EI 3642

Vessel management in offshore wind for new entrants and non-marine professionals

First edition

G+ Global Offshore Wind Health & Safety Organisation

In partnership with energy institute

EI 3642

VESSEL MANAGEMENT IN OFFSHORE WIND FOR NEW ENTRANTS AND NON-MARINE PROFESSIONALS

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FOREWORD

This publication has been prepared by the Energy Institute (EI) in conjunction with Greensforge Performance Solutions Ltd in collaboration with industry specialists and technical contributors from across the offshore renewable energy and marine sectors. It provides practical guidance on vessel management for offshore wind activities and has been developed to support safe, efficient and consistent standards for organisations and individuals who may be new to marine operations.

The purpose of this document is to offer clear, accessible guidance on the fundamental principles of vessel management within offshore wind projects. It outlines key concepts, roles, responsibilities, assurance processes and regulatory considerations that apply throughout the offshore wind project life cycle. The guidance is intended to assist users in understanding what 'fit for purpose' means in the context of vessel selection, preparation and offshore operational planning.

This publication is designed for new entrants and non-marine professionals working in or supporting offshore wind projects. This includes developers, project managers, HSE professionals, procurement teams, vessel charterers, marine coordinators, technical specialists and contractors whose primary experience may lie outside the maritime industry. It will also be of value to organisations seeking consistent, industry-aligned expectations when procuring or overseeing offshore vessels.

This document has been created in response to industry demand for clearer, consolidated guidance that bridges the knowledge gap between offshore wind project delivery and maritime operational requirements. As offshore wind continues to expand in scale and complexity, a shared understanding of marine standards and vessel management practices contributes to safer operations, improved collaboration and more effective integration between marine and non-marine disciplines.

While this publication has been written in the context of the United Kingdom (UK) legislative and regulatory framework, including alignment with relevant European requirements, the principles set out herein may also be applied in other jurisdictions where national and local statutory requirements allow. Where differences exist, the more stringent requirement should be adopted. A similar legislative and regulatory framework generally applies across the European Economic Area.

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Invitation for comments

Suggested revisions, clarifications or technical comments are welcomed and should be submitted to:
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This publication was reviewed by members of the G+ Focal Group, whose collective industry knowledge and technical insight strengthened the clarity, accuracy and relevance of the guidance.

– G+ Focal Group members (collective review)

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1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This good practice guide (GPG) aims to provide an overview of vessel management in offshore wind for those that do not have a marine background. You may be a new entrant to the industry, a supplier providing services for the first time, a new developer to the offshore wind sector, a project manager from a civil background, a procurement lead with no vessel experience or a contractor in their first offshore role; nonetheless, working with vessels can often feel complex and overwhelming. This GPG can help by providing an overview of vessel management in offshore wind. It sets out:

– The key principles that ensure a good level of performance with vessel management.
– The main aspects that need to be considered and by whom during a project life cycle.
– The key questions to ask, and how to make smart, safe decisions about vessel use in offshore wind.

The document is not a technical manual, nor a vessel rulebook. This information can be found elsewhere, written by organisations that have the technical experts and industry knowledge to set standards and vessel working practices. This guide is also not a maritime law standard, nor is it designed to inform the reader of the nuances of maritime law. It is for new entrants and non-marine professionals who need to understand vessel management well enough to make informed decisions, avoid common pitfalls and contribute to safe, efficient offshore operations.

By the end of the document, the reader should have knowledge of:

– how vessels support offshore wind projects;
– what makes a vessel suitable for the job;
– how to plan vessel operations that are safe, legal and efficient, and
– where to get more detailed help on rules, regulations and technical information.

1.2 WHO SHOULD USE THIS DOCUMENT

In offshore wind, vessels are essential. From the first seabed surveys during development to ongoing turbine maintenance to end-of-life decommissioning, nearly every offshore task relies on having the right vessel and equipment, at the right place, at the right time, for the right task. In all cases, it takes substantial planning, assessment and a wide range of personnel to contribute to choosing the right vessel for the right task.

Choosing the wrong type of vessel for the wrong task or failing to plan properly can lead to serious consequences, including:

– expensive project delays;
– equipment damage;
– underperformance;
– increased safety risks for crew, and
– breaches of marine regulations and legal requirements.

The content in this document aims to help you steer clear of those issues. It covers the fundamentals of vessel planning, selection and oversight, so you can make informed decisions, keep operations running smoothly and stay compliant at sea.

You will find it especially useful if you are:

- A developer or project manager working on your first offshore wind project.
- A procurement, health, safety and environment (HSE) or contract management professional involved in sourcing or overseeing vessels.
- A supplier entering the offshore wind sector for the first time – particularly if your team has not worked with vessels before.
- An operations lead, logistics planner or site coordinator who needs to understand how vessels impact your scope, timelines and responsibilities.

1.3 HOW TO USE THIS GUIDE

Sections 1–5 will help readers gain a basic understanding of how to select a suitable vessel for a specific scope of work. Section 6 and beyond provide more details on aspects and stages of vessel operations in offshore wind, including signposting to more detailed or technical documents.

While the document is intended to be read as a whole, individual chapters can also be read in isolation; therefore, there is some repetitiveness intentionally built in.

1.4 KEY TERMS AND CONCEPTS

1.4.1 What this guide covers

This guide follows the typical offshore wind project life cycle and sets out the key principles related to vessel management, including:

- What vessels are used at each stage.
- What makes a vessel 'fit for purpose'.
- What to think about during planning.
- What checks and decisions need to be made before and during vessel operations.
- What good (and bad) looks like when it comes to vessel use.

1.4.2 What 'fit for purpose' means

'Fit for purpose' is a commonly used term in vessel management and in the broader assessment and selection of equipment and assets. When applied to vessels, it refers to the process of selecting the appropriate type of vessel for a specific task or phase within an offshore wind project. This ensures that the vessel's capabilities align with the technical, environmental and operational requirements of the job.

In other words, a vessel is considered fit for purpose when it has the necessary capacity, capability, equipment, competent crew and an effective management system in place to safely and efficiently carry out the required task under the expected conditions, such as weather, sea state and project-specific risks.

For a full glossary, refer to Annex C.

2 WHAT VESSELS DO IN OFFSHORE WIND

While offshore wind is often associated with turbines, cables and substations, none of these components can be delivered, installed or maintained without a diverse and highly specialised fleet of vessels. Vessels are integral to every phase of an offshore wind farm's life cycle, from early site investigations to end-of-life decommissioning and repowering that may occur decades later.

2.1 THE OFFSHORE WIND PROJECT LIFE CYCLE

To understand the various uses of vessels in the offshore wind sector, it is important to first recognise that offshore wind farms are developed through a long and complex life cycle process which encapsulates a 'cradle-to-grave' approach. This involves carefully managed assessment and execution of technically demanding activities ranging from early site investigations, through construction and operations, to eventual decommissioning or repowering.

Understanding the life cycle phases matters because every phase needs the right kind of vessel, with the right team and planning for the specific task to be carried out at that stage of the programme. Marine advisor input is integral at each stage for the success of all offshore activities.

Knowing what work fits into what phase of the life cycle helps in order to:

- choose the right vessel or supplier;
- understand the risks;
- understand any permit or regulatory requirements;
- understand limitations and restrictions, and
- better plan the programme activities.

The five key phases of the offshore wind life cycle are described in the next sections.

2.1.1 Stage 1: development phase – getting ready to build

'*Is this the right place for a wind farm, and can we build here safely?*'

Before any construction begins, developers spend years evaluating the proposed site location. They need to analyse site-specific data to understand a wide range of factors, such as the seabed, weather, environment and any legal or local issues.

Key activities during the development phase:

- seabed surveys (using survey vessels to map the ocean floor);
- environmental studies (to protect wildlife and habitats);
- installing measurement equipment (such as floating light detection and ranging (LiDAR) buoys or met masts to measure wind), and
- stakeholder engagement and permits (talking to local communities, fishing groups, government bodies).

Eventually, once the data and issues have been analysed and assessed, then developers are able to select what can be constructed, which locations to build, the size and scale of the project, financial cost modelling and how to minimise and mitigate potential risks and impacts.

The client/developer will also be in possession of the relevant permits, consents and, where necessary and applicable, a contract for difference (CfD). A CfD is a government-backed financial support mechanism designed to encourage investment in low-carbon electricity generation. Not all countries operate a CfD model.

Vessels involved during the development phase:

– survey vessel for geophysical and geotechnical work scope;
– survey vessel for environmental and navigational surveys, and
– anchor-handling tug, Multicat or smaller light construction vessel to deploy metocean buoys.

2.1.2 Stage 2: construction and installation – building the wind farm

'*We've got the green light – now let's build it.*'

At the end of the development phase, developers will consider all aspects of their analysis and will make a financial investment decision as to whether to proceed to stage 2: construction and installation.

Figure 1: Offshore wind farm in construction

The construction phase is when the project shifts from a two-dimensional concept on paper to complex construction with works being undertaken often onshore and offshore. It is where suppliers and components from all over the globe come together, and they start to take shape offshore, turned into physical reality: foundations, cables, turbines and substation. See Figure 1.

It is also one of the busiest, most complex, labour-intensive and riskiest stages of the offshore works programme of a wind farm's life cycle, with a huge percentage of the working hours taking place offshore, involving vast numbers of contractors, vessels, suppliers and personnel.

Key activities:

- Scour protection installation – conducted during the development phase to stabilise the seabed around turbine foundations and prevent erosion. This activity typically involves the use of fall pipe vessels or rock-dumping vessels, equipped with dynamic positioning (DP) capabilities to accurately place rock or other protective materials around monopiles or jacket structures.
- Component delivery and port logistics – wind turbine components such as blades, nacelles, towers and transition pieces are transported to designated marshalling ports using general cargo vessels, heavy-lift ships or feeder vessels. These components are then staged, assembled or transferred to installation vessels (e.g. jack-up vessels or heavy-lift crane vessels) for offshore deployment.
- Transporting and installing foundations (usually by large heavy-lift vessels or jack-up barges).
- Laying subsea cables, connecting turbines and bringing power to shore, using a cable lay vessel (CLV) equipped with DP.
- Installing turbines and substations using specialist installation vessels with DP.
- Marine coordination and logistics (lots of people, parts and vessels moving around).

This phase has multiple parties undertaking multiple activities, which makes the logistics, resources and risk register complex.

Vessels involved:

- jack-up vessels, see Figure 2;
- CLVs;
- heavy-lift ships;
- construction support vessels;
- crew transfer vessels (CTVs), and
- tow vessels (tugs) and service operation vessels (SOVs).

Figure 2: Jack-up vessel next to offshore wind turbine

2.1.3 Stage 3: commissioning – turning the power on

'*Let's test everything and make sure it works*.'

Once turbines are physically installed, they need to be connected to the grid, tested and signed off on before they start generating power commercially.

Key activities:

– testing electrical systems and controls;
– carrying out final inspections;
– resolving any issues or 'snagging' problems, and
– energising the wind farm safely.

This stage is shorter than construction but still involves offshore work and coordination.

Vessels involved:

– CTVs, and
– support vessels (SOV).

2.1.4 Stage 4: operations and maintenance (O&M) – keeping things running

'*Now the wind farm's live, we need to keep it safe and working*.'

This phase lasts the longest – typically 20–30 years. It is all about routine inspections, planned maintenance and fixing things when they go wrong.

Key activities:

– regular turbine inspections;
– component replacements (such as blades, gearboxes or electrical parts);
– subsea inspections (checking cables and foundations), and
– health and safety checks.

This work is ongoing and often depends on good weather windows and efficient vessel use.

Vessels involved:

– CTVs, SOVs;
– jack-up vessels (for major repairs and component exchange), and
– remotely operated vehicle (ROV) support vessels.

2.1.5 Stage 5: end of life – decommissioning or repowering

'*What happens when the turbines reach the end of their life?*'

Eventually, the wind farm either gets removed (decommissioned) or upgraded (repowered). This needs as much care and planning as construction.

Key activities:

– removing turbines, cables and foundations (in reverse order);
– clearing the seabed and making the site safe, and
– replacing older equipment with newer, more powerful models (if repowering).

Decommissioning plans are usually developed early during the development and construction phases, updated during operations, but final execution of the plan comes decades later.

Vessels involved:

- heavy-lift vessels;
- jack-ups;
- cable recovery vessels;
- seabed clearance vessels;
- environmental survey vessels;
- CTV, and
- SOVs.

Note: some vessels, such as guard vessels, may work across multiple phases to keep the area safe and monitored.

Table B1 in Annex B provides an overview of the vessel types and activities associated with each phase of the offshore wind project lifecycle.

2.2 COMMON VESSEL TYPES

Throughout the offshore wind life cycle, a wide range of vessels, each designed for specific tasks throughout the project life cycle, are utilised. Understanding these vessel types is key to understanding how offshore wind farms are built, operated and maintained.

2.2.1 Survey vessels

- Purpose: used in the early stages to explore and assess the seabed and environmental conditions.
- What they do: conduct geophysical surveys, geotechnical surveys and collect wind and wave data.
- Key features: equipped with sonar, drilling tools and LiDAR systems.

2.2.2 Heavy transport vessels

See Figure 3.

- Purpose: transport large components such as foundations, turbine towers, nacelles and blades.
- What they do: transport components.
- Key features: DP systems and large deck space.

Figure 3: Heavy transport vessel

2.2.3 Jack-up vessels

See Figure 4.

- Purpose: provide a stable platform for installing turbines and foundations in shallow waters.
- What they do: if self-propelled, the jack-up vessel will use DP to position itself and lower the legs and lift itself above the water. If a non-self-propelled vessel, then tugs will position it for jacking up.
- Key features: self-elevating platforms, cranes and accommodation for crew.

Figure 4: Jack-up vessel

2.2.4 Cable lay vessels (CLVs)

See Figure 5.

- Purpose: install electrical cables that connect turbines to each other and to shore.
- What they do: lay and bury subsea cables along planned routes.
- Key features: cable tanks, tensioners, trenching equipment and DP systems are now standard on modern CLVs.

Figure 5: Cable laying vessel

2.2.5 Crew transfer vessels (CTVs)

See Figure 6.

