Offshore Support Vessels

Classification, Certification & Related Services
Our Mission

The mission of ABS is to serve the public interest as well as the needs of our clients by promoting the security of life and property and preserving the natural environment.

Quality & Environmental Policy

It is the policy of ABS to be responsive to the individual and collective needs of our clients as well as those of the public at large, to provide quality services in support of our mission, and to provide our services consistent with international standards developed to avoid, reduce or control pollution to the environment.

All of our client commitments, supporting actions, and services delivered must be recognized as expressions of Quality. We pledge to monitor our performance as an on-going activity and to strive for continuous improvement.

We commit to operate consistent with applicable environmental legislation and regulations and to provide a framework for establishing and reviewing environmental objectives and targets.
Classification, Certification & Related Services for Offshore Support Vessels

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Setting Standards of Excellence
in the Classification & Certification of Offshore Support Vessels
Classification, Certification & Related Services for Offshore Support Vessels

ABS offers a comprehensive range of classification and related services to designers, builders, owners and operators of offshore support vessels (OSVs) which includes specialized multi-purpose vessels. The principal elements of the ABS OSV program are summarized in this handbook. More complete details can be obtained from the nearest ABS office. In addition, a comprehensive library of ABS Rules and Guides can be found on the ABS website at www.eagle.org in the Rules & Guides section under the Resources tab. These technical documents are available for free download.

Establishing Rules for OSVs

ABS first established Rules specifically for smaller vessels in 1973 with the publication of Rules for Building and Classing Steel Vessels under 61 meters in Length. In 1997, the Rules evolved into Rules for Building and Classing Steel Vessels under 90 meters in Length. Besides extending the criteria for length, the Rules specified more functional equipment and arrangement requirements and introduced optional classification notations for specific functions and services.

New generation OSVs have become more technically advanced to meet the support demands of deepwater drilling and subsea operations. To keep pace with industry changes, ABS developed the Rules for Building and Classing Offshore Support Vessels (OSV Rules) with standards for the design and construction of modern OSVs. ABS continuously reviews and updates its Rules and Guides to anticipate industry developments.
Classification Services for OSVs

Over the years, OSVs have evolved dramatically in terms of diversification, worldwide operation and water depth capabilities. The number of recognized categories also continues to increase as well as the level of sophistication. As the current classification market leader for OSVs, ABS is able to provide a wealth of practical and technical experience throughout an OSV project. Major OSV categories include:

- **Offshore Supply**
  Transports and stores materials, equipment and/or personnel (excluding crew boats) to, from and between offshore installations

- **Anchor Handling & Towing**
  Handles anchors of offshore floating installations and/or towing operations

- **Firefighting**
  Carries out firefighting operations

- **Diving & ROV Support**
  Provides support for diving system and underwater remotely operated vehicles (ROVs)

- **Oil Spill Recovery**
  Recovers oil from the water and near shorelines in response to an oil spill in the marine environment

- **Safety Standby Rescue**
  Adapted with special features for evacuating and receiving personnel from an offshore installation, also used in the rescue and care of people from another vessel at sea

- **Pipe Lay**
  Used in subsea pipeline installations

- **Heavy Lift**
  Lifts heavy loads in oil drilling and production operations, offshore construction and/or salvage operations. Heavy lift OSVs have a lifting capacity of 160 metric tons and above

- **Well Intervention, Stimulation & Test**
  Designed and equipped, either permanently or temporarily, to carry out well intervention, well stimulation and/or well test services

- **ESCORT**
  Provides assistance to disabled vessels in emergencies involving impaired maneuverability due to loss of propulsion or steering or both

- **Wind Turbine Installation, Maintenance & Repair**
  Used for installing, maintaining and repairing wind turbines

- **Cable Laying Service**
  Used in subsea cable installations
Offshore Support Vessels: The ABS Advantage

The ABS experience, technology and services outlined in the following pages demonstrate our commitment to being the preferred provider of classification services to the offshore industry and, in particular, to the OSV market sector.

Our OSV Industry Leadership

As the search for oil and gas moves into deeper waters, multifunctional OSVs are now called upon to carry out specific tasks and have created various niches or categories within the OSV market. Today’s OSVs have increased cargo capacity, panoramic navigation bridge visibility, large accommodation spaces, enhanced crew amenities and state-of-the-art propulsion and automation systems.

Specialized multipurpose designs carry out maintenance and repair on platforms, facilities as well as subsea pipelines and equipment. OSVs designed for inspection, maintenance and repair (IMR) are equipped with large accommodation spaces, heavy lift cranes, helidecks and streamlined bow forms for operation in harsh environments. ABS has been in a unique position to see the transformation in OSV design capabilities as it classes approximately one-third of the worldwide fleet.

ABS has also applied its leading edge human factors and ergonomics research to OSVs. This has lead to the establishment of habitability standards addressing vessel accommodations and workspaces for noise, vibration, lighting and other comfort factors. Research shows that incorporating these standards has a positive impact on the safety, productivity, morale and overall well-being of crews.
Our Commitment
Classification is a life cycle approach to the design, construction and operation of an OSV. After delivery, maintenance of classification requires periodic surveys to verify that the vessel remains in compliance with the applicable ABS Rules. A global network of ABS engineers, surveyors and operational support staff delivers efficient, practical and responsive service to support clients and their ABS-classed OSV fleets. ABS maintains relationships with all of the principal flag Administrations, providing an efficient and effective interface that can accelerate regulatory compliance.

Our Mission
Our mission is to promote the security of life and property and preserve the natural environment. We pursue this mission primarily through the development and verification of compliance with technical standards that encourage robust designs and the provision of solutions-oriented survey services. OSVs designed, built and maintained to these standards may be accepted into and retained in ABS class. We are committed to providing superior technical and survey services that assist our clients in conforming to ABS requirements and international industry standards, thereby encouraging safe, efficient operations.

Our Staff
The ABS organization includes nearly 6,000 engineers, surveyors and operational support staff located throughout the world. ABS maintains Engineering offices in Brazil, China, Germany, Greece, India, Italy, Japan, Korea, Singapore, Turkey, the United Arab Emirates, the United Kingdom, the United States and other centers to facilitate the design review of the many OSVs on order to ABS class.

ABS’ experienced professionals provide technical support and assistance to clients during the initial design concept, the plan approval process, construction and throughout the entire life cycle of the vessel. In addition, a special OSV Market Sector Group monitors and anticipates the advances in this specialized fleet.

Our Fees
ABS fees can be tailored to an owner’s fleet profile and to operational and management requirements. These approaches could include Master Service Agreements and Five Year Survey Fee packages as appropriate.
A Multi-Level Approach to Service

ABS service delivery consists of three categories, tailored to meet the specific needs of owners and operators of OSVs.

Category I: Classification & Statutory Services
The range of services associated with the issuance and maintenance of the classification and required statutory certificates. In addition, owners can select from a range of optional products and services offered in Categories II and III.

