Payroll.

Another significant product improvement delivered in 2008 enables users to suspend planned maintenance tasks for a specified period of time. Developed in concert with shipowners from the Great Lakes region, where maintenance tasks may be suspended during the winter months when vessels are in temporary lay-up, the module is equally applicable to ocean-going vessels that are facing protracted periods of downtime and cold lay-up under current market conditions. Prior to this recent release, planned jobs would accumulate and display as overdue in the software.

The importance of continued product investment was highlighted at the annual Users Conference held in Long Beach, California in late 2008. A record number of participants gathered to learn of the many new enhancements included in the year's release, and to discuss their development wish lists for the upcoming year.

A new format for the conference more than doubled the amount of workshop time available to clients and introduced industry focus group sessions to reflect the growing diversity among the ABS NS client base. No longer serving only the traditional marine client, Nautical Systems has seen a significant increase in the number of small boat and offshore operators adopting the fleet management system. Its products are also being adopted by operators of government vessels, a sector that holds the promise of significant growth.

Given the overall level of activity, ABS NS was able to outpace the previous years' revenues, making 2008 another record year. The growing annual maintenance fee base establishes a strong foundation for continued revenue stability and investments into product development. Global expansion continued during the year, with new offices opening in Manila, Jakarta and Newcastle. The Houston and Kuala Lumpur offices also grew in number to support the increased number of clients in the US and Asia.



## MARITIME SERVICES ABS CONSULTING

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RESCUE ZONE

G oing beyond compliance to stay ahead in today's environment is crucial to ABS Consulting's Maritime Services division's clients. The group offers a wide range of industry expertise to assist members of the marine sector to improve the safety and efficiency of their operations, and develop solutions to the operational, regulatory and technical challenges they face. This portfolio of services includes technical assistance, life cycle services, certification, training and casualty response among many others.

The Maritime Services approach is based on assisting a shipowner at every stage of the lifecycle of a ship, from providing initial design consultancy and review, through to assisting with the inventorying of hazardous materials prior to scrapping. In 2008, considerable effort was placed on developing a life cycle hull inspection and maintenance program, in conjunction with ABS Nautical Systems. The program provides a single, coordinated approach to tracking the condition and inspection of a vessel, supporting a holistic and proactive preventative maintenance approach. Simple to use by the onboard crew, following training, it enables both the crew and the shoreside superintendents to detect and track anomalies, such as deteriorated coating condition, fractures and damage within a vessel's structure, and to identify trends across an entire fleet. The program has been enthusiastically received and several installations were being undertaken as the year drew to a close.

The Rapid Response Damage Assessment (RRDA) program remains a core element of the Maritime Services division's portfolio. It provides quick, professional advice by a team of engineers and naval architects when an enrolled vessel is involved in a casualty or incident that affects the stability or survivability of the vessel. In 2008, the number of vessels enrolled in the program increased by 300 to more than 1,450, the largest number contracting for the ABS Consulting service.

Recently enrolled vessels include oil and chemical tankers, bulk carriers, tugs and barges, container carriers, FPSOs, FSOs and LNG carriers. Although it is hoped that the division is never called upon to respond, there were eight incidents in 2008 that required intervention by the RRDA team. They also participated in 22 planned drills, held in conjunction with clients, the highest number recorded.

In the US, the division provided certification for a growing number of casino gaming vessels, serving as an authorized representative for the states of Missouri, Mississippi, Illinois and Indiana. These vessels encompass a wide range of designs, from largely traditional vessels moored alongside a dock, to unique hybrid designs



## **Managing Shipyard Projects**



bu Dhabi National Oil Company (ADNOC) awarded ABS Consulting's Maritime Services division the contract for Master Project Management to oversee engineering review and construction services for newbuild and ship replacement programs. The scope of this contract included the management of shipbuilding projects on behalf of owners, ADNOC, to verify that new vessels are designed and built in compliance with

applicable shipbuilding contracts and specifications, maritime authorities' regulations, classification society requirements, and that the vessels meet shipowners' quality objectives.

During 2008, the division was the project management consultant during the construction of the Field Control Vessel (FCV), which was successfully delivered to ADNOC by Astilleros Balenciaga SA Shipyard (Spain). At year's end, ADNOC newbuild projects included the construction of three Fast Supply Intervention Vessels (FSIV) in Singapore and two Safety Standby Rescue Vessels (SSRV) at Batam Island, Indonesia.