- Purpose: transport technicians and small equipment to and from turbines.
- What they do: enable safe and fast access to turbines for daily operations.
- Key features: high-speed hulls, seating for crew.

Figure 6: Crew transfer vessel pushing on

2.2.6 Service operation vessels (SOVs)

See Figure 7.

- Purpose: support long-term maintenance campaigns offshore.
- What they do: serve as floating bases with accommodation, workshops and spare parts.
- Key features: DP, walk-to-work (W2W) systems, helidecks.

Figure 7: Service operations vessel

2.2.7 Multipurpose support vessels

- Purpose: handle a variety of tasks including inspections, repairs and ROV operations.
- What they do: deploy ROVs, support diving teams and assist with subsea work.
- Key features: flexible deck layouts, cranes, and subsea equipment.
- DP systems are now standard on most vessels of this type.

2.2.8 Anchor-handling and towing vessels

See Figure 8.

- Purpose: used in floating wind projects to install and maintain mooring systems.
- What they do: tow floating platforms and position anchors on the seabed.
- Key features: winches, towing gear and high pull capacity.

Figure 8: Towing vessel

3 PROCURING A VESSEL – FROM REQUIREMENTS TO MOBILISATION

Procuring a vessel for offshore renewable energy work is not as simple as finding any available ship; the process is a structured, multi-phase process that involves technical, legal, commercial and operational planning.

A suitable vessel and vessel operator, chosen with care and foresight, can significantly reduce risk and improve project outcomes, whereas if the process selects the wrong vessel, whether due to oversight, misjudgement or inadequate planning, then this can introduce substantial risks to people and the environment and also lead to delays, inflate costs and compromise the success of the entire project or operation activities.

3.1 VESSEL PLANNING AND MOBILISATION – GENERAL CONSIDERATIONS

The typical steps involved in planning, assessing, selecting and mobilising a vessel for offshore operations should follow a logical sequence. It is important to recognise that certain key focus areas, such as operational capability, crew qualifications, compliance, environmental conditions, communication and risk awareness, are not confined to a single phase of the process.

Instead, they are continuously considered and actively reassessed throughout the entire project life cycle, from initial planning through to execution, operational activities, and to project end-of-life activities. This ongoing attention ensures that any vessel activities, no matter where they occur in the life cycle, remain safe, efficient and fully compliant at every stage. It is therefore essential to have a marine advisor as an integral part of the advice to the project team.

Where these critical aspects are not effectively considered throughout the vessel planning and mobilisation process, the consequences can be significant and lead to a poorly selected vessel which can compromise safety, disrupt schedules and escalate costs. For example:

- Selecting an unsuitable vessel for local sea conditions may lead to unsafe crew transfers or reduced productivity due to motion sickness and fatigue.
- Deploying a crew lacking offshore wind experience can result in procedural errors or non-compliance with safety standards.
- Missing or incomplete documentation, such as permits or certifications, can trigger regulatory delays or detentions or even prevent site access altogether.
- These risks underscore the importance of maintaining a consistent focus on key operational, regulatory and environmental factors at every stage of the project.

3.1.1 Step 1: define the vessel requirements

Before an organisation can approach the vessel market, it must first define what is required to be carried out from a vessel, where and when and for how long. These requirements should reflect the unique geographic, technical and operational demands of the project or operational activities, including:

- Intended use – will the vessel support personnel transfer, construction, survey, accommodation or maintenance?
- Activities required – what activities and what technical equipment will be required?
- Geographical work location – coastal waters, territorial seas or further offshore?
- Duration of the vessel engagement – is this for a 1-week task, a season or the life of the project?
- Operational capabilities – what capacity is needed in terms of crane reach, lifting capacity, hook height, storage space, DP class, endurance, deck space or crew accommodation?
- Regulatory compliance – what flag state, classification society and maritime codes will apply? Are there local or regional standards to meet?

This step is critical in order to establish clear requirements, which lead to safer, more efficient and better value vessel contracts.

3.1.2 Step 2: develop a technical specification

Based on the organisation's needs and what is available, the next step is to create a vessel technical specification that can be shared with prospective vessel owners, operators or shipbrokers.

As a minimum, a vessel specification should include:

- an explanation of the activities to be undertaken;
- the geographical area where the vessel is required;
- the type and size of vessel;
- the minimum performance metrics (speed, fuel type, fuel consumption, station keeping, etc.);
- mission-critical equipment (e.g. cranes, daughter craft, DP, safety systems);
- required certifications (e.g. SOLAS, MARPOL, International Safety Management (ISM), class);
- marine crew qualifications and onboard manning expectations, and
- any agreed upon expectations around mobilisation and readiness.

This vessel technical specification becomes the baseline for comparing vessel enquiry responses later.

3.1.3 Step 3: conduct vessel market research

Once the vessel requirements are clear, the next step is to understand which vessels that match these requirements are available and when. It is important to note that vessel availability can change quickly, so up-to-date intelligence is vital.

In order to establish vessel availability, various options are available:

- using vessel databases (e.g. MarineTraffic, Clarksons, VesselsValue);
- engaging with trusted shipbrokers who know the live market and off-market options;

– reviewing industry reports or market trends for costs, fuel rates and demand patterns, and
– speaking directly with known vessel operators who may already be serving similar scopes.

3.1.4 Step 4: request for information (RFI) or request for proposal (RFP)

Once the vessel technical specification is agreed, then the organisations can now access the vessel market engagement phase by issuing an RFI or RFP.

The RFI or RFP should be sent to:

– vessel operators;
– chartering agents or shipbrokers, and
– specialist marine contractors.

When engaging with the market, it is important to have relevant marine specialists engaged in the process to advise and to equally have clarity for the vessel operators, shipbrokers, etc., to provide comparable data and supply a relevant quotation.

Aspects such as:

– project schedule and mobilisation date;
– expected duration and operational window;
– evaluation criteria (technical, commercial, compliance, risk), and
– any specific HSE, sustainability or local content requirements.

These elements are very relevant to ensure that the right information is provided alongside the vessel technical specifications to ensure a good response from the market.

3.1.5 Step 5: evaluate submissions

Once proposals are received from the vessel market, the information needs to be reviewed and evaluated each against the vessel activity needs.

When reviewing and evaluating, key considerations include:

– Technical capability – can the vessel do the job safely and efficiently?
– Compliance – does it meet all regulatory and certification requirements?
– Commercial terms – are rates competitive and is the value clear?
– Availability – is the vessel free during your required window?
– Operator reputation – past performance, audit history and operational culture.
– Shortlisted vessels may be subject to further due diligence (see step 6).

3.1.6 Step 6: vessel inspection and due diligence

Before confirming any charter, it is recommended that a hiring organisation conduct a pre-hire inspection or third-party audit to verify the vessel and operator's capabilities.

Checks may include:

- inspection of hull, deck and safety systems;
- review of vessel's safety management system (SMS);
- certificates from the classification society and flag state;
- maintenance records and dry dock history;
- crew qualifications and experience;
- operator assessment/audit, and
- insurance cover and claims history.

There are several third-party audits and inspection frameworks that are commonly used in offshore renewable energy and maritime sectors to assess the suitability and compliance of a vessel and its operator.

These audits help verify that the vessel is safe, seaworthy, legally compliant and operationally fit for purpose before it is chartered. Common ones used include:

- IMCA Common Marine Inspection Document (CMID) – this is widely used in offshore energy sectors (renewables, oil and gas) and covers: HSE and quality practices, vessel condition, crew competence and documentation. It is managed by the International Marine Contractors Association (IMCA) and carried out by IMCA-appointed accredited vessel inspectors using eCMID software. There are two inspection formats, one for larger vessels (over 500 gross tonnage (GT)) and another for vessel under 500 GT (previously known as eMISW). Valid for 12 months.
- Offshore Vessel Inspection Database (OVID) – created by the Oil Companies International Marine Forum (OCIMF) and focused on safety and pollution prevention is conducted by OCIMF-accredited inspectors; this is primarily used by oil and gas operators, but also sometimes requested in offshore wind. Valid for 12 months.
- Flag state inspections – this is a regulatory inspection following International Maritime Organization (IMO) requirements and conducted under the authority of the vessel's flag state (by the state itself or a classification society on behalf of the flag state) and focuses on regulatory compliance confirmation of SOLAS compliance, manning levels, safety equipment and certificates.
- Port state control (PSC) records – is the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules.
- Client-specific or project-specific audits – these can also be undertaken in order to audit specifications designed in-house and focus on alignment with site-specific safety systems, simultaneous operation (SIMOPS) interfaces, transfer systems, etc. These are an important part of the Developers Marine Assurance process and demonstrate assurance rigour. Conducted to ensure the vessel is 'fit for purpose', in addition to the desktop assurance. Examples include:
  - developer-led inspections based on internal audit checklists, and
  - HSE or technical reviews against the project's SMS or emergency response plan (ERP) requirements.

- Classification society surveys[1] – a classification certificate is issued after a survey by a classification society (e.g. Lloyd's Register, Det Norske Veritas (DNV), Bureau Veritas, American Bureau of Shipping (ABS)) that must be recognised by the proposed ship register. This is required for a ship's owner to be able to register the ship and to obtain marine insurance on it, it may also be required before a ship can enter some ports or waterways, and may be of interest to charterers and potential buyers. To avoid liability, classification societies explicitly disclaim responsibility for the safety, fitness for purpose, or seaworthiness of the ship. Being 'in class' is a verification only that the vessel is in compliance with the classification standards of the society issuing that classification certificate.

3.1.7 Step 7: contract negotiation and mobilisation planning

Once the preferred vessel and contractor is selected, commercial and legal terms must then be agreed upon before works can be considered. This part of the process is normally led by procurement specialists supported by engineering, construction or operational representatives from the client developer, and marine experts (either in-house or external).

The process will include setting a charter party agreement (often based on BIMCO forms such as SUPPLYTIME), including:

- clear start and end dates;
- daily rates, demobilisation terms and fuel clauses;
- liabilities, indemnities and force majeure, and
- compliance with site or project-specific SMS or ERP requirements.

Mobilisation planning can then begin, including crew onboarding, vessel inspections to ensure the vessel is ready to sail, on-hire survey and project briefings.

Ultimately, procuring a vessel is not a one-size-fits-all process. It requires good planning, market understanding and clear technical documentation.

New entrants to offshore renewables should engage early with specialists (e.g. marine advisors throughout, brokers until contract is signed, client representatives during mobilisation) to avoid common pitfalls and ensure their vessel selection supports project success, safety and regulatory compliance.

3.1.8 Step 8: demobilisation

Once the contract ends, a structured demobilisation process must be undertaken to ensure safe, compliant and efficient closure of the vessel's engagement. This includes offboarding personnel, removing equipment, conducting final inspections and ensuring all contractual and regulatory obligations are fulfilled.

Key considerations include:

- Crew and equipment offboarding – ensuring safe disembarkation and removal of project-specific assets.

1 A ship classification society or ship classification organisation is a non-governmental organisation that establishes and maintains technical standards for the construction and operation of ships and offshore structures. Classification societies certify that the construction of a vessel complies with relevant standards and carry out regular surveys in service to ensure continuing compliance with the standards.

- Final audits and inspections – verifying vessel condition and compliance post-operation and usually will include off-hire/dilapidation survey. This is important because for a completed handover, there needs to be a close out of the vessel contract and responsibility fully transferred to the vessel operator/owner. To achieve this, there needs to be confidence that the dilapidation survey has shown no issues when it has compared the vessel's condition against its pre-mobilisation state.
- Documentation and reporting – closing out logs, incident reports and operational records.
- Commercial closure – confirming demobilisation terms, final payments and any claims or disputes.

3.1.9 Step 9: capture lessons learned

As part of the demobilisation phase, there needs to be a lesson learned process which will normally be coordinated by the client/vessel representative or other appointed party by the client/developer.

The lessons learned process needs to document what went well and what could be improved for similar works to be completed at another time and project. It is important that all parties are involved, that they share feedback with internal teams and, where appropriate, with the wider industry, including through organisations such as IMCA or G+.

4 SAFETY AND RESPONSIBILITY

4.1 VESSEL SUITABILITY: WHAT 'FIT FOR PURPOSE' MEANS

When considering vessels for an offshore operation, the team selecting a vessel needs to ensure that it is a vessel that is 'fit for purpose'. This means that it is fully capable, safe and legally allowed to carry out the specific job that it has been hired for, in the context of the specific location, conditions and programme timeframes required.

Figure 9: Illustration of various vessels and offshore wind foundation types

There is a need to ensure that all relevant information concerning activity, working environment (seabed, sea state, tidal, wind, etc.), programme and specific tasks are collated as clear inputs to the selection decision-making process.

Selecting the right vessel for the right conditions and the right task, see Figure 9, is a safety critical task and is not just about whether the vessel floats or has a crane, it's about whether the entire vessel setup (equipment, crew, systems and paperwork) is ready and suitable for the activity to be carried out, at the time needed in the working conditions that it will be exposed to. A vessel is considered to be 'fit for purpose' when:

a) It meets technical and operational needs:
   i. The vessel has the right equipment (e.g. cranes, winches, DP system) for the job.
   ii. It can operate safely in the expected sea states, weather and water depths.
   iii. It has enough deck space, power supply and endurance for the planned work.

b) It holds valid certifications:
   i. The vessel is classed by a recognised classification society (e.g. DNV, Lloyd's Register).
   ii. It has valid Flag State Certification (the country it is registered in).
   iii. It complies with international maritime rules such as:
      a. SOLAS' (International Convention for the Safety of Life at Sea);
      b. ISM (ISM Code – International Safety Management Code);
      c. ISPS (ISPS Code – International Ship and Port Facility Security Code), and
      d. MARPOL (International Convention for the Prevention of Pollution from Ships).

c) It has a competent crew:
   i. The crew are qualified, trained and experienced in offshore operations.
   ii. They understand the specific risks and procedures for the project.
   iii. There are enough crew members to meet safe manning levels and allow for rest periods.

d) It can support the project duration:
   i. The vessel has enough fuel, food, water and storage to stay offshore as long as needed.
   ii. It has suitable accommodation and welfare facilities for both vessel crew and project personnel.
   iii. It can support crew changes safely (e.g. via helideck or transfer vessel).

e) It has been properly assessed:
   i. The vessel has passed a vessel audit (e.g. CMID or OVID) showing it meets industry standards.
   ii. It has undergone a suitability survey to confirm it can perform the specific task safely and effectively.
   iii. It is important to highlight that the vessel operator/contractor has been assessed by the developer as part of the due diligence process. The vessel operator can be audited to demonstrate that it can effectively support the vessel while on hire.