Category II: Optional Notations & Class-Related Services
Several valuable, optional, class-related services are provided by ABS including elements as diverse as training and advanced structural analysis. This category also includes additional notations that may be used by the owner to demonstrate that the vessel has been designed or is being operated in accordance with standards beyond those required under Category I for routine classification and statutory certification.

Category III: Services Provided by ABS Group
Several additional optional products and services are available from ABS Group, an affiliate of ABS.
Category I

Required Classification & Statutory Services

These services assist an owner or builder to design, construct and deliver a vessel that can be considered for acceptance into ABS class. These services also assist an owner or operator to maintain the vessel to ABS class requirements throughout its operational life as determined by the successful completion of periodic and damage surveys.

When ABS is authorized to act on behalf of the flag State, these services also include the applicable statutory inspections.

Required classification and statutory services comprise five parts:

1. Class Notations
2. Design Analysis and Approval
3. Surveys During Construction or Major Modification
4. Surveys After Construction
5. Statutory Inspections

Class Notations

ABS, in cooperation with the owner and the shipyard, will identify at the outset the class notations that will be applied to the vessel. The notations attest to the vessel’s capabilities and identify the class Rules and requirements that will be applied throughout the class process. The OSV notations will include one or more of the following.

The Maltese Cross (__(()) symbol is assigned to a vessel for which the hull construction and the manufacture of its machinery and components have been carried out under ABS survey. The Maltese Cross will be omitted for vessels accepted into ABS class but not built under ABS review and survey.

A1 is a classification symbol that, together with the Maltese Cross, indicates compliance with the hull requirements of the applicable ABS Rules, or their equivalent, and ABS surveys during construction of the vessel. The symbols ((A1)) will be followed by the appropriate main class notation that identifies the type of OSV.

In accordance with the OSV requirements, the main ABS class notation for a vessel is: ((A1)), Offshore Support Vessel.
Additional notations are assigned to reflect specialized service capabilities:

- **Supply**
  - Platform Supply
- **Supply-HNLS**
  - Supply-Hazardous and Noxious Liquid Substances
- **AH, TOW**
  - Anchor Handling and Towing
- **FFV 1, FFV 2, FFV 3**
  - Firefighting
- **DSV AIR, DSV MIXED-GAS, DSV SAT, ROV**
  - Diving and ROV Support
- **OSR-S1, OSR-S2, OSR-C1, OSR-C2**
  - Oil Spill Response
- **SSR**
  - Safety Standby Rescue
- **Pipe Lay**
  - Pipe Laying
- **Heavy Lift**
  - Heavy Lift
- **WI, WI-TEMP, WI-READY**
  - Well Intervention
- **WS, WS-TEMP, WS-READY**
  - Well Stimulation
- **Well Test Service, WT-TEMP, WT-READY**
  - Well Testing
- **ESCORT**
  - Escort
- **WIND-IMR**
  - Wind Turbine Installation, Maintenance and Repair
- **Cable Laying Service**
  - Cable Laying
- **SPS**
  - Special Purpose

**AMS** is assigned to OSVs for which the machinery, boilers and systems are found satisfactory with regard to the ABS requirements.

Optional class notations that reference dynamic positioning systems, additional equipment, strength criteria, among others, are addressed in Category II of this document.
Design Analysis & Approval

OSV designs intended to be built to ABS class undergo various technical reviews as well as structural analysis by ABS engineering staff. ABS provides responsive, professional, technical services to the designers, builders and owners of OSVs. These technical reviews include:

- **Hull Structural Review**
  ABS reviews material selection, welding procedures, scantlings, longitudinal strength, local strength and yielding and buckling for compliance with the applicable requirements.

- **Machinery Systems**
  ABS focuses on prime movers, propulsion and maneuvering machinery, piping and electrical systems, firefighting and safety systems as well as hazardous or specialized areas such as the cargo deck and tank arrangements.

**ABS Eagle Engineering Manager**

ABS has implemented an advanced, secure, electronic engineering management system. When using ABS Eagle Engineering Manager, plans are handled electronically. Wherever possible, the shipyard submits drawings in electronic format thorough the My Eagle customer web portal. Paper drawings are scanned into the system to facilitate an efficient and effective review process. For shipyards using the system, Engineering Manager provides web-based interaction between the shipyard’s design team and the ABS engineers undertaking plan review of the structure and machinery.

Teams of ABS specialists in different engineering disciplines and different regions of the world can work on the design review simultaneously. If requested by the shipyard, the access of the reviewing engineers can be restricted. As a consequence, the actions of the engineers are fully traceable as part of the system’s built-in security safeguards.

For each drawing or information package submitted, the status of comments can be viewed in real time by any of the involved parties, including the owner, if provided for in the contract between the owner and the shipbuilder. Compared to the traditional paper-based plan review process, the system offers faster overall review time and improves the lines of communication between ABS and the designers and vendors to quickly resolve questions or Rule interpretations.

**Vendor Equipment Coordination**

The ABS vendor equipment coordinator, working with the large number of vendors and sub-vendors, will facilitate the delivery of vendor-supplied equipment with appropriate documentation.
Surveys During Construction or Major Modification

Drawing from its global network of experienced surveyors, ABS will assign appropriate personnel to each newbuilding or major modification, wherever in the world construction is to be undertaken. These surveyors will verify that construction is in accordance with the Rules, approved plans and statutory requirements. They will work closely with both the shipyard and the owner to assist in reconciling questions of interpretation.

The principal activities and services carried out by a surveyor during new construction include:

- Verify compliance with approved drawings
- Confirm materials, fit-up and welding
- Review nondestructive testing
- Witness structural integrity testing
- Witness machinery testing
- Attend system commissioning
- Certify vendor-supplied equipment and material certification
- Confirm qualification of welders and welding procedures

Verifying compliance with approved drawings means approved plans are followed by the builder. The builder uses materials and components, proper installation techniques, good workmanship practices in adherence to the Rules. Surveyors are also involved at various levels with the building, installation and testing of the structure and principal mechanical and electrical systems.

Major system testing or commissioning requirements include:

- Bilge and ballast system
- Ventilation including dampers and shutdowns
- Electrical installations both main and emergency
- Fuel and lube oil systems
- Emergency shutdown systems
- Anchoring and/or position-keeping systems
- Structural fire protection
- Firefighting systems, fixed and portable
- Internal communication systems
- Propulsion systems

Machinery testing in accordance with the Rules includes testing at the point of manufacture and after installation at the shipyard. As identified in the Rules, field surveyors will attend and/or audit manufacturing and construction at vendor shops and fabrication yards. Surveyors will also attend and/or audit steel mills, engine manufacturers and foundries producing castings and equipment to verify that these are produced to the specifications contained in the applicable ABS Rules.
**Coatings**

Vessels greater than 500 gross tons, contracted on and after 1 July 2008 or delivered on and after 1 July 2012, must comply with the IMO Performance Standard for Protective Coatings (PSPC) requirements. The IMO PSPC requirements apply to the dedicated seawater ballast tanks of OSVs.