In addition, the Maritime Sevices division completed the feasibility study for the conversion of the product tankers, M/T AL DHABIYYAH and its sister vessel M/T ARZANAH (pictured above) into dry bulk carriers. The division was also appointed by ADNOC to monitor the tanker conversions at Gemak Shipyard in Turkey.

that require the application of both marine and land-based standards. ABS Consulting's Maritime Services division acts on behalf of the relevant state's gaming commissions to survey the hull and inspect the safety systems. It has issued a *Guide for Alternative Certification of Continuously Moored, Self-Propelled Riverboat Gaming Vessels* that was adopted in 2008 by the Louisiana Gaming Control Board (LGCB).

The Guide was developed when the United States Coast Guard (USCG) advised the owners of these vessels and the LGCB that they would no longer issue USCG Certificates of Inspection to moored gaming vessels effective December 2009. The ABS Consulting guidelines provide an alternative means of certifying these assets. Unanimously approved by the LGCB, ABS Consulting's Guide provides certification that a vessel has met certain industry and statutory safety requirements.

ABS Consulting's Maritime Services division operates globally through a network of regional offices. Principal among these is the office that is maintained in Piraeus to serve the active and important Greek shipping community. The Greek office provides a wide range of training and consulting services to assist shipowners in improving the safety and efficiency of their marine operations. Through the ABS Academy in Piraeus, the division expanded its portfolio of marine training courses to meet identified needs of the local maritime community. The facility also draws participants from throughout Europe and the Middle East. Courses held in 2008 attracted a record number of participants.

Pacific activities are administered from regional headquarters in Singapore and activity remained brisk throughout 2008. An example of the type of work undertaken was the selection of the Maritime Services division to provide naval architectural consultancy services to a shipowner for the conversion of two oil tankers to conventional bulk carriers, compliant with the IACS common structural rules.



## **NUCLEAR UTILITIES** ABS CONSULTING

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Public safety and environmental concerns require operators of power producing facilities and power distribution companies to seek practical answers to challenging issues. Last year ABS Consulting's Nuclear Utilities division provided support to plant owners and operators to manage the challenges of operational risks and regulatory requirements, natural catastrophes and man-made hazards.

In 2008, the US Nuclear Regulatory Commission (NRC) issued a communication regarding the effect on Emergency Core Cooling Systems (ECCS) from the potential formation of gas voids in nuclear plant systems in the event of reactor emergency and accident conditions. ECCS generally remain in an unpressurized standby mode, unless triggered to activate. This standby mode enables any entrained gases to separate out of solution and form gas voids at local high points within these systems. ABS Consulting was requested by the operators of eight US reactors to evaluate this issue.

In response, the Nuclear Utilities division performed in-plant walkdowns to identify the high points and conducted piping system hydraulic and transient analysis to assess void migration to pumps and determine piping transient loadings as a result of pumpstart on system activation. This data was evaluated in piping stress models to identify the ability of the safety systems to operate and perform their intended function. Recommendations relating to the addition of vent locations were also provided.

To address tritium and other radio-nuclides leaking from spent fuel pools at a number of nuclear reactor sites throughout the US, ABS Consulting worked closely with one US plant and its owner and hydro-geologists to develop a comprehensive threedimensional (3-D) plant foundation model to predict the migration paths of the contaminated water in the subsurface strata below the plant. The 3-D model was also used to identify contamination plumes and incorporated subsurface rock profiles, test well locations, individual plant structures' foundation arrangements, subsurface back-fill and underground utilities.



## **Investigating a Manhattan Steam Explosion**



the cause of the incident, Con Edison turned to ABS Consulting in 2008 to perform an independent incident investigation and technical analysis of the rupture to uncover the cause of the incident.

105 miles of main and service pipes. To help determine

ABS Consulting's investigation determined that the incident was caused by a bubble-collapse water hammer that generated a momentary force against the pipe's wall that was more than seven times greater than the pipe's normal operating pressure. It was established that the pipe was found to be in good condition and did not contribute to the event. However, with unusually heavy rains the morning of the incident, high levels of external water accumulating around the deeply buried steam pipe led to cooling of the pipe, which caused above-normal condensate to form and collect within it.