These steps ensure that a vessel is truly fit for purpose and are critical to the success and safety of any offshore operation. A vessel that has not been assessed properly using the right information criteria will be lacking in the appropriate equipment, certifications or operational capability.

This can cause significant programme delays due to breakdowns or non-compliance with regulatory standards. However, more seriously, this not only has the potential to impact the programme, but it also introduces considerable safety risks for the crew and the offshore technical personnel working on the vessel.

From a regulatory compliance perspective, failing to select a vessel that is ‘fit for purpose’ can lead to legal and contractual consequences, including fines or denied access to work sites.

In many cases, the cost of emergency vessel replacement or unplanned downtime far exceeds the investment in proper vessel selection and verification. Therefore, confirming a vessel’s fitness for purpose is not just a technical requirement; it is a fundamental part of the project assurance and operational readiness, and this means that it forms a crucial part of the risk management strategy for the project or works completion, commercial cost control and operational reliability.

4.2 WHO’S RESPONSIBLE FOR WHAT

Whether a vessel is working on an offshore wind project or an operational site, it is crucial that there are clearly defined roles and responsibilities for all parties that are involved in the project or operational activities.

Clear roles in vessel planning, chartering and execution help each party understand how they contribute to safety, compliance and success.

4.2.1 Developer (client/project owner)

The developer (client/project owner) is typically the 'cheque payer' in offshore wind projects. They are the primary funder and ultimate decision-maker, and their role carries significant authority and responsibility.

The developer has the following responsibilities:

- The overall accountability for project HSE performance, and as such may conduct vessel assurance over and above that provided by the contract.
- Responsible for vessel selection when chartering directly, or for approving contractor-selected vessels.
- Ensuring only competent contractors are selected to carry out work activities.
- That there is alignment with marine safety requirements prior to works commencing.
- They are responsible for overseeing the integration of marine operations into the broader project execution plan.

As the funder, the developer usually has the final say, within regulatory and contractual bounds, while day-to-day operations may be delegated to contractors and vessel operators. However, the developer retains strategic oversight and financial control, making them the key authority in decision-making and risk acceptance.

4.2.2 Contractor (tier 1/package contractor)

The contractor is often referred to as the tier 1 or package contractor, who is the party responsible for delivering a defined portion of the offshore wind project on behalf of the developer. Work packages may include the installation of foundations, turbines, cables or other major work packages.

The contractor has the following responsibilities:

- Manages the execution of offshore works, including planning, logistics and marine coordination.
- Responsible for sourcing and assuring the suitability of vessels, including conducting technical and compliance checks, in line with a specification and set of requirements agreed with the client.
- Provides vessel assurance to the client prior to the commencement of offshore works, demonstrating that the selected vessel meets all safety, operational and regulatory expectations.
- Manages the technical project crew, the specialists responsible for carrying out offshore tasks, ensuring they are properly trained, qualified and supported to work safely and effectively.
- Ensures the safe delivery and execution of the contracted scope in line with client and regulatory expectations.

4.2.3 Vessel operator (vessel owner/technical manager)

The vessel operator is the organisation responsible for the day-to-day management and operation of the vessel.

It is important to note that the vessel operator is not always the same as the financial owner of the vessel. The owner may contract another company (acting as technical manager) to operate the vessel. In practice, it is the vessel operator who ensures the vessel runs safely and legally.

The vessel operator is responsible for:

- Maintaining the vessel in a seaworthy condition, including all equipment, systems and safety gear.
- Managing the vessel crew, including hiring, training and ensuring the vessel is properly manned.
- Ensuring compliance with international and national maritime law (e.g. SOLAS, MARPOL, ISM).
- Operating a certified SMS in accordance with the ISM Code.
- Supporting the master (captain) in running the vessel safely and ensuring operational procedures are followed.

4.2.4 Master (captain)

The master (captain) is the most senior person onboard and holds the ultimate responsibility for the vessel and everyone on it. They are appointed by the vessel operator and empowered by international maritime law.

Key responsibilities of the master (captain) include:

- Has overriding authority and responsibility to make decisions with respect to safety and pollution prevention.
- May override project or client instructions if they pose a risk to the safety of the vessel or breach maritime regulations.
- Ensures all activities onboard are carried out in compliance with the vessel's SMS and relevant international and national maritime laws.

4.3 INTERFACE AND COMMUNICATION PROTOCOLS

Clear communication is not just a best practice for offshore working, but it is a critical safety measure. A significant proportion of safety-related incidents in offshore operations is directly linked to miscommunication or a lack of communication.

As the complexity of activities increases and more parties become involved in the work programme, such as developers, contractors, vessel operators and subcontractors, the need for structured, reliable communications becomes even more vital. In terms of vessel management itself, that need is most focused between the vessel manager and the charterer of said vessel.

Without clear communication protocols, the risk for miscommunication and misinformation increases. Therefore, projects and operational sites need to establish the protocols in order to:

- prevent misunderstandings and conflicting instructions;
- ensure safe and coordinated operations;
- establish clear lines of authority and escalation;

- align vessel procedures with project-specific requirements, and
- reduce the risk of incidents caused by communication breakdowns.

4.3.1 Key interface and communication tools

Effective vessel management depends on clear interfaces and communication tools aligned with project or site protocols, ensuring that developers, contractors, vessel operators and subcontractors can exchange accurate, timely and consistent information. The core principle is that the right people receive the right information at the right time, which is essential for safety and efficiency in high-risk offshore environments.

Clear communication protocols reduce misunderstandings, support coordinated responses and help prevent incidents, delays and costly errors, ultimately protecting personnel, assets and the environment.

Common interface and communications tools in vessel management are:

a) Bridging documents: these align the vessel's SMS with the project's operational and HSE procedures, and help:
   - identify and resolve procedural differences;
   - define shared emergency response protocols, and
   - clarify roles and responsibilities during operations.

b) Communication matrices: these help define across the project team or operational site. They are especially important during SIMOPS, complex operations involving multiple contractors such as back deck operations or those that are high-risk when there are multiple vessels and contractors are working in close proximity to one another. They should define:
   - who communicates with whom;
   - when and how communication occurs, and
   - escalation routes and decision-making authority.

c) Kick-off meetings and safety drills: need to be held before vessel mobilisation and then at the start of each offshore phase. They reinforce:
   - clear communication lines and working protocols;
   - reinforce shared understanding of the work scope and risks;
   - review communication protocols and emergency procedures, and
   - establish a culture of open, proactive communication.

d) Interface management plans: these are used on larger projects to manage interactions between multiple contractors, vessels or work packages. These plans:
   - support shared resource coordination;
   - define responsibilities at operational boundaries, and
   - help prevent gaps or overlaps in communication.

These key interface and communication tools should always aim to keep protocols clear, concise and accessible to all personnel, ensure all parties are sufficiently briefed and trained on communication expectations and need to be regularly reviewed and updated, especially after any incidents, near misses, industry learnings or safety alerts that are issues that may be applicable to the work activity or the vessels involved.

Once communication protocols are in place, the broader framework that ensures safety onboard, the SMS, becomes the foundation for consistent safe operation.

4.4 SAFETY MANAGEMENT SYSTEMS

4.4.1 What is an SMS?

An SMS is a structured and documented system used to manage HSE risks in a consistent and controlled way.

An SMS brings together:

- policies and objectives;
- procedures and safe systems of work;
- roles and responsibilities;
- training and competence requirements, and
- monitoring, reporting and learning processes.

Its purpose is to:

- prevent harm to people, vessels and the environment;
- ensure legal and regulatory compliance;
- provide clear instructions for how work is carried out safely;
- define authority, accountability and escalation routes, and
- support continuous improvement through learning and review.

SMS frameworks are used at different levels in offshore renewable energy:

- project or operational site SMS (owned by the developer/operator), and
- vessel's SMS (owned by the vessel operator).

These systems operate together and must be aligned through formal bridging arrangements so that safety is managed consistently across all parties.

4.4.2 Project or operational site SMS

A project or operational site SMS provides the overarching framework for managing HSE risks across an offshore renewable energy project or operating wind farm. It:

- is owned and maintained by the client/developer or operator lead;
- applies to all contractors and activities;
- covers construction, commissioning, operations, maintenance and decommissioning, and
- defines common rules, communication pathways and emergency arrangements.

This system does not replace vessel's SMS. Instead, it provides the framework within which vessel systems must interface.

Vessel operators retain responsibility for:

- marine operations;
- navigation;
- crew safety, and
- statutory maritime compliance.

Alignment between these systems is achieved through:

- bridging documents;
- interface procedures, and
- project-specific instructions.

4.4.3 What is a vessel's SMS?

A vessel's SMS is the formal, documented system used by a vessel operator to ensure the safe and environmentally responsible operation of a vessel.

Its primary objectives are to:

- prevent accidents and injuries;
- avoid loss of life;
- reduce the risk of pollution, and
- ensure compliance with maritime law.

For most commercial vessels over 500 GT, a compliant vessel's SMS is a legal requirement under the ISM Code, which forms part of the SOLAS Convention.

For smaller vessels, equivalent SMS arrangements may be required by:

- flag state legislation;
- classification society rules;
- national maritime authorities, or
- charterer or client requirements.

In offshore renewable energy, vessel's SMSs are especially important because vessels often operate:

- close to structures;
- in congested work areas;
- with frequent personnel transfers, and
- in challenging weather and sea conditions.

The vessel's SMS is:

- owned by the vessel operator;
- implemented onboard by the master and crew;
- audited by flag state or class, and
- mandatory for lawful operation.

4.4.4 Why a vessel's SMS is critical

A vessel's SMS is critical because it:

- Provides the legal basis for safe vessel operation.
- Protects the authority of the master.
- Defines how risks are controlled in day-to-day marine activities.
- Ensures consistent standards across the operator's fleet.

- Allows vessels to interface safely with offshore projects.
- Enables effective emergency response.
- Supports investigation and learning from incidents.

Without an effective vessel SMS:

- Safe operation cannot be assured.
- Legal compliance cannot be demonstrated.
- Project safety controls cannot function reliably.

4.4.5 What a vessel's SMS must cover

A vessel's SMS developed in line with the ISM code will normally include as a minimum:

- safety and environmental protection policy;
- company responsibilities and authority;
- master's overriding authority;
- designated person ashore;
- manning and competency arrangements;
- safe operation procedures;
- emergency preparedness and response;
- incident and near-miss reporting;
- maintenance of vessel and equipment;
- document and record control, and
- internal audits and management review.

These elements ensure that:

- the vessel is safely operated;
- risks are systematically controlled;
- responsibilities are clearly defined, and
- compliance can be demonstrated.

4.4.6 How a vessel's SMS is shaped and regulated

Vessel SMSs are shaped by international maritime regulation, including:

- IMO ISM Code;
- SOLAS convention;
- MARPOL convention;
- flag state legislation, and
- classification society rules.

Compliance is verified through:

- external audits;
- certification, and/or
- PSC inspections.

This means that vessel SMSs are:

- statutory systems, not optional company procedures;
- enforced by maritime authorities, and
- independent of project or client systems.

However, when vessels are chartered to offshore renewable energy projects, their SMS must be:

- bridged to the project or site SMS;
- aligned with project procedures, and
- supported by project-specific instructions.

This is normally achieved through a bridging document, which defines:

- which system applies in different situations;
- how conflicts are resolved;
- how communication and escalation work, and
- how emergency response is coordinated.

4.4.7 Understanding and working within the vessel's SMS

All personnel working onboard a vessel must operate in accordance with the vessel's SMS.

This includes:

- vessel crew;
- project personnel;
- technicians, and
- visitors.

Key principles are:

a) Mandatory compliance: the vessel must always operate in accordance with its SMS.

b) Authority of the master: the master has overriding authority to:
   - delay;
   - modify, and
   - suspend operations (if they are not safe or not compliant with the SMS).

c) Operational alignment – project activities must be planned so they:
   - fit within vessel procedures;
   - respect vessel limitations, and
   - do not conflict with statutory requirements.

Failure to respect the vessel's SMS can:

- create confusion;
- increase risk;
- undermine emergency response, and
- expose the vessel and project to legal action.

4.4.8 Incident reporting and escalation within the SMS

Incident and near-miss reporting must form part of both:

- the vessel's SMS, and
- the project or site SMS.

Clear reporting and escalation arrangements are essential to:

- meet ISM Code requirements;
- ensure consistent communication;
- support learning and improvement, and
- enable effective interface management.

Escalation arrangements should define:

- who must be informed;
- in what order;
- by what means, and
- who has decision-making authority (normally the master).

Key escalation principles are:

a) If in doubt, speak up: any person can raise a concern at any time.
b) Stop work: anyone may stop an unsafe activity without fear of blame.
c) Stand down: operations must be suspended if:
    - conditions exceed safe limits;
    - risks cannot be controlled, and
    - uncertainty remains unresolved.

Standing down is a professional safety decision, not a failure.

4.5 EMERGENCY PREPAREDNESS AND RESPONSE

Vessel operations in offshore renewable energy are carried out in remote and challenging environments where external emergency support may be delayed. For this reason, every vessel must be able to respond immediately and effectively to emergencies that occur onboard.

This is achieved through the vessel's ERP, which forms part of the vessel's SMS.

4.5.1 What is a vessel ERP?

A vessel ERP is the documented set of procedures that defines how the vessel's master and crew respond to emergency situations onboard in order to:

- protect life;
- prevent escalation of the incident;
- minimise damage to the vessel, and
- reduce harm to the environment.

The vessel ERP is designed around the vessel's:

- type and layout;
- equipment and systems;
- manning levels;
- operational profile, and
- project activities being undertaken onboard.