ABS provides guidance to both shipowners and shipbuilders on the technical requirements of the PSPC and the role coatings play in the longevity of a vessel’s structure. General information is contained in the ABS Guidance Notes on the Inspection, Maintenance and Application of Marine Coating Systems. Although industry standards place the responsibility for the proper application of the coatings on the shipyard, the ABS Guidance Notes clarify the issues and responsibilities for all parties.

OSVs that are built in conformance with the requirements contained in the ABS Guide for the Class Notation Coating Performance Standard (CPS) may be awarded the CPS notation.

**Sea Trials**

An ABS surveyor will attend the sea trials of the vessel to verify that the trials are conducted properly and that relevant class and statutory criteria are met.

**Acceptance into Class**

Once all outstanding issues are resolved, the vessel is presented to the ABS Classification Committee. The committee, comprised of ABS members drawn from the marine, offshore and insurance industries, includes a representative of the US Coast Guard and ABS officers, assesses the vessel’s compliance with the Rules based on collective experience and recommendations from ABS staff. Once accepted by the committee, the vessel receives its full-term certification.

The vessel’s classification information, characteristics and other particulars are then entered into the ABS Record, the electronic register of vessels classed by ABS. The ABS Record is maintained and updated on the ABS website. Optional class notations that a vessel has acquired are also recorded. These are further explained in the Category II section.
Surveys After Construction

Upon delivery and throughout its service life, an ABS-classed OSV is subject to periodic surveys to verify that it is maintained in accordance with the applicable classification standards. This imposes a requirement for the vessel to be subject to a series of surveys – Annual, Intermediate, Special and Drydocking – on a rotating five-year basis.

The class survey regime also requires the owner to notify ABS when the vessel’s hull and/or machinery suffer damage. An ABS surveyor will arrange to attend the vessel as promptly as possible and will verify that the vessel remains in, or is returned to, a condition that is in conformance with the applicable Rules.

Prompt attendance by an ABS surveyor for the requisite periodic survey is made possible by the extensive, global network of strategically placed ABS survey offices.

ABS recognizes the operational and contractual requirements of OSVs and therefore may accept underwater inspection in lieu of drydocking (UWILD) subject to approved planning documents.

ABS Eagle Survey Manager

To assist the owner, operator or manager plan for the required periodic surveys in an efficient, cost-effective and informed manner, ABS provides the operator with access to the advanced, web-based ABS Eagle Survey Manager program.

The Survey Manager system has been in use for several years and is routinely enhanced and expanded to better serve clients. Based on positive user feedback, ABS Eagle Survey Manager is considered to be the most advanced, effective and user-friendly system currently available to operators to monitor the classification status of their vessels.

Survey Manager efficiently manages the class and statutory data for an owner’s entire ABS-classed fleet in a web-based electronic format. Shipowners have access to the data from multiple locations – in the office, on board a vessel or from remote sites such as a repair yard.
Survey Manager includes a record of the tank condition; historical records of survey dates, locations and surveys carried out; a record of outstanding recommendations, both open and closed; and a system to integrate survey activities with the ABS planned maintenance module.

OSV owners are able to select the interval to receive messages regarding upcoming and overdue surveys. Multicolored timelines of survey due dates significantly diminish the need to view individual listings of survey items such as hull, machinery and equipment.

ABS Eagle Survey Manager provides a wide range of informational and support services to the operator in real time at an office or on board the vessel. Services include:

- A fleet summary and complete status of class surveys for each ABS-classed vessel
- Status of statutory surveys and certificates issued by ABS on behalf of the flag Administration
- Timeline presentations of the class and statutory surveys completed in the previous three years, surveys in progress and surveys scheduled for the next five years including identification of grace periods
- Principal particulars of each OSV
- Vessel attendance history with links to related ABS reports
- Certificate list and file containing copies of ABS-issued class and statutory certificates currently on board the vessel
- Fleet level tools for budgeting within user-defined periods (such as drydockings)
- Status indication of surveys completed, often before the surveyor leaves the vessel
- Automated onboard issuance of class and statutory certificates
- An owner administration module to provide access to users and the ability to select the OSV or fleet that each user can view
- Tools for survey planning and survey guidance including vessel-specific templates for the preparation of enhanced survey plans
- Electronic booking of survey attendance and optional email progress notifications

**Damage, Failure & Repair Surveys**

When the hull or machinery suffers damage or failure, ABS should be notified. ABS will determine if attendance is required and if necessary arrange for a surveyor to attend the vessel as promptly as possible. The attending surveyor will verify that the vessel remains in, or is returned to, a condition that is in conformance with the applicable Rules.
Statutory Services

ABS is recognized by the majority of international flag States and has been delegated authority to act as a Recognized Organization on behalf of more than 120 governments. ABS carries out these responsibilities during the design stage, verifying that the design complies with the statutory requirements (e.g. stability, watertight subdivision, safety construction and equipment, firefighting and lifesaving) of the selected Administration as contained in the various international and national maritime codes and conventions including:

- Load Line
- Marine Pollution Prevention (MARPOL)
- Safety of Life at Sea (SOLAS)
- Tonnage
- Anti-Fouling System (AFS)
- International Safety Management (ISM)
- International Ship and Port Facility Security (ISPS)

In addition to the national or international tonnage certificates, ABS can issue Panama and Suez Canal tonnage certificates on behalf of those authorities. Once in service, when authorized by the flag State, ABS will conduct the applicable periodic statutory inspections and, if warranted, issue the relevant certificates.

Every nation can implement its own requirements for a vessel to operate in its waters, known as coastal State requirements. ABS can assist an OSV owner in verifying the vessel meets certain coastal State requirements.
ISM Code Compliance
As a Recognized Organization for many flag States, ABS is authorized to act on their behalf in performing audits and issuing certificates required by the ISM Code. These include both the audits of the vessel operator leading to the Document of Compliance (DOC) certificate and the audit of the vessel which, when successfully completed, will result in the issuance of the Safety Management Certificate (SMC) to that vessel. ABS maintains a global pool of fully qualified ISM auditors able to respond promptly to clients’ requests.

ISPS Code Compliance
A large number of flag States have authorized ABS to act on their behalf as a Recognized Security Organization. In this capacity ABS can approve security plans, perform security audits of vessels and issue International Ship Security Certificates (ISSC) on behalf of those flag States. The ABS Guide for Ship Security (SEC) Notation is available to assist operators in achieving compliance with the statutory security requirements of the ISPS Code and in obtaining the ABS SEC notation. In addition, ABS has qualified ISPS auditors able to respond promptly to clients’ needs.