During the post-incident investigation, ABS Consulting revealed the capacity of the pipe's two steam traps was affected by epoxy materials. Some of the materials appeared to have ultimately entered the traps and hampered their operation. Steam traps usually drain ordinary amounts of condensate accumulating within steam pipes, but the compromised traps could not drain the large amount of condensate produced when the pipe was surrounded by water.

A number of mitigating strategies were developed, including the design and installation of a pool water cleaning system. The Nuclear Utilities division designed, fabricated and provided oversight during installation and commission testing, greatly reducing the contamination levels of the leaking pool inventory. The final measure to mitigate this issue was the removal of the spent fuel to dry storage containers where ABS Consulting provided engineering support activities to the owner on this fast track project to remove the spent fuel and drain the fuel pools, to eliminate the source of the ground contamination.

In 2008, the Nuclear Utilities division continued to provide nuclear plant security assessments at US and international reactors. Typically, barriers are provided to limit the location and access of any terrorist approach utilizing vehicle-mounted bombs. These requirements have been in place at US reactors for many years; however the design requirements continue to evolve with the consideration of new potential threats.

To assist the operator of one nuclear facility which had requested relocation of the vehicle barriers to accommodate other site requirements, ABS Consulting performed detailed blast modeling of the site facilities to address the impact of vehicle bombs at various locations on the secure security and required reactor shutdown facilities. The Nuclear Utilities division's engineers utilized CFD-based computer software to predict blast pressure loadings on secure structures housed within other facilities and evaluate resulting blast pressure loadings to those structures. Where required, the engineers developed structural modifications to improve the stability and ability of the enclosures to remain viable in the event of a terrorist attack.



## PROCESS INDUSTRIES ABS CONSULTING

Process safety culture is difficult to measure and harder to change. ABS Consulting's Process Industries division helps clients meet process safety compliance and emphasizes that the key to sustainable process safety performance is culture. There are few direct indicators of culture and, because of its nature, it cannot be evaluated very frequently. For its clients, ABS Consulting has devised a formal approach for connecting process safety and environmental, health and safety performance outcomes to culture.

The management of process safety focuses on the design and engineering of facilities, hazard identification and assessment, management of change, inspection, testing and maintenance of equipment, effective alarms, effective process control, effective shutdown and emergency response, operating procedures, training of personnel and human factors. In 2008, the Process Industries division evaluated the process safety program and culture at Maersk Oil's offshore operations in Qatar, Denmark and the United Kingdom. This review involved extended visits to each region, performing process safety technical reviews and conducting interviews with Maersk Oil offshore, onshore and corporate personnel. In addition, a process safety culture survey was administered where the analysis of all results was used to determine the health of process safety in the company and cultural issues that are vital for the company's achievement of top-quartile performance in process safety.

Within the Process Industries division, ABS Consulting's Extreme Loads and Structural Risk group provided advanced simulation capabilities to assess and mitigate hazards for clients who process hazardous chemicals. Release of hazardous materials is uncommon but the consequences can be catastrophic. Understanding the impact of these events is complex when considering a dynamic process environment involving multiple pressurized systems, confined areas and a wide array of release scenarios.

The group developed cutting edge methodologies for screening critical hazards and helping clients focus on scenarios which produce the greatest risk for personnel and equipment. These techniques include the use of computational fluid dynamics (CFD) modeling to simulate dispersion of toxics and flammable materials and the resulting vapor cloud explosions.



## **Building Sustainable Process Safety Performance**



A aersk Oil, a subsidiary of the A.P Møller Group, produces 800,000 barrels per day from locations across the globe. At any given moment, exploration and production activities are ongoing in the Danish, UK and Norwegian sectors of the North Sea, Qatar, Algeria, Angola, Kazakhstan, Oman, Brazil and the US Gulf of Mexico. Committed to safe, environmentallyresponsible oil and gas recovery, Maersk Oil executives commissioned a thorough review of its operations to evaluate process safety in its three producing regions and determine whether areas for improvement existed.



ABS Consulting led a combined Maersk Oil and ABS Consulting team to evaluate the process safety program and culture at Maersk Oil's offshore operations in Qatar, Denmark and the United Kingdom. This review included technical reviews, interviews with Maersk Oil personnel, a survey and analysis. The team determined there were eight cross-cutting process safety issues challenging Maersk Oil's pursuit of process safety excellence, including process safety competency and training.