Typical emergency scenarios addressed include:

- fire and explosion;
- collision or grounding;
- man overboard;
- flooding or loss of stability;
- machinery or power failure;
- pollution or spill response, and
- medical emergencies.

The vessel ERP is managed by the master, supported by the vessel operator and must be understood by all personnel onboard.

4.5.2 Relationship to project or operational site emergency arrangements

While the vessel ERP governs the immediate onboard response, offshore renewable energy projects also operate under a wider project or operational site ERP.

These two systems are complementary:

- Vessel ERP: focuses on the vessel and the actions taken by the master and crew during an onboard emergency.
- Project or site ERP: provides the wider coordination framework for incidents affecting multiple vessels, offshore structures or personnel and enables escalation to shore-based and external emergency responders.

The vessel ERP must therefore:

- interface clearly with the project or site ERP;
- define communication and escalation routes, and
- support coordinated response across vessels and installations.

This ensures that vessel-level actions and project-level coordination work together without conflict or delay.

4.5.3 What the vessel ERP must achieve

An effective vessel ERP should:

- Define clear command and control, led by the master.
- Allocate roles and responsibilities for emergency duties.
- Set out practical response procedures for foreseeable scenarios.

- Establish communication arrangements with:
  - project/site control;
  - other vessels, and
  - shore-based emergency services.
- Be fully integrated into the vessel's SMS.
- Be adaptable to:
  - changes in onboard manning;
  - new equipment or activities, and
  - different project phases.

The vessel operator is responsible for ensuring the ERP remains current and aligned with the vessel's operational risk profile.

4.5.4 Familiarisation, drills and readiness

For the vessel ERP to be effective in practice:

- All personnel onboard (crew, technical staff, visitors) must receive:
  - vessel safety induction;
  - muster and alarm briefings, and
  - emergency procedure familiarisation.
- Regular drills must be conducted for scenarios such as:
  - fire;
  - man overboard;
  - abandon vessel;
  - collision or flooding, and
  - medical emergencies.

These drills are normally led by the master and form part of the vessel's SMS requirements.

4.5.5 Industry good practice guidance

Detailed good practice for emergency preparedness and response in offshore renewable energy is set out in:

EI 3395 *G+ Integrated offshore emergency response (G+ IOER)*: *Good practice guidelines for offshore renewable energy developments*. See Figure 10.

This guidance provides:

- a structured framework for offshore emergency response;
- alignment between vessel, site and shore-based response arrangements;
- good practice for coordination with external responders, and
- lessons learned from offshore renewable energy operations.

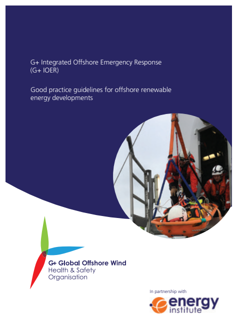

Figure 10: *G+ Integrated offshore emergency response* publication cover

Users of this guide should refer to EI 3395 for detailed guidance on:

- scenario planning;
- command and control;
- multi-vessel and multi-site emergencies, and
- external response integration.

4.6 MEDICAL SUPPORT AND INTEGRATION WITH SMS

Provision for medical support onboard offshore vessels is not optional as it is a critical requirement under both the vessel's SMS and the project or operational site SMS. These systems must work together to ensure an appropriate, coordinated response in the event of injury, illness or medical emergency offshore.

The medical provision baseline on a vessel is always determined by the flag state. However, the vessel master may include extra equipment based on a combination of risk factors, including:

- Type of operations being conducted (e.g. construction, diving, heavy-lifting, confined space entry).
- Vessel type and layout, which can affect response time and stretcher access.
- Distance from shore or medical facilities and typical response time for evacuation (e.g. medevac helicopter).
- Duration of deployment, including whether personnel are expected to live onboard for extended periods.

Medical support and integration should be clearly defined in the vessel's SMS through:

- Requiring medical equipment and consumables, based on operational risk and flag state regulations.
- The presence of trained first aiders or onboard medics, based on persons on board and risk profile.
- Establishment of procedures for stabilisation, casualty management and communications with shoreside or emergency responders.
- Telemedical support arrangements (defined by flag state).

The project-level or operational site SMS should clearly define medical support and integration through:

- Defining overarching medical emergency protocols, including notification, triage and escalation routes.
- Ensuring that the vessel's capabilities are integrated into wider site emergency response arrangements.
- Setting out the medical fitness and certification requirements for technical crew and specialists, visitors, etc.
- Including plans for coordination with external agencies, including coastguards and helicopter services.

By considering these factors early in the planning phase, integrating vessel and project SMSs, developers, operational site teams and vessel operators can ensure that medical emergencies are managed safely, efficiently and in full compliance with regulatory expectations.

Although there are country-specific regulations that govern medical arrangements on vessels, these are in addition to baseline global standards. Country-specific requirements tend to typically align with or build upon international maritime conventions, but may also introduce stricter or more detailed requirements depending on the flag state (country of registration) or PSC (country of operation).

The global baseline for medical requirements on vessels is set by:

- ILO Maritime Labour Convention (MLC) 2006 requiring all vessels to carry:
  - adequate medical supplies and equipment;
  - at least one trained first aider (with advanced training on larger vessels);
  - access to telemedical assistance services, and
  - procedures for evacuation in case of serious injury/illness.
- IMO International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) mandating:
  - specific medical training for designated crew (e.g. elementary first aid, medical care), and
  - role-based competency depending on the size/type of vessel and area of operation.

4.7 HEALTH AND WELFARE ARRANGEMENTS

Welfare on offshore vessels goes far beyond basic sanitation and sleeping quarters. It is essential to provide an environment that actively prevents fatigue and supports the overall well-being of all personnel onboard.

Key welfare considerations are based on IMO requirements, but may include:

- Crew accommodation: must meet flag state, regional or international standards, providing clean, comfortable and adequately sized living spaces.
- Fatigue management: effective shift rotation and regulated working hours are critical. Work schedules should allow sufficient rest between shifts, avoid excessive hours and comply with maritime regulations, such as the MLC that limit working time and ensure minimum rest periods (only applies to vessel crew). Proper management helps prevent fatigue-related risks and maintains alertness.
- Rest facilities: sleeping quarters should be designed to promote restorative sleep through soundproofing, control of lighting and ergonomic bedding.
- Nutrition and hydration: provision of balanced meals and access to safe drinking water is essential to sustain energy and health during demanding offshore work.
- Environmental controls: noise reduction, vibration control, temperature regulation and good air quality help create a restful environment for off-duty periods.

Together, these factors create a holistic approach to welfare onboard, ensuring personnel can perform safely and effectively throughout their deployment.

5 WORKING OFFSHORE AND TRAINING

5.1 DIFFERENCE BETWEEN VESSEL CREW, PROJECT CREW AND VISITORS ONBOARD

When working offshore, people onboard a vessel typically fall into three main groups: vessel crew (seafarers), project, operations or technical crew and visitors.

5.1.1 Vessel crew (seafarers)

Qualified personnel employed by the vessel operator who are responsible for the safe operation and maintenance of the vessel and who work under maritime regulations (e.g. STCW). They report to the vessel master and are divided into:

- Officers:
  - master (captain);
  - nautical officers;
  - engineering officers, and
  - electro-technical officer (ETO).
- Ratings:
  - deck crew;
  - engine crew;
  - catering staff;
  - electrician, and
  - other vessel support personnel.

5.1.2 Project, operations or technical crew

Mission-specific industrial personnel who are not part of the marine crew but are onboard to carry out offshore project or operational tasks. They use the vessel as a work platform and typically report to a project manager or offshore construction manager. This group may include:

- wind turbine technicians;
- cable installation teams;
- surveyors;
- construction or commissioning engineers, and
- project team members.

5.1.3 Visitors

These are people who are not part of the regular marine or project crew, such as:

- inspectors;
- auditors;
- client representatives, and
- VIPs or journalists (occasionally).

Visitors may be onboard for short periods and usually:

– Do not have a defined working role.
– Must comply with vessel induction and safety requirements.
– Are under the authority of the master for safety purposes.

5.2 SPECIFIC OFFSHORE ROLES

5.2.1 Marine warranty surveyor (MWS)

The developer (client) appoints an MWS as an independent third party to act on behalf of their insurer and is usually engaged through an insurance warranty clause, which means that for the developer to maintain coverage for high-value operations, the insurer requires them to appoint an MWS approved by their insurer. The developer is ultimately responsible for the risk and holds the insurance.

The MWS works independently of the contractors and vessel operators, even though they are part of the project team. Their priority is verifying that operations are technically sound, safe and compliant with the approved engineering and procedural documents.

The MWS acts to independently verify that high-risk or complex marine operations (e.g. heavy lifts, cable lay, foundation installation) are being carried out safely and in accordance with approved procedures.

Their role typically is:

– To review and approve method statements, risk assessments and engineering calculations ahead of operations as the developer (client) needs assurance that marine operations meet the safety and engineering standards required by the insurer.
– Attend critical stages of the project to witness and verify that procedures are being followed correctly.
– Provide a sign-off (called a certificate of approval) that operations can proceed, which is often a condition of insurance cover.

The MWS are not permanently stationed offshore onboard a vessel. Instead, they are onboard for short durations and attend only during specific, high-risk or critical operations, such as:

– mobilisations;
– loadouts;
– sail-away, and
– heavy lifts.

5.2.2 Client representative (client rep)

A client rep is appointed by the developer (client) and is responsible for representing the client's technical, safety and contractual interests during offshore operations. They are the main point of contact on the vessel for ensuring that the project is executed safely, efficiently and in line with contract requirements. They work with the vessel crew, project teams and sometimes side-by-side with the marine warranty surveyor (MWS), but they have a different focus.

Key aspects of their role include:

– Monitoring daily activities, safety performance and progress against scope.
– Ensuring that the vessel and contractors follow project plans, permits and quality standards.
– Liaising with both the vessel crew and onshore project teams, often sending daily reports and updates.
– Acting as the client's 'eyes and ears' offshore, helping manage real-time decisions.

Client reps are typically onboard for the full duration of the vessel's operations and project phase. They typically join at mobilisation and stay throughout operations, often rotating in shifts (e.g. every 2–4 weeks) depending on project length.

5.3 TRAINING AND CERTIFICATION FOR THOSE WORKING OFFSHORE

5.3.1 Offshore training and medical standards

Vessel crew (seafarers) are governed by global maritime standards established by the IMO, a United Nations agency. The IMO oversees the STCW Convention, which sets minimum training, certification and medical fitness requirements for seafarers to ensure safe vessel operations worldwide. These standards are enforced by flag states through national authorities, including the issuance of medical fitness certificates such as ENG1.

Project, operations or technical crew (industrial personnel) working offshore in the wind and renewables sector typically follow safety training standards developed by recognised industry bodies such as the Global Wind Organisation (GWO). GWO provides role-specific safety training modules, including sea survival, working at heights and first aid, designed to address the hazards associated with offshore wind activities and offshore transfers.

Under the International Code of Safety for Ships Carrying Industrial Personnel (IP Code), which is mandatory under SOLAS Chapter XV, additional safety, medical and operational requirements apply to industrial personnel working onboard vessels in offshore sectors such as wind energy and subsea operations. These requirements go beyond basic induction training and are intended to ensure that personnel are suitably prepared for offshore and vessel-based risks.

Key training requirements for industrial personnel under the IP Code include:

– Safety training: completion of appropriate safety training equivalent to STCW A-VI/1. Subject to flag state acceptance, this may include recognised alternatives such as GWO, OPITO or BOSIET certification.
– Ship-specific familiarisation: mandatory onboard safety briefings covering vessel layout, emergency procedures, muster points, alarms and life-saving equipment.

Medical fitness standards: Developers (clients) and contractors should consider adopting the health and safety standard EI 3583 *Medical fitness assessment for wind turbine workers*. This guidance provides a consistent, industry-aligned framework for assessing medical fitness, supporting fair and standardised evaluations and enabling personnel mobility across projects and contractors.

Developer/client responsibility: The project developer or client holds the primary responsibility for defining the required training and medical fitness standards for all personnel working on or visiting their project, particularly the project crew and visitors. These requirements are formalised within the project HSE plan and contractual documentation, and must be clearly communicated to contractors during tendering and mobilisation to ensure compliance and consistency across the project.

5.3.1.1 *Vessel crew (the vessel's crew)*

Vessel crew is the qualified seafarers (e.g. navigators, engineers, electricians, stewards) responsible for operating the vessel safely and ensuring it is operating correctly and legally.

All crew members must undertake training and qualifications that meet international maritime standards, STCW as a minimum. Training may include:

- formal academic training and experience to achieve certificates of competency for officers;
- STCW basic safety training (BST);
- vessel-specific training;
- basic and advanced firefighting;
- medical care at sea;
- radio operations (e.g. Global Maritime Distress and Safety System (GMDSS)), and
- crowd and crisis management (on passenger vessels).

In addition, vessel crew often need to undertake country-specific training and certifications depending on:

- The flag state of the vessel, as each flag state may have additional or specific training requirements beyond international conventions.
- Where the vessel is operating, as some offshore areas require specific PSC, environmental and safety training if they are in designated exclusive economic zones.
- These specific safety or security protocol requirements may well go beyond the global minimum standards (such as STCW); vessel crew must comply with relevant flag state and operational region training requirements to ensure full legal compliance and operational safety.

Medical fitness is a critical requirement for seafarers worldwide to ensure their ability to safely perform duties at sea. Under the STCW, all seafarers must meet minimum medical fitness standards established by their respective flag states.

These standards cover physical and mental health aspects necessary for safe vessel operations. While each country issues its own medical certification to verify compliance, the certificates must align with the STCW's global baseline requirements.

5.3.1.2 *Project, operations or technical crew*

These are the industrial personnel who are not part of the vessel crew but are onboard to carry out project-specific or technical tasks such as technicians, surveyors and construction teams who work on board vessels to carry out operational activities related to surveying, construction and maintenance of offshore wind farms. Unlike the vessel crew, they do not operate the vessel itself.

They must complete recognised offshore safety training standards, which vary by region and industry, but generally include:

- GWO sea survival – widely accepted as the preferred standard within the offshore wind industry globally.