ILO MLC Compliance
As a Recognized Organization, ABS is authorized to review and approve the Declaration of Maritime Labour Compliance (DMLC) and carry out onboard inspections to verify compliance with the ILO Maritime Labour Convention and issue the Maritime Labour Certificate on behalf of flag States. To assist OSV owners and operators in implementing the MLC requirements, ABS issued Guidance Notes on the ILO Maritime Labour Convention, 2006. Vessels that comply with the ABS Guide for Compliance with the ILO Maritime Labour Convention, 2006, Title 3 Requirements may be awarded the optional notation, MLC-ACCOM.

US Coast Guard Assistance
ABS also maintains a strong relationship with the US Coast Guard (USCG) under various, long-standing Memorandum of Understanding. ABS is authorized to act on behalf of the USCG on a number of issues. This involvement also provides ABS with the experience and insight to offer specific assistance to owners trading to the United States for demonstrating compliance with USCG requirements, particularly those related to environmental, safety and security issues. In addition, the USCG has assigned a Liaison Officer to ABS to facilitate communication between the two organizations.
Optional Notations & Class-Related Services

For a variety of reasons, many OSV owners choose to build and/or operate their ABS-classed vessels to standards established by ABS that extend beyond those required for class acceptance and for registration by a flag State. To assist these owners in demonstrating that they have adopted these enhanced standards, ABS offers a range of optional services that may result in accompanying notations. These services range from structural analyses to standards that address the habitability of the onboard living conditions to enhanced safety, quality, environmental and health standards.

Category II services comprise nine parts:
1. Optional Notations for OSVs
2. Technical, Engineering and Environmental Services
3. Fleet Management Systems
4. Hull Integrity Management
5. Machinery Maintenance Services
6. Integrated Management Systems Certification
7. Rapid Response Damage Assessment
8. Training Services
9. Regulatory Information Services
Optional Notations for OSVs

There are many optional ABS notations for OSVs in relation to special capabilities and features. Conformance with the standards required for the award of these optional notations allows an owner to demonstrate that a particular vessel has been built or is being operated to internationally recognized standards that exceed those required solely for the issuance of the class certificate. Optional notations for OSVs include:

- **ABCU** – is assigned to a self-propelled vessel which is fitted with the required automation and remote monitoring and control systems to enable the propulsion machinery space to be periodically unattended. The propulsion control is to be accessed primarily from the navigation bridge.

- **ACC or ACCU** – ACC is assigned to a self-propelled vessel having the means to control and monitor the propulsion machinery space from a continuously manned centralized station installed within or adjacent to the propulsion machinery space. This notation may be enhanced for unattended operation, or ACCU, indicating the means to control and monitor the propulsion machinery space from the navigation bridge and from a centralized control and monitoring station installed within or adjacent to the propulsion machinery space.

- **BWE** – indicates a vessel has been designed, constructed and surveyed in accordance with the ABS Guide for Ballast Water Exchange. Vessels which have not been constructed under survey in accordance with the requirements of this Guide may obtain the optional BWE notation, provided the vessel’s arrangements have been determined to comply with the design and construction criteria contained in this Guide.

- **BWT or BWT+** – indicates a treatment system has been reviewed and installed in compliance with the ABS Guide for Ballast Water Treatment.

- **CCO** – is assigned to a vessel designed, equipped and intended to operate in low temperatures that complies with the ABS Guide for Vessels Operating in Low Temperature Environments.

- **CRC** – signifies that the vessel’s cranes are designed and constructed in accordance with the ABS Guide for the Certification of Lifting Appliances. A Register of Lifting Appliances attesting to compliance with the requirements of the Guide will be issued at the request of the owner or builder upon satisfactory completion of plan review, in-plant survey, installation and testing of the crane to the satisfaction of the attending surveyor.

- **DLA** – is assigned to vessels which have been evaluated using an enhanced structural analysis procedure and criteria for calculating and evaluating the behavior of hull structures under dynamic loading approach.

- **DPS-0, DPS-1, DPS-2 or DPS-3** – indicates that a unit is fitted with a dynamic positioning system built and tested in compliance with the ABS Guide for Dynamic Positioning Systems. The assigned numeral (0, 1, 2 or 3) indicates the degree of redundancy. Supplemental enhanced system (EHS) notations may be assigned to DPS-2 or DPS-3 vessels for power and thruster systems, control systems, and fire and flood protection systems. In addition, stationkeeping (SKP) notations may be assigned for specific environmental conditions.
• ☑ – signifies that the equipment of anchors and chain cables are in compliance with the Rules or with the requirements corresponding to the service limitations noted in the vessel's classification.

• ENVIRO or ENVIRO+ – is assigned to a vessel denoting adherence to enhanced standards for environmental protection. The standards are contained in the ABS Guide for the Environmental Protection Notation for Vessels.

• GP – is applicable to new and existing OSVs that have had the vessel's details and Part 1 of the Inventory of their Green Passport prepared and certified to the requirements of the ABS Guide for the Class Notation Green Passport (GP).

• GFS – is assigned to a vessel that is arranged to burn natural gas as fuel for propulsion or auxiliary purposes for gas fuel storage, fuel bunkering systems and fuel gas preparation rooms. Fuel gas supply system arrangements are to be designed, constructed and tested in accordance with the ABS Guide for Propulsion and Auxiliary Systems for Gas Fueled Ships. For OSVs, the GFS notation may also be assigned in association with an additional notation – GFS(DFD) for dual fuel diesel engine power plant and GFS(GCU) for gas combustion unit.

• HAB(WB), HAB+(WB) or HAB++(WB) – HAB(WB) is assigned to a vessel that complies with the criteria for crew accommodations and ambient environment (i.e., vibration, noise, indoor climate and lighting) provided in the ABS Guide for Crew Habitability on Workboats. For HAB+(WB), vessels must meet more stringent accommodations, vibration and indoor climate criteria aimed at increasing crew comfort and safety. For the HAB++(WB) level, vessels must meet even more stringent accommodations, vibration and noise criteria.

• HELIDK or HELIDK(SRF) – HELIDK is assigned to vessels with a helicopter deck intended for landing without provision for storage or refueling as per criteria included in the ABS Guide for the Class Notation Helicopter Decks and Facilities. HELIDK(SRF) is assigned to units with a helicopter deck and a helicopter facility for storage and/or refueling.

• HIMP – signifies that the vessel is enrolled in the Hull Inspection and Maintenance Program in accordance with the ABS Guide for Hull Inspection and Maintenance Program. HDC, HLC are assigned to OSVs intended to carry heavy deck cargo or heavy liquid cargo.

• HSQEEn, HSQE, HSQE, HSQEn, HQEEn, HSE, HSQ, HSEn, SQEn, SQE, HS, SEEn, SE, SQ, S – indicates the unit complies with the relevant criteria for health, safety, quality, environmental and/or energy management systems in the ABS Guide for Marine Health, Safety, Quality, Environmental and Energy Management.
• **Ice Class** – indicates the vessel complies with the requirements in the ABS *Rules for Building and Classing Steel Vessels*, Part 6, Chapter 1 that are applicable for the designated ice class.