To address these and related issues, Maersk Oil chose ABS Consulting to help design, develop and deliver a Global Process Safety Training Program. This effort fosters process safety competency throughout the company for over 3,000 personnel, from the executive level to offshore technicians. The program is increasing process safety knowledge and helping to build a sustainable culture of process safety in the organization. Course designs include interactive workshops and exercises based upon the company's specific operating experience. Ultimately, Maersk Oil personnel will take train-the-trainer instruction so that the program could evolve into a self-sustaining competency assurance activity that could help the organization reach and sustain its goal of being a global process safety leader in oil exploration and production.

This methodology involves construction of a numerical model of a process unit or offshore module and surrounding equipment and facilities. Using this approach, the group was able to determine the impact of objects on the flow of flammables and toxics and accurately determine the consequences. This modeling also helps clients develop mitigation for flammable hazards, including state-of-the-art water spray systems. Training and experience with advanced CFD tools provides practical, effective solutions which are required for implementation in operating facilities that address real world hazards and can dramatically improve the safety of client's facilities.

The European region of the Process Industries division experienced growth in its core business areas and managed consultancy services. The team expanded the engineering risk services for assessing the effects of extreme loadings to a major national oil company in the Middle East, including the provision of risk mitigation options to promote business continuity. Also, the group was involved in several design verification projects for a major maritime company regarding its assets installed in the North Sea.

ABS Consulting continues to develop its THESIS BowTie<sup>™</sup> Hazard Management software. In 2008, THESIS Version 5.5 was released as a standalone product as well as with THESIS Enterprise, a parallel tool, which is configured as a fully web-based program bringing additional functionality in the best practice management of risk. The Process Industries division's continued consulting support with THESIS includes a project in which the software was used for the analysis of process safety hazards for the handling and distribution of oil and LNG cargoes globally.



# PUBLIC SECTOR ABS CONSULTING

BS Consulting's Public division continued to grow through 2008 with major government bodies turning to the division as a leading provider of risk management and other independent, third-party assessment services for agencies and administrations. Serving federal, state and local governments, the division worked with the Department of Homeland Security (US Coast Guard), the Department of Defense (US Navy and US Marine Corps) and the Department of Energy. For these agencies, the Public division provided hazard risk assessment/ management services and independent, third-party validation, verification and certification program risk management functions.

The division performed engineering services for extreme loads on structures of critical infrastructure/key resources and marine engineering support, including life cycle asset management, reliability/maintainability and system safety services for fleets of public vessels. For prominent port authorities, the division provided assistance for the development of port-wide risk assessments, strategic risk management plans and trade resumption/resiliency plans under the Port Security Grant Program.

Several years ago, the US Coast Guard (USCG) embarked on a modernization and strategic transformation of its entire organization and key processes to achieve optimal execution of its multiple missions. Sustaining its work with the USCG, the ABS Consulting's Public Sector became a key member of the USCG's logistics transformation process, providing a broad range of engineering and technical

support services to the USCG as it transitions its logistics operations to a more centralized, mission focused support structure.

The USCG's new logistics model is centered on bi-level maintenance coordinated by the newly created Surface Forces Logistics Center (SFLC), which is responsible for depot maintenance as well as technical and logistics support. A crucial component of the transformation is the shift to a reliability-centered maintenance (RCM) concept to promote the optimal mix and timing of preventive maintenance tasks in order to maintain and improve the inherent reliability of systems and equipment at minimum cost. ABS Consulting developed an RCM program for the Coast Guard that aligns with its transformed organization, while adopting the USCG's aviation logistics model and best commercial practices as applicable.

In addition, technical analyses of existing systems using RCM analysis techniques were conducted to identify enhancements to the preventive maintenance system and potential



## **Enhancing Facility Security**



The Department of Homeland Security's (DHS) mission is to secure the United States and preserve its freedoms from coast-to-coast. The US Congress mandated that the DHS consider risk in its regulation of terrorism threats to chemical facilities since the US public could be threatened by the release of chemicals associated with those facilities. DHS responded with the development of the Chemical Facility Security Anti-Terrorism Standard (CFATS). The CFATS regulation requires facilities with more than a specified threshold for a large group of chemicals to register with DHS and provide input for an initial consequence screening.



Based on those screening results, some of those facilities (high risk potential) are required to perform a security vulnerability assessment (SVA). If considered high risk by DHS based on the SVA results, the facilities must develop a site security plan (SSP) and undergo federal security inspections.