- STCW personal survival techniques (PST) or BOSIET – commonly used in oil and gas sectors internationally.
- RenewableUK (RUK) marine safety training – specific to some UK offshore wind operations.

Additional job-specific safety training may include:

- working at height and rescue;
- confined space entry, and
- rigging and lifting operations.

Specific training requirements are set by the client developer and agreed with contractors prior to appointment and the commencement of offshore work. All personnel going offshore must provide evidence of their certifications.

For anyone transferring from vessel to vessel or to an offshore structure, completion of the full BST as per GWO requirements is typically mandatory.

All personnel must also complete a vessel induction covering emergency procedures and life-saving equipment, in line with maritime guidance.

5.3.1.3 Visitors and specialists

These are the professionals who are not involved in day-to-day vessel or project operations. MWS, client representative, auditors, original equipment manufacturer (OEM) reps, but who are onboard for either oversight, inspection or technical advice, or are there for observation only. In which case, the latter would be classed as a visitor as they do not carry out physical work and in most cases do not transfer from a vessel to an offshore structure.

Due to the varied nature of the works that can be carried out by specialists versus visitors who are offshore to observe and experience, training requirements need to be considered by the developer (client) and/or operational site team. These need to be set and communicated in advance for any visitor or specialist intending to go offshore on the project or operational site.

When considering the training standards for visitors or specialists, the following minimum content should be included:

- vessel familiarisation induction and orientation undertaken by the vessel master (captain or their representative);
- basic marine safety awareness induction, and
- ERP training and participation where required in emergency drills.

If a visitor or specialist plans to undertake a transfer offshore (e.g. to an offshore structure or vessel to vessel transfer), then they must have suitable training certification as per the requirements for project, operations or technical crew. This is because the risk profile of the task they are undertaking is now vastly different from that of someone who is offshore onboard a vessel but will not transfer.

Where a person intends to transfer as a visitor or specialist, the minimum training required is typically based on a risk assessment and would include GWO sea survival or BOSIET and working at height.

The extent of training required may vary depending on the risk assessment when considering the duration/frequency of offshore travel and risk exposure. This is for the developer (client) and or operational site team to assess, set and communicate to the relevant parties.

Visitors and specialist personnel also require a level of medical fitness to go offshore, whether they are observing or carrying out physical work activities.

Medical standards that are deemed acceptable for these personnel are usually set by the project developer or operating company, often aligning with the requirements for the project or technical crew to ensure consistency and safety across the operation. These standards form part of the project or operational sites SMS and should be communicated during contractor tendering and mobilisation.

Those spending extended time at sea or transferring offshore may require the same level of medical certification as project or operational personnel described previously.

Visitors may have a shorter time offshore, and as they are not carrying out physical work and are only observing, the physical demand on the body will be less demanding than the vessel crew (the vessel's crew) or project, operations or technical crew. However, visitors must still be medically fit to safely travel to, stay on and evacuate from offshore locations if needed.

Project and operational sites SMS must therefore detail a set of requirements for visitors that includes fitness requirements and a process for either checking fitness prior to going offshore, pre-medical certifying or providing sufficient health awareness prior to going offshore that a visitor can make the correct decision. All of this should form part of the offshore visitor standard and protocol defined in the project and operational sites SMS.

6 MARINE COORDINATION

6.1 WHAT IS MARINE COORDINATION?

Marine coordination is the organised management and control of all vessel movements and marine activities within an offshore project area.

It provides a single, coordinated overview of:

- which vessels are operating;
- where they are working;
- what activities they are undertaking, and
- how those activities interact with each other and with offshore structures.

Marine coordination typically includes:

- monitoring vessel positions and movements;
- controlling access to windfarm or safety zones;
- coordinating personnel transfers and logistics;
- managing interfaces between vessels and offshore installations, and
- acting as the central communication point between vessels, offshore sites and shore-based teams.

Its purpose is to ensure that marine operations are conducted safely, efficiently and in compliance with applicable maritime and project rules.

6.2 WHY IS MARINE COORDINATION IMPORTANT?

Marine coordination is essential because offshore renewable energy projects commonly involve:

- multiple vessels operating at the same time;
- close proximity working near turbines, substations or construction sites, and
- transfers of people and equipment in changing sea and weather conditions.

Effective marine coordination supports:

- Safety:
  - Reduces the risk of collision, grounding and contact with structures.
  - Helps manage personnel transfers and lifting operations safely.
  - Maintains awareness of weather and sea conditions.
- Operational control:
  - Avoids conflicting vessel movements and work activities.
  - Supports planning and control of SIMOPS.
  - Improves scheduling and use of marine resources.
- Regulatory compliance:
  - Helps ensure vessels operate within defined safety zones and permit conditions.

  - Supports compliance with maritime law and project requirements.
  - Provides records of vessel movements and activities.
- Emergency response:
  - Maintains situational awareness across the project area.
  - Supports coordinated response to incidents involving vessels or personnel.

Without effective marine coordination, risks increase rapidly due to loss of visibility, poor communication and uncontrolled interfaces between activities.

6.3 KEY THINGS TO ENSURE

For marine coordination to function effectively, projects should ensure:

- clear responsibility for marine coordination is defined;
- single point of control for vessel movements within the project area;
- direct communication with vessel masters and offshore site teams, and
- defined procedures for:
  - vessel entry and exit;
  - safety zones and exclusion areas;
  - SIMOPS management, and
  - emergency escalation.
- real-time awareness of:
  - vessel positions;
  - planned activities, and
  - weather and environmental limits.
- alignment with local maritime authorities and project permits.

Marine coordination arrangements must be appropriate to:

- the scale and complexity of the project;
- the number and type of vessels involved, and
- local regulatory and navigational requirements.

6.4 INDUSTRY GOOD PRACTICE GUIDANCE

Detailed good practice for marine coordination in offshore renewable energy projects is set out in EI 3595 *G+ Marine coordination good practice guidelines.* The guidance provides:

- a structured framework for marine coordination;
- defined roles and responsibilities;
- guidance on communication, control and escalation;
- good practice for managing SIMOPS and vessel interfaces, and
- alignment with international offshore renewable energy experience.

Users of this GPG should refer to EI 3595 for detailed implementation guidance where marine coordination is required.

7 WEATHER AND WORKING CONDITIONS

Weather and sea conditions are one of the most significant factors influencing offshore operations. They directly affect the safety of personnel, the operational limits of vessels and equipment, and the overall programme and commercial performance of offshore wind projects. Poor or misjudged weather planning can lead to lost working days, standby costs, unsafe transfers, vessel damage or serious harm to personnel.

7.1 UNDERSTANDING SEA STATES

Sea states are typically described using the Douglas Sea Scale or significant wave height metrics (Hs), swell period and wind strength, which together impact vessel motions and safety margins for operations.

Operational limits, such as maximum allowable wave height for personnel transfer or crane operations, must be clearly defined for each vessel and task.

These limits will vary depending on:

– the type and stability of the vessel (e.g. DP class, hull form);
– the nature of the activity (e.g. transfer, heavy-lift, cable laying);
– max operational limits (transfers, equipment use);
– safe transit and loitering thresholds;
– fatigue considerations from long-term wave motion exposure;
– crew competency and experience, and
– the time window required to complete the task safely (including recovery time).

Vessels operating beyond their limits risk structural damage, crew fatigue, injury, fatalities and project failure.

7.2 PLANNING AROUND WEATHER

Responsibility for weather planning sits jointly across several parties, depending on the project phase or operational works programme and the contracting type and model being used between the parties.

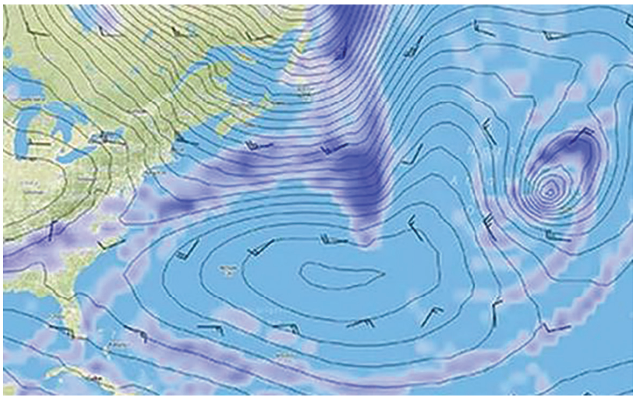

Figure 11: Weather modelling showing atmospheric pressure over the North Atlantic

Key principles that should be ensured when planning works, regardless of the contracting type and model being used, are:

– The developer holds ultimate accountability for weather risk management in project planning. They are responsible for ensuring weather windows are considered in overall programme scheduling, contingency planning and contract clauses (e.g. weather downtime allowances).
– Marine coordination teams are typically responsible for real-time weather monitoring and advising on safe working conditions during execution. They act as a hub for incoming weather data and coordinate with vessels, site teams and emergency response.
– The vessel master retains overriding authority to decide whether an activity is safe to proceed, based on current and forecasted conditions. This includes cancelling operations if conditions are worsening or above operational limits.
– Package managers/offshore managers are responsible for integrating weather constraints into their work package plans (e.g. cable laying, turbine installation) and should consult forecast data as part of their daily and weekly planning cycles.

The impact of poor weather planning can be:

– Programme integrity: poor forecasting or unrealistic assumptions can delay critical path activities, causing cascading delays across multiple work packages.
– Vessel availability: weather-related standbys incur cost; poor planning may lead to vessel demurrage or breach of contract.
– Commercial risk: missed milestones may trigger contractual penalties, reduced availability payments or lost revenue due to generation delay.
– Safety: operating near or beyond weather limits increases the risk of an incident, particularly in small craft, during transfers, where suspended loads are involved or any vessel working beyond defined operating limits.

7.3 WEATHER TOOLS AND FORECASTING RESOURCES

Effective weather forecasting is critical to the safety, efficiency and success of offshore wind operations. Weather impacts every phase of the project life cycle, from early planning and scheduling to vessel selection, mobilisation, day-to-day execution and demobilisation.

As offshore wind projects expand from near-shore sites to further offshore with potentially more remote and challenging environments, the ability to accurately forecast, interpret and respond to changing metocean (meteorological and oceanographic) conditions becomes increasingly important.

7.3.1 Weather forecasting tools and data sources

A wide range of tools and technologies is used to support weather-informed decision-making:

- Specialist metocean forecast providers: professional services offering high-resolution, site-calibrated models tailored to specific offshore wind locations. These forecasts typically include wind speed and direction, wave height and period, swell, visibility, precipitation and tidal/current data.
- Automatic identification system (AIS)-integrated marine planning platforms: software platforms that combine AIS data with weather forecasts, vessel availability and project schedules to optimise marine operations and reduce downtime.
- Vessel-based monitoring systems: many vessels are equipped with onboard weather stations, motion sensors and wave radar that provide real-time environmental and vessel behaviour data. This information supports operational awareness and feeds into forecasting models.
- Real-time data sources: satellite imagery, fixed buoy networks, floating LiDARs and remote-sensing platforms offer ongoing measurements of sea state, wind conditions and atmospheric data, contributing to situational awareness and forecast verification. See Figure 11.

7.3.2 Forecasting horizons and application

Weather forecasting supports different decision-making needs depending on the planning horizon:

- Short-term forecasts (0–72 hours): used to support immediate operational go/no-go decisions, vessel transfers, lifting operations and crew mobilisation. Accuracy is highest in this window.
- Medium-term forecasts (3–10 days): inform logistics coordination, marine planning and the sequencing of operations. They help balance readiness with contingency planning, such as mobilising W2W vessels or rescheduling campaign activities.
- Long-term forecasts (climatology): historical and seasonal data trends inform broader planning decisions, such as campaign windows, procurement timelines, vessel charter durations and high-risk weather periods. Long-term datasets also support strategic risk assessments and investment decision-making.

7.3.3 Weather forecasting – integration into project decision-making

Weather forecasting should be embedded into the project's marine coordination, planning and HSE systems, with clear protocols for interpreting and acting on forecast data.

Decision thresholds for wave height, wind speed, visibility and sea state must be agreed and documented in risk assessments, method statements and marine operations plans.

Forecast data should also be shared transparently across all contractors and vessel operators to promote joined-up planning and reduce the risk of misalignment or unsafe decision-making.

7.4 TRAINING AND AWARENESS ON WEATHER AND SEA CONDITIONS

A strong understanding of weather data is essential for safe and efficient offshore operations. While formal meteorological qualifications are not required, all key personnel must be competent in interpreting relevant weather information and applying it to operational decision-making.

7.4.1 Weather training – who needs training and why?

Marine coordination personnel: their role is to monitor weather in real time, assess the impact on daily operations and act as the central hub for communicating forecasts and alerts to vessels and offshore teams. Training should include:

- interpreting marine forecasts (wind, wave height, period, visibility, precipitation);
- use of site-specific metocean tools and forecasting platforms;
- understanding the difference between forecasts and observed conditions;
- alert protocols and when to escalate concerns, and
- communicating operational limits to all stakeholders.

Offshore managers and package engineers: their role is to plan activities safely around forecast windows, establish clear go/no-go criteria, ensure these are documented in RAMS and lift plans and maintain alignment between marine operations and overall project execution.

Training for offshore managers and package engineers should include:

- forecast interpretation and confidence levels;
- translating wave and wind data into operational implications (e.g. lifting limits, access conditions);
- site-specific hazards (e.g. tidal races, fog zones, seasonal storms);
- contingency planning for weather downtime, and
- collaborating with marine coordinators and vessel masters.

Key project engineers (e.g. installation, cable laying, WTG teams): their role is to align work sequences with realistic weather assumptions and understand how environmental conditions affect equipment, vessel access and safe operations.

Training should include:

- basics of metocean forecasting relevant to their scope;
- integrating weather data into method statements and task risk assessments;
- communicating with vessels and adjusting work plans based on forecasts, and
- understanding and enforcing weather limits.

Vessel masters and vessel crew: must be fully aware of their vessel's operational limitations, including maximum safe sea state for personnel and equipment transfers, lifting and transits. They must participate in pre-task briefings that include weather limits and emergency stand-down conditions.

Vessel masters and vessel crew should receive refresher training on:

- use of onboard weather monitoring equipment;
- company procedures for defining, reviewing and escalating weather-related hazards, and
- the authority of the master to stop operations at any time due to weather.