• **MLC-ACCOM** – is assigned to a vessel complying with the criteria contained in the ABS *Guide for Compliance with the ILO Maritime Labour Convention, 2006 Title 3 Requirements for crew accommodations and the associated ambient environmental characteristics (i.e., vibration, noise, indoor climate and lighting).*

• **NBL, NBLES or NIBS** – is assigned to a vessel that complies with the relevant section of the ABS *Guide for Bridge Design and Navigational Equipment/Systems*.

• **RCM** followed by the applicable qualifiers such as (CARGO), (FIRE), (PROP) or (MACH) – indicates compliance with the ABS *Guidance Notes on Reliability-Centered Maintenance* as it applies to cargo handling, fire extinguishing, propulsion or both firefighting and propulsion.

• **RRDA** – signifies compliance with the requirements in the ABS *Guide for Rapid Response Damage Assessment*.

• **POT** – is assigned to a vessel that meets the requirements for the protection of fuel and lubricating oil tanks.

• **SEC** – indicates the vessel complies with the ABS *Guide for Ship Security (SEC) Notation*.

• **SFA(years)** – indicates compliance with the requirements of spectral fatigue analysis for the design fatigue life year identified in parentheses which is greater than or equal to 20 years.

• **UWILD** – underwater parts of the vessel are to be examined at prescribed intervals. This examination may be conducted without the need to drydock the unit where an underwater inspection plan has been submitted and approved in accordance with the requirements contained in the ABS *Guide for the Class Notation Underwater Inspection in Lieu of Drydocking (UWILD).*
Technical, Engineering & Environmental Services

During the early stages of vessel development, ABS personnel are available to discuss areas of concern with the client’s design team. The preliminary planning and advice (PPA) service arranges for subject matter knowledgeable personnel to discuss the developing design with respect to conformance with class and statutory requirements.

PPA and basic design approval are not requirements of ABS class. These early stage engineering support efforts are offered to clients to assist in the development of the design and minimize rework that could result from a noncompliant design. This early stage engineering support precedes the detailed engineering design review, addressed in Category I, which is required for classification or certification.

Engineering Analysis

ABS personnel are available to provide a wide range of additional engineering-related analyses during the design evaluation and plan review phases of an OSV project. Depending on the size and type of OSV, a variety of additional analyses can be performed:

- Global and local strength analysis
- Dynamic loading analysis (DLA)
- Spectral-based fatigue analysis (SFA)

When performing these analyses, the ABS Eagle DLA/SFA software may be applicable.
**ABS Eagle DLA/SFA**

A detailed evaluation of the vessel structure can be conducted using DLA. This ABS-developed, first principles approach assesses the hull structure’s strength to withstand the principal failure modes of buckling, yielding and fatigue. Central to this methodology is the use of a program based on seakeeping theory for calculating the loads and responses for a range of wave length and directions under various loading conditions. The dynamic loads are then applied to a three-dimensional (3-D) finite element model of the vessel to assess the adequacy of the structure.

In addition, this procedure can be used for the application of SFA for the evaluation of structural fatigue. SFA is a rational analysis procedure for evaluating fatigue life related to possible local cracking of vessel structures. The spectral-based method for evaluating fatigue strength, due to the wave-induced responses, is well established and has been extensively documented.

To streamline these procedures, ABS has integrated the proven analysis of DLA and SFA into a single software program. Using a self-generated or user-supplied finite element model, the program can perform a thorough DLA and SFA analysis of a vessel’s structure. The 3-D seakeeping, short and long-term statistical analysis, finite element analysis, strength evaluations and fatigue assessments are fully integrated within the program.

OSV designs that successfully undergo an ABS Eagle DLA/SFA evaluation will be awarded optional notations denoting their evaluation by this methodology, including a notation indicating the vessel’s designed fatigue life, e.g. SFA(30).

**ABS Eagle Rule Manager**

To further simplify the application of the relevant ABS Rules and statutory regulations at the design stage, ABS has developed the advanced, web-based ABS Eagle Rule Manager. This application allows the designer and owner to easily and quickly identify and access relevant ABS Rules and statutory requirements for the vessel. The built-in search capability allows the owner, shipyard or designer to specify the scantling length, contract date, delivery date, class notations and other criteria which, in turn, highlights the relevant ABS Rule text and the IMO requirements for that specific project.

Advanced input parameters can be used to narrow the search criteria to the Rule requirements applicable to a specific system, component, structural element, piece of equipment, notation or survey. Hyperlinks embedded within the text provide the user with immediate window access to other related sections of the Rules. The user can also generate check sheets that can be used to verify that applicable Rule requirements have been addressed during the design and construction phases of a project.
Human Factors Engineering

Ergonomic principles, criteria and design processes can be effectively integrated with engineering activities to improve human performance on board OSVs and contribute towards a reduction in the likelihood of accidents or incidents attributable to human error.

ABS has developed extensive guidance for OSV owners and designers based on industry-specific and internationally applicable ergonomic principles and standards. Criteria have been established that address equipment, workstation and system design, including guidance for the ergonomic design of navigation bridges, as well as occupational health and safety concerns.

Design guidance accounts for personnel capabilities, limitations and needs so that the arrangement and orientation of the onboard work environment meets the needs of the crew members regardless of their cultural background and physical dissimilarities.

Criteria are contained in the ABS Guide for Crew Habitability on Workboats. Applicable notations address crew habitability and the acceptability of conditions on board a vessel in terms of vibration, noise, lighting, indoor climate and physical and spatial characteristics. The criteria have been developed to support effective human performance, mental alertness and basic levels of comfort that promote the general well-being of the crew members and, as a consequence, the efficient and safe operation of the vessel. OSVs that comply with the relevant criteria may be awarded the optional notations for habitability of HAB(WB), HAB+(WB) or HAB++(WB).

Environmental Services

ABS can provide assistance to designers and owners as they seek to understand and address the increasing number of environmental regulations and challenges. Advice and guidance is available on topics as diverse as ballast water management to cold ironing, controlling emissions, handling oily bilge water residues and complying with local and regional regulations that may differ from international standards.

The ABS Guide for the Environmental Protection Notation for Vessels has been developed with the objective of promoting environmentally safe design, construction and operation of ABS-classed vessels and marine structures. The requirements relate to enhanced environmental standards for hull anti-fouling systems, ballast water management and the prevention of oil, sewage, garbage and air pollution. There are two optional notations available. The ENVIRO notation, denotes compliance with the requirements of Annexes I, II, IV, V and VI to the International Convention for the Prevention of Pollution from Ships, MARPOL 73/78, as amended. The ENVIRO+ notation includes additional criteria for environmental protection related to design characteristics, management and support systems, sea discharges and air discharges.
OSVs in Harsh Environments

OSVs operating in harsh environments have unique design and operational considerations for icebreaking and ice management. These supportive roles can be critical elements for Arctic offshore oil and gas exploration and production as they can potentially extend the drilling season window and reduce disconnection events. OSVs are expected to maneuver more rigorously in ice than traditional ice-strengthened transit ships due to their ice management responsibilities and advanced propulsion systems, e.g. podded propulsors and azimuthing thrusters. Special focus is given to the strength of the stern shoulder region and appendages beyond the basic ice strengthening requirements. ABS has been at the forefront of developing scenario based ice load models capable of addressing stern and pod ice impacts.