Shortly after the development of the regulation, DHS selected ABS Consulting to provide subject matter expertise to help DHS implement the CFATS requirements in an effective manner. DHS recognized the need for physical security, chemical engineering, process safety and risk assessment support from an organization that was recognized for its leadership in these areas.

In 2008, ABS Consulting provided security vulnerability assessment and security risk expertise to DHS. Those services focused on SVA consulting, risk assessment guidance and security training services for DHS CFATS inspectors. ABS Consulting's review services involve the performance and integration of reviews in the areas of chemical engineering, physical security and cyber security. The reviews provided input to DHS in their consideration as to whether or not a facility met the applicable regulatory requirements.

engineering changes to enhance overall system readiness. Root cause failure analyses were performed to more fully understand the mechanisms of failures and determine corrective actions that can prevent repeat failures which could adversely affect the USCG's mission performance. The Public Sector provided training, information management and quality assurance for this project.

The division offers multiple perspectives and insights on RCM and related reliability/ maintenance best practices from the direct experience gained from working with the USCG, the US Navy, other Department of Defense branches, other government agencies and the worldwide marine industry. The logistics services that the division provided supported not only the SFLC, but ultimately USCG headquarters, field activities and operational units in enhancing readiness and enhancing mission performance.

Additional work with the USCG included assisting the USCG Research and Development Center (RDC) to augment its capacity, acquisition experience and technological expertise in its role as advisor and consultant to the Coast Guard Acquisition Directorate (CG-9) and its sponsors. This augmentation represents a long-term partnership to provide support of major and non-major systems throughout the acquisition life cycle.

Compiling a team of 19 partners, ABS Consulting is providing principal investigators and system engineering and technical assistance including complex analyses requiring the coordinated integration of experience and expertise applied to several tasks. One of these included the team assisting the USCG in developing an acquisition strategy that will form the basis for its Offshore Patrol Cutter (OPC) Acquisitions Plan.

Another task included high latitude mission analysis for supporting the USCG's evolving mission in the polar regions. ABS Consulting reviewed the current characterization of the physical, economic and political environment in the polar regions, including an assessment of international policies, laws and international agreements, and summaries of activities of other nations to assert their interests, updated the existing "Polar Ice **Operations**" Mission Analysis Report and developed a plan for analyses of Coast Guard program area missions in the polar regions.

ABS Consulting's Public Sector's services and training provide clients with knowledge and deliverables that meet the expectations of governing bodies, both in the United States and abroad, while assisting clients to understand and meet the latest regulatory and legislative compliance requirements.



## CORPORATE SECTOR ABS CONSULTING

Understanding and effectively managing natural hazard and man-made catastrophe threats has never been more important than in this economic environment. By combining ABS Consulting's Corporate Sector's overall engineering capabilities with its EQECAT catastrophe modeling software, the group has continued to help improve operational and financial performance for its clients by providing technology-based solutions for managing the financial consequences of natural hazard, operational and security risks. In 2008, the division further promoted its modeling dominance in the offshore energy arena through a combination of model enhancements, expansion of licensing into the insurance markets and use of its Offshore Energy Model (OEM) to support a host of key consulting projects for offshore energy producers who continue to improve their risk management decisionmaking processes.

A series of enhancements were applied to the OEM to further support insurance underwriters, catastrophe managers and oil and gas operators in evaluating their risk exposure to hurricanes that track through the Gulf of Mexico. The refinements utilized recent operator damage data and damage vulnerabilities for key assets in the region. In addition, the model was updated to better integrate unique US Department of the Interior Minerals Management Service asset codes from platform asset names commonly provided in exposure data files in the insurance markets. This enables essential asset characteristics and data, including platform production capacity and pipeline network connectivity data, to be more accurately and automatically included in offshore platform catastrophe analyses. This simplifies the modeling process and helps generate better estimates of potential business interruption, contingent business interruption and control of well losses.

The Corporate Sector successfully integrated the use of the OEM model into risk management consulting efforts and projects. Utilizing the unique risk perspective offered from the model, the division worked with a large energy-related company on two key consulting projects consisting of analyses of its portfolio assets in the Gulf of Mexico and an analysis of its business interruption and contingent business interruption exposure resulting from the peril of hurricanes. These initial projects provided the company with the insight it needed to optimize its portfolio in the Gulf and better manage catastrophic risk to promote continued success in efficiently managing financial growth.