Project crew (technicians, riggers, surveyors, etc.): must understand the weather conditions under which their task is safe to perform.

This is particularly important for complicated and high-risk work, including:

- transfer by CTV or W2W gangways;
- working at height;
- working over water;
- lifting or handling suspended loads;
- underwater operations, and
- deployment of arrays, cables, ROVs, UAVs, etc.

Training or induction should cover:

- the concept of working environmental limits (e.g. wind speed, wave height, visibility);
- escalation processes, that is, who to speak to if concerned about changing working environmental conditions, and
- reiteration of the understanding of the empowerment for individuals to stop work if they feel unsafe.

8 VESSEL MANAGEMENT – RULES AND REGULATION

Regulatory frameworks in high-risk sectors such as offshore renewable energy and maritime operations are designed to safeguard people, the environment and assets through enforceable standards. These regulations ensure consistent levels of safety, quality and accountability, irrespective of geography, experience or commercial pressures.

Vessel-related regulations are typically sector-neutral, focusing not only on selecting the appropriate vessel for a task but also on ensuring that all aspects of vessel operations are conducted safely, legally and with effective risk controls. This includes the entire vessel life cycle, from selection and mobilisation through to operations and demobilisation.

Compliance requires a proactive approach to risk management and regulatory adherence by all parties involved in planning and executing vessel activities.

8.1 VESSEL REGULATIONS

The offshore environment presents a range of inherent hazards, from unpredictable weather and dynamic sea states to complex lifting operations and multi-vessel coordination. To mitigate these risks, vessels must comply with a suite of international, national and project-specific regulations designed to protect life, the environment and asset integrity.

These regulations govern how vessels are:

- designed and constructed.
- crewed and operated.
- maintained and certified.
- integrated into offshore project frameworks.

Compliance is not optional, and it forms the legal and safety baseline for all offshore activities.

8.2 MARITIME REGULATIONS

All vessels are subject to maritime regulations designed to safeguard personnel, protect the environment and ensure vessels are technically suited to their intended operations.

Maritime rules are set by different parties depending on many factors, but include:

- International conventions: set by global bodies such as the IMO, these provide baseline standards for vessel safety, crew welfare and environmental protection.
- Flag state requirements: every vessel is registered under a country (its flag state) and must meet that country's legal and technical rules.
- PSC: when vessels call at ports, the PSC, as the official authority, can join any vessel at any time to inspect the vessel for compliance.
- Project or country-specific guidance: offshore wind developers may also require compliance with regional industry guidance or their own project-specific requirements.

Together, these form a layered regulatory framework that ensures vessels are safe, well-managed and operated competently.

Maritime regulations typically cover the following areas:

- Construction and equipment: how the vessel is built, maintained and equipped (e.g. navigation systems, life-saving appliances).
- Operations and emergency planning: how the vessel is operated day-to-day and what procedures are in place for fire, collision, grounding or abandon-ship scenarios.
- Crew qualifications and welfare: the training, certification, working hours and medical fitness of marine crew – ensuring they are capable and fit for offshore duties.
- Environmental protection: how vessels handle waste, emissions, oil spills and marine biodiversity.

8.3 MARITIME GUIDELINES

Regulations as have been described are legally binding directives issued by a government or regulatory authority.

Maritime rules, however, are prescribed guidelines or instructions, often set by organisations, companies or projects, and are internal or project-specific or set by industry associations for a sector. They are set to guide behaviour, ensure consistency across the sector and support internal governance.

Examples of vessel-related guidelines set by non-regulated organisations that are commonly followed in offshore renewable energy projects, especially in vessel selection, assurance and operational planning, are:

- G+ – not a regulator but an established industry organisation focused on the global offshore sector. The G+ vessel GPG is widely adopted by developers and contractors as assurance baseline.
- International Marine Contractors Association (IMCA) – a globally recognised industry body providing offshore marine guidance. While not a regulator, IMCA's publications are widely adopted across the offshore energy sector and play a key role in vessel assurance and operational standards.
  - Key IMCA guidance includes the IMCA M 220 series on DP operations, CMID and marine safety alerts. The IMCA standards are used extensively for audit and chartering decisions.
- Oil Companies International Marine Forum (OCIMF) – a voluntary industry body that provides inspection and assurance frameworks for offshore support vessels. While not a regulator, OCIMF's tools are widely used by energy majors to standardise vessel inspections and share findings.
  - Key tool: OVID, which is a voluntary framework, often required for vessel acceptance in oil and gas and increasingly adopted in offshore renewables.
- Classification societies (e.g. DNV, Lloyd's Register, Bureau Veritas) – independent, non-governmental organisations that develop and apply technical standards for the design, construction and operation of ships. Classification is a key component of vessel assurance and regulatory compliance.
  - The classification societies play a key role by issuing class rules covering hull integrity, propulsion, DP systems and more. Although these are non-

governmental, the classification is often a prerequisite for regulatory certification (e.g. SOLAS compliance).

- Flag state-recognised organisations (e.g. International Association of Classification Societies (IACS)) – technical bodies authorised by flag states to carry out inspections and certification on their behalf. While their rules are not laws, they form the basis for enforceable compliance when acting under flag state authority. They importantly develop and apply technical rules and procedures used in vessel inspections and statutory certification. They are indirectly enforceable when acting on behalf of flag administrations; base documents are advisory unless mandated by a flag state.

8.4 KEY INTERNATIONAL VESSEL STANDARDS

When it comes to vessel management in any offshore industry, including renewables, four core international conventions set the foundation for how vessels are built, operated and crewed:

- SOLAS;
- MARPOL;
- MLC, and
- STCW.

These standards are developed by the IMO and are recognised globally by most flag states.

While not all offshore vessels (especially smaller ones) require full compliance with every part of these conventions, they remain key benchmarks for best practice and many developers or contractors will expect alignment as part of project assurance.

8.4.1 Safety of life at sea (SOLAS)

SOLAS is the cornerstone of global maritime safety. It sets minimum safety standards for how vessels are constructed, equipped and operated to protect life at sea.

It covers areas including, but not limited to:

- fire safety and firefighting systems;
- life-saving appliances (lifeboats, lifejackets, immersion suits);
- navigation and communication equipment;
- emergency procedures (e.g. abandon ship, collision response), and
- safe manning levels and crew responsibilities.

Even vessels not formally required to comply (e.g. under 500 GT) often adopt SOLAS-based features or procedures, particularly when supporting offshore renewable energy projects involving passenger transfers, lifting operations or extended campaigns.

8.4.2 Marine pollution (MARPOL)

MARPOL sets rules to prevent pollution from vessels, both during normal operations and in emergencies. It includes:

- oil pollution prevention (e.g. oily water separators);

- sewage and garbage handling;
- air emissions controls (sulfur, nitrogen, particulates), and
- ballast water management to reduce ecological impacts.

Offshore renewable energy projects often have strong environmental goals. Ensuring vessels meet or exceed MARPOL standards helps manage reputational and regulatory risk, especially in sensitive marine environments or when working near protected zones.

8.4.3 Maritime labour convention (MLC)

MLC is the international standard for seafarer rights and working conditions. It ensures fair treatment and protection for crew members.

It includes requirements for:

- working hours and rest periods;
- employment contracts, pay and repatriation;
- medical care and onboard welfare;
- accommodation standards (space, hygiene, catering), and
- crew complaints and grievance handling.

Crewing standards directly affect health, morale and performance. In offshore renewable energy, MLC compliance, or flag-state-equivalent measures, supports safety, professionalism and responsible project delivery, especially on longer or more complex campaigns.

8.4.4 Standards of training, certification and watchkeeping (STCW)

STCW is the International Maritime Safety Convention that sets minimum training standards for crew on commercial vessels. It reduces accidents caused by human error and requires BST.

It includes requirements for:

- minimum training and competency standards for deck, engine and ETOs and ratings;
- certification and endorsement of qualifications by flag states;
- watchkeeping arrangements and fitness for duty;
- refresher training and revalidation of certificates, and
- medical fitness standards for seafarers.

STCW compliance is fundamental to safe vessel operations. In offshore renewable energy, adherence to STCW requirements ensures competent crewing, effective watchkeeping and safe integration of vessel operations with offshore construction, installation and maintenance activities.

8.4.5 Symbiotic working

- SOLAS protects the vessel and the lives on board.
- MARPOL protects the marine environment.
- MLC protects the people who crew the vessel.
- STCW covers the competency and training of vessel staff.

These conventions provide a global reference point for safe, compliant and ethical vessel operations. Even where full compliance is not mandatory, project developers and vessel owners should seek alignment with their principles to ensure confidence across clients, regulators and stakeholders.

9 SIMOPS

SIMOPS are a routine but high-risk aspect of vessel operations and are particularly frequent in offshore renewable energy projects and operational sites. Understanding how to identify, manage and safely execute SIMOPS is essential to project safety, efficiency and success.

Figure 12: Two vessels in operation simultaneously

Activities where two or more potentially conflicting activities are planned to occur at the same time and in the same area are considered to be SIMOPS. SIMOPS as a concept is not unique to offshore working and occurs frequently in many areas of construction, operations, end-of-life decommissioning and, in particular, high-risk environments such as offshore renewable energy projects.

In the marine context, SIMOPS could involve multiple vessels conducting different types of operations at the same time, such as personnel transfer, lifting, diving or cable laying, within the same operational zone or exclusion area. See Figure 12.

9.1 SIMOPS AS A PLANNING CONSIDERATION

In offshore renewable energy projects, SIMOPS must be carefully identified, planned and executed. The nature of construction, operations and maintenance (O&M) phases often means that multiple activities occur in parallel, whether due to project sequencing, scheduling pressures or the drive to reduce time and cost.

However, when these overlapping activities are not properly coordinated, they can introduce significant risks, not just to safety, but also to logistics and operations. The consequences can be complex and far-reaching, potentially affecting personnel safety, the environment and commercial performance.

9.2 COMMON OFFSHORE SIMOPS SCENARIOS

- CTVs are approaching an offshore substation, while jack-up vessels are conducting lifting operations.
- Survey vessels operating near installation zones during foundation or turbine erection.
- W2W gangway systems in use during simultaneous diving or ROV operations below deck.
- CLVs crossing paths with general logistics or guard vessels.
- Aviation and marine operations being scheduled concurrently (e.g. helicopters and vessels at the same structure).

9.2.1 Risks of poorly managed SIMOPS

Examples include:

- collisions between vessels or between a vessel and a fixed asset;
- uncontrolled lifting or dropped objects during transfer or lifting;
- personnel injury during unsynchronised transfers or handovers;
- environmental damage (e.g. spills, uncontained debris), and
- disruption to critical path project activities.

9.3 KEY ELEMENTS OF SIMOPS MANAGEMENT

To manage SIMOPS effectively, projects and operational sites typically use the following tools and practices:

9.3.1 Pre-planning and risk assessment of activities vs programme of works

SIMOPS should be identified early during project or operational planning and logistics scoping.

- Each activity is analysed to understand who is doing what, where and when.
- This information is then assessed for risk and compatibility with other activities and overlaps identified.
- Project or operational works programme should highlight those activities that will be classified SIMOPS and shown on the programme.
- The project SMS and marine coordination plan should require a SIMOPS risk assessment before concurrent operations are allowed to be undertaken.

9.3.2 Permit-to-work (PTW) systems

A permit-to-work (PTW) system is a formalised process used to control high-risk activities in hazardous environments such as offshore wind farms, vessels and construction sites. It ensures that all work is properly authorised, risk-assessed and coordinated – particularly critical when multiple operations are occurring simultaneously.

In the context of SIMOPS, PTW systems become even more vital. Offshore projects typically require tier 1 contractors to implement and manage PTW systems that define when and how specific operations may proceed. During SIMOPS, this often involves:

- joint PTW coordination between multiple parties (e.g. vessel and project teams);
- elevated authorisation levels, involving designated role holders from both the project and vessel SMS;
- enhanced control measures, including formalised communication protocols, increased supervision and additional risk mitigation steps, and
- continuous oversight throughout the planning, execution and demobilisation phases of the work.

Effective PTW integration within SIMOPS is essential to maintaining safety, avoiding operational conflicts and ensuring regulatory compliance across all concurrent activities.

9.4 SIMOPS COMMUNICATION AND COMMAND

Clear communication and defined command structures are critical during SIMOPS to ensure safe and coordinated operations. Key roles typically include vessel masters, the offshore construction or site manager and the marine coordinator.

To manage overlapping activities, tools such as SIMOPS matrices or real-time coordination trackers are used to visualise responsibilities, operational zones and restrictions.

Command hierarchies must be clearly established for both routine and emergency scenarios. ERPs should include predefined escalation routes and procedures to address conflicts, miscommunication or unplanned vessel movements.

9.5 SIMOPS OPERATIONAL CONTROLS

In complex offshore environments, careful planning is essential to avoid accidents or interference between activities. One common method is the use of exclusion zones.

These are designated areas around vessels or equipment where no other activity is allowed and act as restricted control zones that help prevent physical overlap and reduce the risk of collisions or operational conflicts. Standby vessels may also be deployed to monitor safety and respond quickly if something goes wrong.

In some cases, staggered timings are used to ensure that high-risk tasks do not happen at the same time in the same area. Operations may be adjusted based on weather, visibility and sea conditions, as these factors can significantly affect safety.

Importantly, all personnel are empowered with stop-work authority, meaning anyone who sees a potential danger or conflict has the right to halt operations immediately until the issue is resolved. This approach ensures that safety remains a focus during operational activities.

9.6 SIMOPS DOCUMENTATION AND TOOLS

When multiple operations are happening at the same time in the offshore environment it is essential to have clear documentation and tools in place to keep everything organised and safe.

Offshore projects typically use the following resources:

- SIMOPS risk register: a structured list of potential risks associated with overlapping activities, along with plans to manage or reduce those risks.
- Interface management plan: outlines how different teams, contractors and vessels will work together, communicate and avoid conflicts.
- Marine SIMOPS plan: a specific document (or part of a broader marine execution plan) that details how marine operations will be coordinated during SIMOPS.
- Daily marine coordination meeting records: logs from daily meetings where vessel movements, operations and safety issues are discussed and updated.
- Real-time activity dashboards or vessel-tracking software: digital tools that show live vessel locations and ongoing operations, helping teams monitor and respond quickly to changes.