The ABS Guide for Vessels Operating in Low Temperature Environments includes a section that specifically addresses OSV operations. The Guide supplements the requirements for Ice Class related to the hull, machinery and safety systems. Guidance is provided for preparing the vessel and the crew for operating in harsh environments. Requirements for tank arrangements to prevent freezing of the contents and structural design to protect equipment and crew are also provided.

In addition, the IACS Unified Requirements for Polar Class vessels (Polar UR) have been further endorsed by the maritime authorities worldwide. It is expected that the IMO International Code of Safety for Ships Operating in Polar Waters will become a mandatory Polar Code. In order to align ice class notations with the anticipated Polar Code, ABS implemented the Polar UR into the Rules for Building and Classing Steel Vessels as of 2012, effectively replacing the ABS General Ice Classes. However, until IACS completes the further enhancement and harmonization effort to the current requirements, an optional enhanced notation is available based on the ABS General Ice Class requirements.
OSV operators are adopting maintenance procedures that promote the life cycle integrity of a vessel. To assist them, ABS Nautical Systems offers a variety of software solutions that provide a framework for maintaining the structural and mechanical condition of an OSV.

**NS5 Enterprise**

ABS Nautical Systems Division is a leading provider of fleet management software for the marine and offshore industries. Marketed as a suite of products called NS5 Enterprise, the software modules can function on a standalone basis or as a fully integrated management solution that addresses the principle elements of an OSV’s daily operational functions. The software system allows the operator to better manage routine structural and mechanical inspection and maintenance; manage inventory and personnel records; control HSQE documentation; and conduct root cause analyses.

NS5 Enterprise can efficiently handle tasks ranging from regulatory compliance to payroll to planned maintenance and quality programs. The modules share information, eliminating the need for repetitive data entry, and allow the user to move rapidly from one module to another.

NS5 Enterprise offers the user greater efficiencies, increased productivity and more effective cost control. The integrated architecture makes adding modules simple. Each module is valuable on its own but the complete suite provides the most powerful, single-source asset management tool available.

NS5 Enterprise is an easy-to-use Windows-based system with full replication capability offering solutions for the following categories:

- Maintenance Management
- Supply Chain Management
- Workforce Management
- Safety Management
- Environmental Management

Full information on how the NS5 Enterprise fleet management software can improve operating efficiency can be found at www.eagle.org within the Software section.
Hull Integrity Management

The ABS Guide for Hull Inspection and Maintenance Program addresses requirements for developing a hull maintenance management system. Vessels enrolled in this program will be eligible for the class notation HIMP, which will be entered in the ABS Record. ABS has developed hull integrity management software to assist owners and operators in taking an active role in inspecting and maintaining their vessels.

The NS5 Enterprise Hull Inspection software is a browser-based tool that efficiently schedules hull inspections, targets critical areas within the hull's structure and identifies specific areas for ongoing monitoring. The tool contains a built-in dashboard for high-level reporting and analyses, maintains a record and history of inspections and records the condition of the hull with an easy to understand traffic light status.

The Hull Inspection program:
- Alerts staff to potential problem areas for inspection
- Generates deficiency reports, highlights critical areas and improves repair planning
- Features a single database to store, retrieve and analyze inspections
- Displays the condition of the hull structure with a traffic light grading system
- Contains a built-in dashboard, with drill-down capabilities, to view the vessel's condition
- Shows open anomalies and deficiencies

Machinery Maintenance Services

OSV operators are adopting maintenance procedures that promote life cycle integrity. To assist them, ABS offers a variety of programs that provide a framework for maintaining the mechanical condition of the vessel while leveraging the operator's maintenance program.
Preventive Maintenance

Planned maintenance and condition-based maintenance are two approaches utilized within the preventive maintenance program to assist owners with maintaining machinery. Often these techniques are used concurrently. By applying them, credit can be given towards the requirements of the Continuous Survey of Machinery.

- **Planned Maintenance**

  Planned maintenance involves the setting of formal schedules for maintenance and the overhaul of machinery. Running time or calendar time may be used to establish a schedule. Such schedules are generally established by the machinery manufacturer and include lubrication servicing; filter, bearing and seal replacements; as well as major overhauls.

- **Condition-Based Maintenance with Condition Monitoring**

  With a condition-based maintenance program the frequency of planned maintenance tasks can be more dynamically driven based on the results obtained from condition monitoring tasks. The use of condition monitoring techniques promotes cost-effective maintenance by reducing the number of breakdowns and extending operating periods beyond those of time-based programs. Maintenance is undertaken as a result of the knowledge of the condition of the equipment. This results in better utilization of resources, controlled replacement of wearing components and a reduction in incidents of unplanned maintenance.

Many maintenance procedures include condition monitoring, e.g. checking and recording of vibration levels, pressure, temperature, load current, running hours, lubricating oil analysis data and fuel consumption. Practical use of this equipment condition data gives benefits such as eliminating the need to open up machinery, saving on human resources and expenditure on spare parts and reducing downtime and associated costs.

Reliability-Centered Maintenance

As a logical evolution of machinery maintenance program development, the application of reliability-centered maintenance (RCM) allows maintenance programs to be evaluated in a risk-based approach that provides the most value to an owner or operator. RCM analysis allows an owner to optimize maintenance programs by first identifying functional failures within machinery systems that have the highest risk of failure and then determining the optimum maintenance tasks and strategies that mitigate potential failures to an acceptable level. In this way, maintenance programs are created which focus on critical components and proper maintenance strategies.

By applying RCM principles, maintenance strategies are evaluated and applied in a rational and systematic manner. ABS can assist owners in gaining approval for their own RCM programs for the maintenance of class or offer further assistance in preparing and implementing an effective RCM program for machinery. The ABS Guidance Notes on Reliability-Centered Maintenance provide the maintenance theory and philosophy of RCM. In addition, the ABS Guide for Survey Based on Reliability-Centered Maintenance contains the RCM program requirements for obtaining an optional RCM notation.
Integrated Management Systems Certification

In addition to facilitating the certification of an OSV to the applicable classification and regulatory requirements, ABS offers owners and operators additional services that allow them to demonstrate their adoption of specific health, safety and environmental standards. Attaining certification to these optional ABS standards provides evidence that the vessel is being operated to the highest standards available to the industry. The ABS Guide for Marine Health, Safety, Quality, Environmental and Energy Management provides operators with an integrated management system model for safe operation and demonstrating operational excellence.