## Serving the Insurance & Financial Markets



uring the months of August to October, the Gulf of Mexico's warm water and atmospheric conditions can contribute to violent and devastating storms. For insurance and financial industries, understanding and acting on their catastrophe risk is critical. This understanding can be gained through catastrophe modeling.

EQECAT's enhanced Gulf of Mexico US Offshore Energy Model (OEM) is becoming the leading tool used by the insurance and financial markets to better evaluate and



manage their risk exposure to hurricanes in the region. This model is particularly attractive to those underwriters of offshore risks that place a high degree of importance on their overall underwriting strategy. Two prominent such underwriters include Torus Insurance, a technical lines insurer specializing in large complex risks with particular focus on the energy sector, and Catlin Underwriting Agencies Limited, a wholly owned subsidiary of Catlin Group Limited, an international specialist property, casualty insurer and reinsurer. Both firms licensed the OEM for portfolio risk management and underwriting, following the enhancements made to the program in 2008.

Applications for the model also expanded from the pure analytical risk analysis for the offshore platform and assets, and were adopted for use in energy trading by one of ABS Consulting's Corporate Sector's clients. This client implemented the OEM to support trading decisions on oil and gas commodities, through arbitraging the value of oil and gas contracts that could be affected by an impending hurricane track through the energy fields in the Gulf. Enhancements in the business interruption and contingent business interruption components of the model enabled energy traders to calculate the expected loss of production and shut-in capacity of oil and gas from impending hurricane events tracking through the Gulf.

The OEM model was also tapped to support a risk assessment analysis for another energy-related company to identify opportunities for ceding the risk to Gulf assets in the capital markets through a catastrophe bond. This company operates the world's longest crude oil and liquids pipeline system. These pipeline systems have operated for over 55 years and now comprise approximately 13,500 kilometers of pipeline, delivering more than two million barrels per day of crude oil and liquids. Using the OEM, the Corporate division provided a view of damage and financial risk to the firm's assets in the Gulf from hurricane events, enabling an informed decision between competing and alternative risk management strategies. The analysis further allowed the company to determine an appropriate level of traditional risk transfer protection for their assets, given the loss exceedance results.

EQECAT also incorporated the use of its OEM to support a hurricane risk assessment for a company's asset portfolio in the Gulf of Mexico. Using its EQECAT software, the division performed the risk assessment and modeling analysis of the exposure of this company's assets in the area to potential damage and financial loss from hurricane wind and wave action impact. The loss assessment analysis included insurable coverages of property damage, control of well and removal of debris, with loss metrics provided through the OEM model to support the analysis.

The Corporate division also helped companies better understand and more effectively manage their earthquake risk. One of Europe's largest automotive parts suppliers that produces components for most major automobile and truck manufacturers, asked the division for an initial due diligence earthquake global risk screening evaluation for 15 facilities, ten of which are located in Japan with the remainder distributed in Indonesia, Taiwan and China. The key drivers for the evaluation related to the business continuity and life safety aspects at the selected sites. The initial objective was to provide the company with an opinion of the earthquake exposure for the identified locations, which was anticipated to assist them in their acquisition negotiations. In France, a large company specializing in home furnishings also called on ABS Consulting to perform site risk analysis work which was considered critical to the success of its insurance program and the mitigation of business interruption from the peril of an earthquake.



## **QUALITY MANAGEMENT SYSTEMS** ABS QUALITY EVALUATIONS, INC.

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n 2008, ABS Quality Evaluations, Inc. (ABS QE), a subsidiary of ABS Group of Companies, Inc., successfully provided training and auditing services related to its certification of accredited quality management systems in various industries. The company also continued to contribute to the development of industry, national and international standards through its accreditation from the largest and most respected accreditation bodies.

As an established and respected certification body, ABS QE was selected by the US Green Building Council (USGBC) as one of the certification bodies for the Leadership in Energy and Environmental Design (LEED) Green Building Rating System<sup>™</sup>. The system encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria. LEED certification provides independent, third-party verification that a building project meets specified green building and performance measures.

USGBC is working with ABS QE, and a few other select certification bodies, to expand service, eliminate backlogs, comply with ISO standards and allow those entities to focus more fully on their vision of market transformation. ABS QE provides technical expertise and system controls that will help maintain the integrity of the LEED Green Building Rating System.