Together, these tools help ensure that everyone involved in SIMOPS is informed, aligned and working safely, even in a fast-moving and complex offshore environment.

10 COMMON OFFSHORE ACTIVITIES AND VESSEL INTERFACES

From a maritime perspective, offshore renewable energy projects often involve:

- Multiple vessels operating simultaneously, sometimes in close proximity.
- The transfer of personnel and heavy equipment in dynamic and challenging sea conditions.
- A mix of national and international vessels working within a local regulatory framework and often with multi-national crews.

These factors create a complex and high-risk operating environment. As such, understanding and complying with applicable maritime regulations is not optional; it is essential for ensuring safety, legal compliance and the overall success of the project.

Vessels support nearly every phase of an offshore renewable energy project. The nature of their operations varies depending on the task at hand, whether transporting personnel, lifting turbine components or conducting seabed surveys. This chapter outlines the most common offshore activities and the typical vessel interfaces involved, providing guidance on how to manage them safely and effectively.

10.1 CREW TRANSFERS

Transferring personnel safely to and from offshore structures, such as wind turbines and substation, is a routine but critical operation in offshore renewable energy projects.

This is typically carried out using CTVs, which are specially designed to transport technicians and equipment in varying sea conditions. In some cases, helicopters or daughter craft (smaller boats launched from a larger vessel) may also be used, depending on the location, weather and urgency of the transfer.

These operations require careful planning and coordination, as they often take place in dynamic marine environments where vessel movement, sea state and visibility can significantly impact safety.

Crew transfers are governed by strict procedures and are often supported by real-time communication with marine coordination to ensure safe boarding, disembarkation and tracking of personnel.

When planning transfers, there are a number of key aspects that need to be considered:

- Safe transfer points: vessels must align with turbine boat landings or use W2W systems on larger vessels.
- Training requirements: personnel require marine safety training (e.g. GWO sea survival) and familiarisation with transfer equipment.
- Weather limitations: transfers are highly dependent on sea state and wind conditions.
- Communication and coordination: marine coordinators manage transfer windows and ensure real-time visibility of personnel movements.

Further information on offshore wind farm transfer can be found in EI 3429 *G+ Good practice guideline – Offshore wind farm transfer*. See Figure 13.

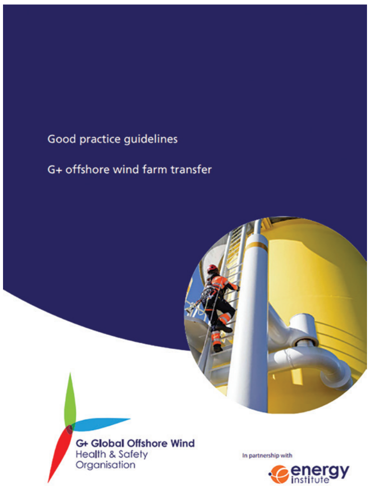

Figure 13: *G+ offshore wind farm transfer good practice guidance* publication cover

10.2 SURVEYS (GEOPHYSICAL, ENVIRONMENTAL)

Before any offshore construction begins, a range of marine surveys is carried out to understand the conditions of the seabed and the surrounding environment. These surveys are essential for safe and effective project planning and help ensure compliance with environmental regulations.

Typical surveys include:

- Geophysical surveys: use sonar and other remote-sensing technologies to map the seabed, identify hazards and assess soil conditions for foundation design.
- Environmental baseline surveys: gather data on marine habitats, species and water quality to understand the existing ecosystem and assess potential impacts.
- Geotechnical investigations: involve taking physical samples of the seabed to analyse soil strength and composition.
- Archaeological and unexploded ordnance (UXO) surveys: identify historical artefacts or potential explosive hazards that may be buried beneath the seabed.

These surveys are usually conducted by specialist vessels equipped with advanced sensors and tools. The data collected inform everything from turbine placement and cable routing to environmental mitigation strategies.

During offshore surveys, specialist vessels equipped with advanced tools such as sonar systems, ROVs and seabed coring equipment are deployed.

These vessels often carry both marine crew and dedicated survey teams who work closely together to collect critical data. Operational activities typically take place in busy construction zones where multiple vessels may be active at once, increasing the risk of overlap and interference.

Survey activities often involve towed or over-the-side equipment, which requires precise navigation and coordination to avoid entanglement or collision. To manage these risks, clear communication, spatial awareness and integration with broader SIMOPS planning are essential.

10.3 CONSTRUCTION SUPPORT

The construction phase of offshore renewable energy projects relies on a diverse fleet of specialised vessels, including heavy-lift ships, cable-laying vessels, jack-up rigs, barges and anchor-handling tugs. These assets are used to install key infrastructure such as foundations, turbines, inter-array and export cables, and offshore substations.

Vessel interfaces during this phase are complex and varied. DP vessels are used for precision tasks, W2W vessels enable safe technician access to offshore structures and a range of support craft, such as guard vessels, tugs and chase boats, provide essential logistical and safety functions.

Operational challenges are significant and include the need for robust SIMOPS planning and marine coordination to manage the overlapping activities.

Lifting operations, often conducted in unpredictable sea and weather conditions, require strict procedural control.

Additionally, the presence of multiple specialist roles onboard, ranging from marine crew and project technicians to client representatives and MWSs, demands clear communication, defined responsibilities and integrated safety management.

10.4 MAINTENANCE AND UNDERWATER WORKING

O&M in offshore renewable energy projects involves a mix of planned and reactive tasks, ranging from routine inspections and component replacements to urgent repairs. These activities occur both above and below the waterline and are essential for ensuring the long-term safety, reliability and performance of offshore assets such as turbines, substations and subsea cables.

Above-water tasks are typically supported by CTVs for daily technician access and SOVs equipped with W2W gangways and onboard accommodation for extended stays. These vessels enable safe and efficient access to offshore structures, even in challenging sea conditions.

Subsea operations introduce additional complexity and require specialised support. ROVs are commonly used for underwater inspections, cable tracking and structural assessments. See Figure 14. These unmanned vehicles are deployed from dedicated support vessels and operated by skilled technicians using real-time monitoring systems.

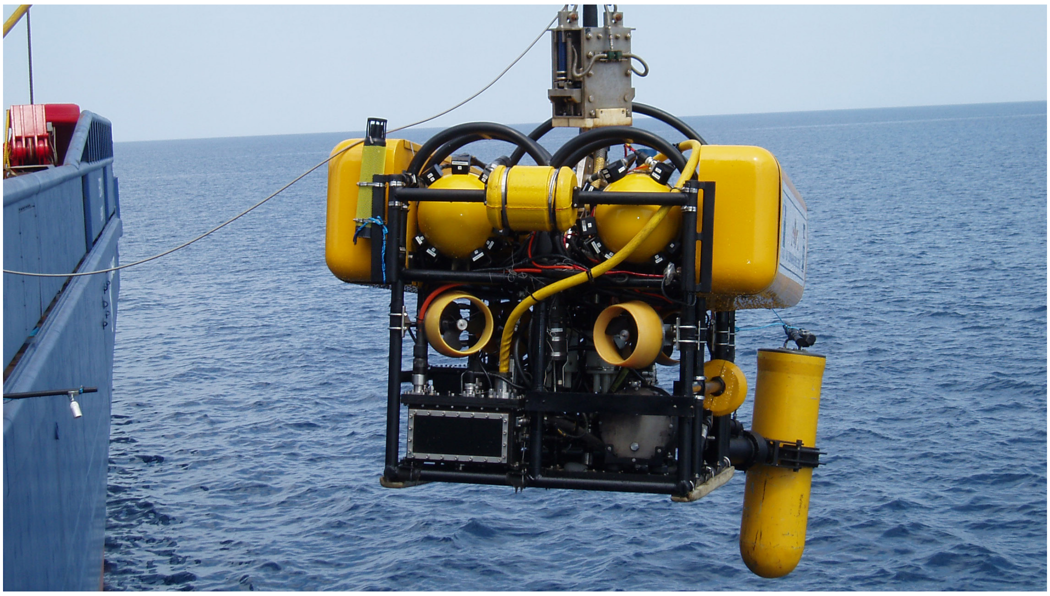

Figure 14: An ROV being prepared for operations

When human intervention is necessary, such as for manual repairs or confined-area inspections, commercial diving operations are employed. See Figure 15. These are highly regulated and supported by dive support vessels, which are equipped with essential systems including dive control stations, decompression chambers and launch and recovery systems.

Figure 15: Divers

Underwater work carries specific risks, particularly when conducted alongside other marine operations. Careful planning and integration into the broader SIMOPS framework is essential.

This includes establishing exclusion zones, coordinating with shore-based control centres and implementing robust safety protocols for diving, ROV use and personnel transfers. Flexibility is also key, as reactive maintenance often requires rapid mobilisation and dynamic risk management.

11 LESSONS LEARNED AND CONTINUOUS IMPROVEMENT

As projects grow in scale and ambition, the need for continuous improvement in vessel management becomes increasingly important, not only to reduce risk and enhance safety but also to improve efficiency and project outcomes. Capturing and applying lessons learned is a vital part of this process.

11.1 END-OF-PROJECT REVIEWS

At the conclusion of each project or major operational phase, structured end-of-project reviews should be conducted. These reviews provide an opportunity to reflect on vessel performance, safety incidents and operational effectiveness. They are not just retrospective exercises; they are essential for informing future planning and improving standards across the sector.

Key areas to evaluate include:

- the effectiveness of vessel planning, selection and contracting strategies;
- performance of vessel operators, marine crew and project personnel;
- the success and challenges of SIMOPS and marine coordination, and
- safety, compliance and any incidents or near misses encountered.

11.2 OUTPUTS AND APPLICATION

The outputs from these reviews should be clearly documented as lessons identified, along with recommended improvements. These insights should feed directly into updates to project specifications, operational guidance and vessel management standards. Sharing these findings across organisations and industry bodies helps build a stronger, safer and more resilient offshore sector.

11.3 FEEDBACK LOOPS AND CONTINUOUS LEARNING

Learning and improvement in offshore vessel management should not be limited to project close-out. Establishing ongoing feedback loops allows teams to make real-time adjustments, proactively manage risks and continuously refine operational practices. These loops are especially valuable in dynamic environments where conditions and challenges can change rapidly.

Examples of effective feedback mechanisms include:

- near-miss reporting and structured follow-up actions to prevent recurrence;
- weekly vessel performance reviews to monitor operational efficiency and crew feedback, and
- post-transfer feedback from technicians regarding safety, comfort and transfer conditions.

To support these processes, projects often use tools such as HSE dashboards, lessons learned registers and shared coordination platforms such as vessel-tracking systems or SIMOPS logs. These tools help capture insights, promote transparency and ensure that learning is embedded into daily operations and not just documented at the end, becoming a continuous improvement loop.

11.4 SHARING GOOD PRACTICE ACROSS THE INDUSTRY

In a sector as collaborative and fast-moving as offshore renewables, sharing good practice is essential to raising standards and improving safety across the board. Lessons learned from one project can help prevent incidents or inefficiencies in another, making open communication and knowledge exchange a shared responsibility.

Good practice can be shared through:

- industry forums and networks, such as G+ and IMCA;
- participation in working groups, guideline reviews and technical committees, and
- contributions to shared databases, technical bulletins or cross-project learning platforms.

Developers, vessel operators and marine service providers all play a role in this process. Constructive and transparent sharing, especially when it relates to safety, SIMOPS or vessel performance, can help the entire industry evolve and reduce the likelihood of repeat issues.

12 RESOURCES AND FURTHER READING

This section provides additional materials, guidance documents, training resources and industry bodies that support new entrants and non-marine professionals in understanding vessel management within offshore wind. These resources complement the core content of this GPG and help readers deepen their knowledge in specific areas such as maritime regulation, offshore safety, marine operations and technical competency.

12.1 GLOSSARY OF TERMS

A full glossary of the terminology used in this GPG is provided in Annex C.

It includes:

– key maritime terms (e.g. DP, jack-up, master, flag state);
– offshore wind terminology (e.g. O&M, metocean, SOV, cable laying);
– regulatory and assurance terminology (e.g. ISM, SOLAS, CMID, OVID);
– project, vessel and safety-related definitions, and
– acronyms used throughout the document.

Readers new to marine operations are encouraged to review Annexes B and C early in their learning to help contextualise terminology used throughout offshore wind vessel discussions.

12.2 RECOMMENDED TRAINING AND COURSES

Training needs vary depending on whether an individual is:

– vessel crew (seafarers under STCW);
– project/technical crew (industrial personnel under the IP Code), or
– visitors or non-operational personnel needing baseline awareness.

Below is recommended training aligned to industry expectations.

For vessel crew (seafarers)

Mandatory under IMO/STCW:

– STCW BST;
– advanced firefighting;
– medical first aid/medical care at sea;
– GMDSS radio operations;
– vessel-specific DP training (for DP vessels), and
– crowd and crisis management (where applicable).

Flag states may require:

– country-specific endorsements;
– security training under ISPS, and
– national equivalency modules for local waters.

For project/technical crew (industrial personnel)

Widely recognised for offshore wind:

- GWO BST:
  - sea survival;
  - first aid;
  - fire awareness;
  - working at height, and
  - manual handling.
- GWO enhanced first aid (role-dependent);
- GWO slinger/signaller (where lifting involved);
- GWO advanced rescue (for WTG technicians);
- STCW PST (if required for vessel mobilisation), and
- confined space entry (project-dependent).

Under the IP Code (SOLAS Chapter XV):

- safety training equivalent to STCW A-VI/1, and
- ship-specific familiarisation on boarding.

For visitors/occasional offshore personnel

Minimum expectations (risk-based):

- vessel induction;
- basic marine safety awareness briefing;
- emergency response orientation, and
- participation in drills where required.

If transfers occur:

- GWO sea survival or BOSIET (risk-based), and
- working at height (if accessing structures).