ABS recognizes the positive impact that sound management practices have on these areas. The requirements of this Guide have been largely derived from accepted management system principles reflected in the ISM Code for safety; ISO 9001 for quality management systems; ISO 14001 for environmental management systems; ISO 50001 for energy management systems; and OHSAS 18001 for occupational health and safety management systems. These standards have been marinized as appropriate for greater relevance to the practical operation of maritime vessels.

Rapid Response Damage Assessment

Coastal States are showing an increased intolerance towards marine incidents and ship-sourced pollution. Proactive owners mitigate the potential risks associated with an incident by enrolling in a Rapid Response Damage Assessment (RRDA) program. The ABS RRDA program provides 24-hour, 365 days per year emergency support services to OSV owners and operators with vessels enrolled in the program. Currently the program covers more than 2,000 oceangoing vessels and offshore units. Emergency analysis for structural strength and residual stability post-accident is provided quickly to assist stakeholders in developing an appropriate mitigation strategy.

Training Services

ABS offers focused client seminars and training services for owners and operators of OSVs. Through the ABS Academy more than 150 specialized training courses are available to address design, construction and operational maintenance issues for marine and offshore assets. Classes are conducted in Academy locations in Piraeus, Singapore, Shanghai, Dubai, Houston, Rio de Janeiro and Busan.
Topics associated with OSVs include:

- Classification and Statutory Regulations for Superintendents
- ILO Maritime Labour Convention, 2006 (MLC) Compliance
- STCW Awareness for Offshore Operators
- Statutory Regulations Primer: IMDG Code
- Welding, Inspections and Nondestructive Evaluation
- Risk Assessment
- Incident Investigation and Root Cause Analysis
- Harsh Environment: Operational and Technical Overview
- Prevention and Mitigation of Human Error in Marine Operations
- Key Issues Affecting Cultural Change
- Offshore Support Vessels: New Construction

ABS Academy offers a range of courses addressing implementing and auditing management systems to recognized industry standards. Courses can be customized and delivered at a client's facility. For more information, visit the ABS Academy website at www.absacademy.org.

**Regulatory Information Services**

It is important for owners to keep abreast of the constant flow of new regulatory and classification requirements. Through its participation at IMO as either a member of the IACS delegation, or the US delegation, ABS is able to provide its owners with in-depth coverage and insight into these changes. Future and proposed convention amendments applicable to a specific vessel type or size can be found in the Regulatory Newsroom located at the Resources section of the ABS website, www.eagle.org. Frequent regulatory updates are also posted to the ABS website and ABS owners receive a variety of informational newsletters and publications designed to assist them with understanding the issues. ABS Rules and current regulatory information can be accessed on the ABS website at any time.
Category III

Services Provided by ABS Group

ABS Group offers a broad range of risk-based and certification-related services that have been designed to assist OSV operators to manage their projects and vessels more efficiently. These services are independent of the classification process and range from the identification of potential hazards in conceptual designs through detailed evaluation and certification during construction. ABS Group can also address operational issues such as life extension of mature systems, incident investigation and the development of risk-based and reliability-centered maintenance and inspection programs.

Category III services comprise three parts:
1. Technical and Engineering Services
2. Operational Services
3. Support Services

Technical & Engineering Services

ABS Group is a leader in the application of advanced technology, analysis and modeling to complex engineering projects. Its technical staff is focused on preparing solutions that maximize client efficiencies and minimize the cost of operation without increasing exposure to risk. The services provided are applicable at every stage of an OSV project.

Concept & Preliminary Design Development

From inception through the preliminary design phase, ABS Group can assist an owner in defining the technical specifications for the vessel, drawing up realistic project requirements and providing guidance on preliminary budget estimations. Concept development may include industry trending and transportation studies, equipment definition, construction techniques and statutory requirements.

During the evaluation phase, ABS Group can undertake an independent review of the design, taking into account construction and subsequent operational factors that may include: suitability to owner's needs, selection of propulsion plant and operational requirements among others.
Outline Tender Specification & Evaluation of Bids

ABS Group can prepare the tender specification for an OSV newbuilding project, incorporating the requirements identified by the owner. These may include factors such as: the main structural configuration, the prime mover and principal machinery systems, materials and equipment, coating specifications, navigation systems, the identification of applicable certificates and logistical support.

Once contract proposals have been received, ABS Group can assist the owner in reviewing the proposals to identify those considered most advantageous. This review is intended to reveal ambiguities, obvious omissions, incorrect requirements, future maintenance needs and potential issues associated with the structure, cargo handling, engineering operations and crew safety.

Engineering Analyses & Plan Review

ABS Group engineers are available to review the submitted drawings against specified industry, classification, regulatory or owner standards and requirements. If required, detailed technical analyses can be undertaken including strength and fatigue analysis, comprehensive vibration analysis, shaft alignment assessment, seakeeping and motion studies, maneuvering and mooring analyses, intact and damage stability analysis, failure mode and effects analysis, trim and stability calculations, human factors engineering assessment, environmental compliance assessments and a vessel-specific analysis of the structural response when subject to very high loading rates.

Vessel Construction Services including Trial Attendance

ABS Group surveyors are available to attend the vessel throughout the period of construction and trials, providing comprehensive owner's representation services to verify that the vessel is constructed in accordance with the approved drawings, that the material and equipment conforms to specifications and provide other oversight as agreed to with the owner. These may include inspection of fabrication procedures, machinery installation, nondestructive testing and evaluation, monitoring the installation of automation and control systems and progress monitoring.

Experienced ABS Group staff can confirm test requirements during builder's dock, sea and acceptance trials. This may include verification of the adequacy of deck equipment, outfitting and navigational items and propulsion machinery and auxiliary equipment. A report detailing any areas requiring rectification can be provided to the client on the completion of the trials.
Shipyard Guarantee
Period Support

As required, ABS Group can be available to monitor the performance of the vessel for the entire shipyard guarantee period. This may involve monitoring the repair of warranty items including machinery, coatings, deck and navigational equipment. Under normal circumstances the engineers assigned to the vessel during the guarantee period will already be familiar with the vessel and the contractual requirements from their involvement with the project during construction. Guarantee period oversight may include verification of warranty items, recommendations for operational enhancements, vessel performance, lube oil analysis, habitability (particularly noise and vibration) and coating performance.

Retrofitting & Modifications

ABS Group Maritime Services personnel have extensive experience advising owners and undertaking detailed engineering studies for major retrofit and modification projects.

Operational Services

ABS Group is available to provide worldwide technical support to the owner throughout the operational life of the OSV. ABS Group can be made available to conduct condition surveys and to assess the need for and approach to subsequent repairs including the preparation of repair specifications and inspection of any repair work undertaken.

Survey & Related Services

ABS Group offers a wide range of survey services to the owners and operators of OSVs. These can be conducted to industry accepted or owner-specified standards and include:

- Pre-purchase condition surveys
- Damage surveys
- Draft and on/off hire surveys
- P&I condition surveys
- Material and equipment inspection

An owner considering purchasing an OSV can also contract with ABS Group to conduct a comprehensive record review of the vessel’s classification history.