Staying committed to exceeding international accreditation requirements and rigid industry standards in 2008, many organizations turned to ABS QE for certification of their quality and environmental management systems. The US Environmental Protection Agency (EPA), Region 7, provider of environmental program development, oversight, permitting, enforcement, support and analytical services, selected ABS QE as its service provider for ISO 14001 certification.

In Mexico, ABS QE was awarded a project for the renewal, scope increase and future expansion of new operations of the Panama Canal's ISO 9001 certificate. The scope of work included the canal operations (lock maintenance, docks, tugging, energy generation and water system) and administration activities (purchasing department, facility security, training and human resources). In Spain, ABS QE provided ISO 27001 certification to IVC Outsourcing, Netconsulting, System Telecom & Data, Webesfera Consulting, Avanzza, Argon Information, Essential Minds and Safelan Seguridad Information. Information is a fundamental asset of any business and may range from digital information, paper documents and physical assets (computers and networks) to the knowledge of individual employees. To enhance the security of that information, the ISO/IEC 27001:2005 is an international standard that specifies the requirements for establishing, implementing, operating, monitoring, reviewing, maintaining

and improving a documented information security management system within the context of the organization's overall business risks.

Working with the US Government, ABS QE provided ISO 9001 certification services to the National Business Center, located in the US Department of the Interior (DOI). Headquartered in Washington DC, The National Business Center (NBC) is a federal shared service provider for business services. The NBC provides services to the DOI and other federal agencies outside the Department.



## Port Authority Certified to ISO 28000:2007



A s operators of one of the largest ports in the world, the Port of Houston Authority (PHA) must make certain that the processing of vehicles through its terminal gates properly addresses security measures. PHA facilities comprise a 25-mile long complex of diversified public and private terminals designed for handling general cargo, containers, grain and other dry bulk materials, project, heavy lift and other types of cargo.



When ABS QE certified the security management

system of the Port Police to ISO 28000:2007, it became the first port authority in the world to receive this certification. It specifies the requirements for a security management system, including those aspects critical to the supply chain. Aspects include the activities controlled or influenced by organizations that could impact overall supply chain security.

ABS QE provided a comprehensive, independent audit, which validated standards and procedures at the port. This confirmed that PHA's security measures, including more detailed and efficient monitoring and documentation, broader training of the PHA's police force and security partners, met the new standards. This certification has also brought a new level of awareness to employees of the port, and placed the port authority on a path of continuous improvement.

A key factor in obtaining the full value from management systems is a solid understanding of the principles behind the systems and the methods and tools available to implement them properly. In 2008, ABS QE trained organizations both on understanding management systems and their impacts and benefits on businesses. Training clients included Sonangol Oil & Gas of Angola, the governmental organization that grants the rights to the exploration for oil and for natural gas production in Angola, both on land and offshore. With headquarters in Luanda, Sonangol has offices in Brazzaville, Congo, Hong Kong, Houston, London and Singapore.

For government bodies, ABS QE provided awareness training to the latest quality management system standard for the US Army Corps of Engineers, as well as internal auditor training to the integrated management systems standard for the US Federal Aviation Administration. In Brazil, ABS QE provided training on quality management systems for MODEC International LLC. MODEC provides engineering, procurement, construction, project management, installation and operation of floating offshore facilities.

ABS QE expertise in first, second and third party management system audits for quality, health, safety and environment allowed it to assist companies with meeting the full spectrum of assessment needs, from internal management processes to supply chain vendor compliance. In Brazil, for example, ABS QE provided Petrobras with assistance auditing its IT facilities and telecommunication services for internal clients including refineries, E&P services and engineering; the production of software, organization of corporate infrastructure, provision of IT services; design, development and installation of telecommunications systems; and the management of supporting network operations including call centers.

ABS QE continued to support Nabors Drilling International in maintaining the integrity of its rig management system by providing first-party audit services. The rig audits were performed primarily in the Middle East and Africa. Headquartered in Houston, Texas, Nabors owns and operates almost 600 land drilling and approximately 875 land workover and well-servicing rigs worldwide.

ABS QE continues to assist its global client base to improve business performance by applying its detailed knowledge of the certification process, together with its complementary training and audit services.