Project Management Services

ABS Group can provide an OSV owner with tailored project management services that may promote efficiencies and help to minimize the risk of unexpected delays, technical inaccuracies and cost overruns. These services can be made available for new construction projects, for major modifications or repairs or to evaluate potential projects for their feasibility prior to being undertaken.
Oil Testing Services

ABS Group provides prompt, professional services to owners and operators for the analysis and management of their fuel and lube oil supplies. The comprehensive Oil Test Program (OTP) helps the owner monitor deliveries, pre-test supplies, confirm quantities received and provide a detailed analysis of the fuel delivered to promote efficient operations and reduce the potential for disputes.

The OTP encompasses the entire bunkering process, from pre-loading tests to machinery maintenance recommendations, with the particular service package being customizable to the individual client’s needs. It includes:

- Pre-loading tests to reduce incidences of de-bunkering
- Fuel line sampling to verify that the bunkers supplied meet the operator’s specifications
- Identification of fuel characteristics including density, viscosity, sulfur water, metals sediment, pentane insolubles, acidity, sediment particle count, ferrography, ignition quality and carbon residue fuel dilution
- Comparison with specified fuel standards and optional testing for specific criteria
- Verification of density for determination of delivered/invoiced quantity
- Determination of compatibility with other fuels
- Assessment of lube oil condition including additives
- Recommendations on condition maintenance and renewal of lube oils
- Machinery condition monitoring reports and performance trend analysis
- Fuel damage investigations
- Machinery damage surveys
- Preventive strategies for minimization of fuel-related problems
- Impartial independent measurement of bunker quantities

Each client will be placed in direct contact with an ABS Group appointed project coordinator who will be responsible for arranging the speedy dispatch of the fuel samples and efficient delivery of results. User-friendly forms have been created for the OSV’s crew to simplify the collection and dispatch of the samples. Results are normally available electronically within 24 hours of receipt of the samples at the laboratory. A rapid alert service is initiated when the quality of the fuel does not meet the desired specifications.
Support Services
ABS Group takes a holistic approach to the development of products and services designed to assist owners and operators to manage their fleets more efficiently. These services include detailed HAZID and HAZOP studies and the development of effective reliability-centered maintenance strategies. From design conception to the vessel’s final voyage, the global team of ABS Group professionals is available to provide and develop practical, effective support services that promote operational safety and efficiency.

Risk Management & Reliability Services
ABS Group’s risk and reliability experience covers a broad spectrum of services for the OSV operator including hazard identification, explosion and fire evaluations, natural disaster assessment, consequence modeling, incident investigation, auditing, safety and environmental management program development, reliability and business interruption analysis, risk assessment, risk mitigation and risk management. ABS Group can assist clients to lower risks to a level that is as low as reasonably practicable (ALARP). Services particularly tailored to the marine sector include the following:

- **Formal Safety Assessment of Marine Applications**
  ABS Group can prepare a report for the marine safety or reliability related aspects of an owner’s operations in accordance with the IMO Guidelines on Formal Safety Assessment (FSA). The five-step FSA procedure incorporates customary techniques as well as novel safety and reliability methodologies in order to identify, measure and mitigate possible risks and their respective consequence.

- **Risk Assessment Manuals for Engineering Systems, Structures & Processes**
  ABS Group can prepare risk assessment manuals to address the immediate and future preventive risk-reduction controls for onboard engineering systems including structures and processes, as required by the operator. These manuals can identify major hazards related to the installation, operation or maintenance of the items examined. Risks related to the identified hazards and the severity of their respective consequences, in more than one area if applicable, can also be addressed. In addition, an assessment of the financial impact of the application of the controls is proposed with a course of action to minimize risks.
• **Reliability-Centered Maintenance Strategies**
  ABS Group can provide guidance for identifying effective maintenance strategies for either a specific piece of machinery, an engineering system or a complete engine room. The use of analytical reliability methodologies, combined with engineering and operational experience, can reveal actions required to minimize failures. These actions can reduce the overall vessel’s downtime due to engineering delays and increase the life expectancy and safety of the items examined.

• **Reliability-Centered Maintenance Plan for Marine Applications**
  ABS Group can prepare a reliability-centered maintenance (RCM) plan for identification of optimal maintenance intervals, with proactive engineering to help reduce overall expenses used for maintenance purposes. An RCM plan addresses maintenance as a benefit for additional savings and not as an extra cost.

• **HAZID & HAZOP Studies**
  With many years experience in HAZID and HAZOP studies, ABS Group can facilitate an assessment of safety and reliability elements relating to the design or operation of OSVs.

**Environmental Services**
ABS Group staff members have in-depth knowledge of the implications for owners and operators of international and local environmental requirements, such as NOx and SOx levels and cold ironing, through to the more far-reaching aspects of regulatory agencies in dealing with maritime pollution incidents. Failure to comply with the provisions of MARPOL and national legislation such as the US Clean Water Act can result in massive fines and possible criminal penalties. Increased vigilance by the US Coast Guard, in addition to the European Union and many port State authorities, has led to several high profile prosecutions of shipping companies.

ABS Group offers a wide range of environmental management, auditing and training programs to assist an owner or operator in implementing an effective environmental management plan. These services encourage an owner to fully assess the company’s environmental risk profile and may include:

• Effective energy management
• Environmental program management
• Environmental compliance audits
• Economic, technical and risk analysis
Quality Assurance & Security Compliance

ABS Group offers support for operator’s seeking compliance to internationally recognized safety, security, health, quality, environmental and energy management systems. Services include either assistance to establish a program or the required periodic reviews of an existing quality or security system, process instructions and/or procedures to verify compliance. These services include the development and preparation of manuals meeting the criteria in the ISM and ISPS Codes, as well as the OHSAS 18001, ISO 9001, ISO 14001 and ISO 50001 standards.

ABS Group will review existing management systems for an owner or operator and can prepare new manuals according to a client’s request. The manuals and plans are prepared according to the ISM Code guidelines and other applicable industry standards using vessel-specific information.

ABS Group can also conduct an internal audit of the vessels in the client’s fleet to identify areas for improvement and prepare crews for upcoming external audits. One of the main goals is to identify best practices on board vessels and promote these fleetwide.
Classification & Certification Services

For more information on the classification and statutory certification services provided by ABS, please contact the ABS office nearest you. A full listing of ABS offices with contact information can be found on the ABS website at www.eagle.org

For further information on the products and services provided by ABS Nautical Services please contact the ABS Nautical Systems office nearest you. A full listing of the offices can be found on the ABS website at www.eagle.org within the Software section.

Related Services

General inquiries regarding products and services provided by ABS Group can be sent to info@abs-group.com or please refer to the website to contact representatives at www.abs-group.com
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