# **COMMUNITY INVOLVEMENT**



Future Location of the ABS Center for Applied Engineering & Research Maine Maritime Academy

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Future Design of the American Bureau of Shipping Information Commons Massachusetts Maritime Academy



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44 **E** ducation is the most powerful weapon which you can use to change the world." At ABS we do not have the power "to change the world" in the manner that the quote's author, Nelson Mandela, has done. But, within our own sphere of influence, we believe strongly that knowledge, wisdom and experience are the foundation upon which an innovative and responsible maritime industry is based. And the seeds of those characteristics are sown at the maritime colleges that prepare each successive generation for service, whether onboard or ashore.

To that end, providing support to maritime education around the world has long been an unshakeable commitment at ABS. In 2008, this commitment was taken to a higher level with substantial, multi-year agreements being reached with institutes in the US, Greece and the United Kingdom.

As a US-based organization we turned first to American colleges, providing sizable donations to the University of Michigan's naval architecture program and to both the Maine and Massachusetts Maritime Academies, two prominent colleges training the licensed seafarers of tomorrow, and the alma maters of many ABS employees.

These gifts were the first in what is intended to be an ongoing program through which ABS will help fund major infrastructural developments on the campuses of US maritime academies. At Maine Maritime Academy, the ABS gift is to be applied to the building of a modern engineering facility, to be named the ABS Center for Applied Engineering and Research.

Massachusetts Maritime Academy will use the funds to help underwrite the costs of building the college's new library, to be named The American Bureau of Shipping Information Commons.

With ABS' support, the Massachusetts Academy will construct a 44,000 square foot building that will house a full mission bridge simulator, an amphitheater with digital audio/visual streaming capabilities, computer laboratories, a multimedia laboratory and an academic resource center. The Academy will seek LEED (Leadership in Environmental and Engineering Design) certification for the building and incorporate the latest in environmental efficiencies and sustainable design.



## Last of the Liberties



B the ARTHUR M. HUDDELL was languishing in the James River in Virginia. The last available Liberty ship out of the more than 2,700 that were built during World War II (two others exist as museum ships in the United States), the HUDDELL attracted the attention of a dedicated group of Greek shipping people.

The importance of the Liberty ships to the resurgence of Greek merchant shipping in the post-World War II



period cannot be over stated. The Greek fleet had been decimated, assisting in the supply of Allied troops. With hostilities over, the US Government made the surplus fleet of Liberty ships available for purchase on favorable terms, with Greek owners taking what was to become known as the 'Blessed 100' (actually 104 Liberty ships). These were the seeds from which the post-war Greek fleet grew.

However, those, and the many other Liberties that passed through Greek hands over the years, had all gone to scrap. None remained to mark their place in Greek maritime history. A campaign was launched to raise the money needed to take the HUDDELL, a gift from the US Government, to Greece. ABS had classed all of the original Liberties, and the Blessed 100 were the foundation upon which the post-war expansion of ABS activities in Greece was built. It was with great pleasure that ABS Chairman Robert D. Somerville was able to provide financial support to the Institute of History of the Greek Merchant Marine to assist with the restoration of this historic vessel.

Recognizing the increased financial sophistication of the modern shipping industry, ABS provided a substantial, multi-year endowment to the prestigious Cass Business School at City University in London. The gift will fund two core Masters level modules at the renowned Costas Grammenos International Centre for Shipping, Trade and Finance at the University: one in Shipping Investment and Finance; the other in support of Shipping Innovation.

In Athens, ABS chose to support efforts to minimize the environmental footprint of the international shipping industry by funding a three year research program to be undertaken by the National Technical University of Athens (NTUA) to study the impact of environmental protection on marine transportation. The intent of the study is to develop tools that can be used by designers, shipowners and other stakeholders to identify and select effective, environmentally positive methods.

When ABS learned that the Universidad Maritime International de Panama (International Maritime University of Panama) faced tragedy when its main campus building was destroyed by fire, the ABS Balboa office in Panama responded quickly. ABS Senior Surveyor-in-Charge Roberto A. Villalobos visited with University officials just days after the fire, offering ABS support and making a donation on behalf of ABS.

In Korea, the ABS Geoje office staff joined with colleagues from Samsung Heavy Industries (SHI) in a local effort called "Volunteering: Let's Know the World." In 2008, four members of the ABS staff spent time teaching the students of Geoje's Tah Ahn Middle School about their homeland countries as part of that program.

From major company initiatives to individual office events, ABS made a point to be seen and heard in communities around the world. Philanthropy and community service are core elements of our corporate values.



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