12.3 KEY MARITIME AUTHORITIES AND INDUSTRY BODIES

These organisations set, regulate or influence standards relevant to offshore vessel operations in renewable energy.

International maritime bodies

- International Maritime Organization (IMO) sets SOLAS, MARPOL, STCW, ISM, ISPS, IP Code
- International Association of Classification Societies (IACS) coordinates technical rules applied by class societies

Classification societies

Commonly encountered in offshore wind:

- Det Norske Veritas (DNV)
- Lloyd's Register
- Bureau Veritas
- American Bureau of Shipping (ABS)

Industry good practice bodies

- G+ Global Offshore Wind Health and Safety Organisation (G+): emergency response, marine coordination, offshore transfers
- Energy Institute (EI): G+ guidance and wider safety standards
- International Marine Contractors Association (IMCA): CMID, DP, vessel operations, safety flashes
- Oil Companies International Marine Forum (OCIMF): OVID assurance framework used by some operators

National maritime authorities

Depending on geography, this will vary depending on the region of operation.

Examples:

- UK Maritime and Coastguard Agency (MCA), and
- US Coast Guard (USCG).

ANNEX A
REFERENCES AND FURTHER READING

A.1 OVERVIEW

This annex provides a consolidated list of all external standards, guidelines and authoritative publications referenced throughout this good practice guide, along with additional recommended reading for those seeking further knowledge on vessel management in offshore wind.

A.1.1 International maritime conventions and codes

- SOLAS – International Convention for the Safety of Life at Sea
- MARPOL – International Convention for the Prevention of Pollution from Ships
- STCW – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
- MLC, 2006 – Maritime Labour Convention
- ISM Code – International Safety Management Code
- ISPS Code – International Ship and Port Facility Security Code
- IP Code – International Code of Safety for Ships Carrying Industrial Personnel (SOLAS Chapter XV)
- UNCLOS – United Nations Convention on the Law of the Sea (referenced conceptually)

A.1.2 G+/Energy Institute guidance

These documents are directly referenced or underpin good practice within offshore wind vessel operations:

- EI 3595 *G+ Marine coordination good practice guidelines*
- EI 3429 *G+ Good practice guideline – Offshore wind farm transfer*
- EI 3395 *G+ Integrated offshore emergency response (G+ IOER) Good practice guidelines for offshore renewable energy developments*
- EI 3583 *Medical fitness assessment for wind turbine workers*
- G+ annual safety reports and incident data (contextual reference)

A.1.3 Industry assurance, audit and inspection frameworks

Used for vessel assurance, pre-hire inspection and due diligence:

- IMCA CMID – Common Marine Inspection Document
- IMCA MISW – Inspection for Vessels <500 GT
- IMCA M Series – Marine Guidance (e.g. DP operations)
- IMCA Safety Flashes (supporting learning and continuous improvement)
- OCIMF OVID – Offshore Vessel Inspection Database

A.1.4 Survey, environmental and specialist guidance

- IHO – Standards for Hydrographic Surveys
- JNCC – Marine Mammal Mitigation Guidelines
- UXO Survey and Clearance Standards (regulator-specific)
- National offshore environmental impact assessment guidelines (where referenced)

A.1.5 Training and competence frameworks

- Global Wind Organisation (GWO) – Basic Safety Training (BST) and enhanced modules
- OPITO – Offshore emergency response training (where applicable)
- RenewableUK – Marine safety training guidance

A.1.6 Operational and project-level documentation referenced

These documents are part of standard offshore practice and are referenced throughout the GPG:

- Project safety management system (SMS)
- Vessel safety management system (ISM-compliant)
- Emergency response plans (ERP) – Vessel and project
- Bridging documents – Alignment of SMS systems
- Permit to work (PTW) systems
- SIMOPS plans and interface management plans
- Vessel technical specifications
- Charter party agreements (e.g. BIMCO SUPPLYTIME forms)

A.1.7 Weather, metocean and marine coordination resources

- Professional metocean forecast providers (site-specific)
- AIS-based marine traffic platforms (MarineTraffic, VesselsValue)
- Onboard vessel motion and environmental monitoring systems
- National meteorological services (Met Office, NOAA, etc.)

A.1.8 Additional recommended reading

For a broader understanding of offshore vessels, safety culture, regulatory frameworks and operational risk in offshore renewable energy, the following resources are recommended:

- Oil Companies International Marine Forum (OCIMF) – Mooring Equipment Guidelines
- Oil Companies International Marine Forum (OCIMF) – Marine Terminal Safety Guidelines
- International Maritime Organization (IMO) publications on marine operations and safety, including guidance for dynamic positioning (DP) operator training and best practice

- Det Norske Veritas (DNV) offshore standards series, including the OS-E, OS-H and OS-J series relevant to renewables and offshore marine operations
- Lloyd's Register Technical Guidance Notes, covering classification, offshore operations and vessel integrity
- Bureau Veritas Marine and Offshore Rule Notes, addressing design, construction and operational guidance for vessels and offshore units
- Industry lessons learned databases, including:
  - G+ Global Offshore Wind Health and Safety Organisation (G+);
  - International Marine Contractors Association (IMCA);
  - Oil Companies International Marine Forum (OCIMF), and
  - National maritime authorities.
- Academic and industry publications on:
  - Offshore wind vessel capability and market trends;
  - Dynamic positioning (DP) systems and failure modes;
  - Marine operational risk management;
  - Onshore/offshore integration of marine logistics, and
  - Human factors and safety culture in offshore operations.

A.1.9 Document-specific referenced material (as used in this GPG)

The following publications, standards and frameworks are directly referenced, explicitly or implicitly, throughout this GPG.

G+/EI documents

- EI 3642 *G+ Vessel management good practice guide* (this document)
- EI 3595 *G+ Marine coordination good practice guidelines*
- EI 3429 *G+ Good practice guideline – Offshore wind farm transfer good practice guidance*
- EI 3395 *G+ Integrated offshore emergency response (G+ IOER) Good practice guidelines for offshore renewable energy developments*
- EI 3583 *Medical fitness assessment for wind turbine workers*

Maritime assurance and vessel audit frameworks

- International Marine Contractors Association (IMCA) CMID – Common Marine Inspection Document
- International Marine Contractors Association (IMCA) MISW – Marine Inspection for Small Workboats
- International Marine Contractors Association (IMCA) Dynamic Positioning (DP) Operations Guidance (M 220 Series)
- Oil Companies International Marine Forum (OCIMF) OVID – Offshore Vessel Inspection Database

International maritime regulations and conventions

- International Maritime Organization (IMO) SOLAS – International Convention for the Safety of Life at Sea

– International Maritime Organization (IMO) MARPOL – International Convention for the Prevention of Pollution from Ships
– International Maritime Organization (IMO) STCW – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
– Maritime Labour Convention (MLC, 2006)
– International Safety Management (ISM) Code
– International Ship and Port Facility Security (ISPS) Code
– International Code of Safety for Ships Carrying Industrial Personnel (IP Code)

Classification society technical rules

(Referenced generally throughout the GPG)

– Det Norske Veritas (DNV)
– Lloyd's Register (LR)
– Bureau Veritas (BV)
– American Bureau of Shipping (ABS)
– Registro Italiano Navale (RINA)

Training and competence frameworks

– International Maritime Organization (IMO) STCW training requirements
– Global Wind Organisation (GWO) basic safety training (BST) and advanced modules
– Original Equipment Manufacturer (OEM) technical documentation, including turbine, cable and foundation equipment manuals

Other referenced materials

– National HSE requirements (project-specific)
– Port authority marine operations guidance (jurisdiction-specific)
– Marine coordination procedures and project-specific SMS/ERP documentation

ANNEX B
OVERVIEW OF VESSELS USED IN OFFSHORE WIND

Table B1: Overview of vessels used in offshore wind

Project phase	What is happening offshore	What the vessels do
1. Development	Site assessment and preparation: before construction begins, vessels conduct essential surveys to assess the viability of a site	– Geophysical and geotechnical surveys to map the seabed and understand subsurface conditions – Meteorological and oceanographic (metocean) data collection to measure wind speeds, wave patterns and currents – Operations are typically carried out by survey vessels equipped with sonar, drilling rigs and LiDAR systems – AUV survey vessels – autonomous underwater vehicles – used for subsea survey operations particularly in offshore wind, oil and gas and marine research. These are unmanned, self-guided submersibles that can operate independently or be controlled remotely, often from a remote operations centre (ROC) onshore
2. Construction and installation	Construction and installation: during the construction phase, a range of highly specialised vessels is deployed	– Heavy-lift vessels install foundations, transition pieces and turbine components – Cable-laying vessels install inter-array and export cables, often supported by trenching or burial vessels – Jack-up vessels provide stable platforms for turbine installation in shallow waters – Anchor-handling and towing vessels support floating wind installations by deploying mooring systems
3. Commissioning	Logistics and crew transfer: efficient logistics are essential to project success	Vessels in this category include: – Crew transfer vessels (CTVs) that transport technicians and small equipment to and from turbines – Service operation vessels (SOVs) that provide accommodation, workshops and spare parts storage for longer offshore campaigns

Table B1: Overview of vessels used in offshore wind (continued)

Project phase	What is happening offshore	What the vessels do
4. Operations and maintenance	Operations and maintenance (O&M): once operational, wind farms require ongoing inspection, maintenance and repair	– Routine inspections using CTVs or drones launched from SOVs – Corrective maintenance involving jack-up or heavy-lift vessels for component replacement – Subsea inspections and interventions using remotely operated vehicles (ROVs) deployed from multipurpose support vessels
5. Decommissioning/ repowering	Decommissioning and repowering: at the end of a wind farm's operational life, vessels are again essential	– Component removal, including turbines, foundations and cables – Repowering operations, where older turbines are replaced with newer, more efficient models

ANNEX C
GLOSSARY OF TERMS

This glossary provides definitions for all key terms, abbreviations and acronyms used throughout this GPG. It is designed to support readers, particularly new entrants and non-marine professionals, in navigating the technical language of maritime operations, offshore wind and vessel management.

C1 ACRONYMS

Acronym	Full term
ABS	American Bureau of Shipping
AIS	automatic identification system
AUV	autonomous underwater vehicle
BV	Bureau Veritas
CfD	contract for difference
CLV	cable-laying vessel
CMID	common marine inspection document
CTV	crew transfer vessel
DP	dynamic positioning
DNV	Det Norske Veritas
EI	Energy Institute
ERP	emergency response plan
ETO	electro-technical officer
GMDSS	Global Maritime Distress and Safety System
GWO	Global Wind Organisation
GT	gross tonnage
HSE	health, safety and environment
IACS	International Association of Classification Societies
IMCA	International Marine Contractors Association
IMO	International Maritime Organization
IOER	integrated offshore emergency response
IP	industrial personnel (under the IP Code)
IP Code	International Code of Safety for Ships Carrying Industrial Personnel
ISM	International Safety Management Code
ISPS	International Ship and Port Facility Security Code
JNCC	Joint Nature Conservation Committee
JP/Jack-Up	jack-up vessel/jack-up barge
LR	Lloyd's Register

Acronym	Full term
MLC	Maritime Labour Convention
MWS	marine warranty surveyor
OCIMF	Oil Companies International Marine Forum
OEM	original equipment manufacturer
O&M	operations and maintenance
OVID	Offshore Vessel Inspection Database
PTW	permit to work
RINA	Registro Italiano Navale
ROV	remotely operated vehicle
ROC	remote operations centre
SIMOPS	simultaneous operations
SMS	safety management system
SOLAS	Safety of Life at Sea Convention
SOV	service operation vessel
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
UXO	unexploded ordnance
WTG	wind turbine generator
W2W	walk-to-work

C.2 DEFINITIONS OF KEY TERMS

A

- Accommodation vessel – a vessel providing living, working and welfare spaces for offshore personnel during extended campaigns.
- AUV (autonomous underwater vehicle) – an unmanned subsea vehicle used for survey and inspection tasks.

B

- BIMCO – an international shipping association producing standard charter party contract formats such as SUPPLYTIME.
- Bridging document – a document that aligns the vessel's SMS with the project/site SMS.

C

- Cable-laying vessel (CLV) – a specialist vessel used to install subsea cables.
- Charter party agreement – a legally binding contract between a vessel operator and a charterer.
- Client representative (client rep) – the client's on-site authority on a vessel overseeing safety, quality and contractual compliance.

– Compliance – conformance with applicable maritime regulations, project requirements and vessel operator procedures.

D

– Dynamic positioning (DP) – a computer-controlled system that maintains a vessel's position using thrusters.
– Deck crew – seafarers responsible for deck operations such as mooring, lifting and vessel maintenance.

E

– Emergency response plan (ERP) – a set of documented procedures describing how emergencies are managed on a vessel or project.
– Essential services – systems required for safe vessel operations, including power, communications, steering and emergency lighting.

F

– Fit for purpose – a vessel whose capability, crew competence, condition and certifications match the requirements of the intended operation.

G

– Gangway (W2W) – a motion-compensated bridge used for safe personnel transfer from a vessel to an offshore structure.
– Geophysical survey – a seabed investigation using sonar and sensors to map marine conditions.

H

– Helideck – a certified landing deck on a vessel for helicopter operations.
– Hs (significant wave height) – the average height of the highest third of waves in a sea state.

I

– Industrial personnel (IP) – non-seafarer specialists working temporarily onboard under the IP Code.
– Interface management – a structured approach for controlling operational boundaries between multiple contractors or vessels.

J

– Jack-up vessel – a mobile offshore installation with extendable legs that elevate the vessel above sea level for stability.

L

– LiDAR (light detection and ranging) – technology used for wind measurement and environmental data gathering.
– Lifting operations – controlled movement of loads using cranes or lifting systems.

M

– Marine coordination – the real-time control and monitoring of all vessel movements and offshore activities within a project area.

- Marine warranty surveyor (MWS) – an independent expert verifying that marine operations meet insurer requirements.
- Metocean data – meteorological and oceanographic data used for planning and operations.

N

- Near miss – an event that could have resulted in injury, damage or loss but did not.

O

- Offshore substation – an electrical platform offshore that collects and exports power to shore.
- On-hire survey – a survey conducted before charter commencement to document vessel condition.

P

- Permit to work (PTW) – a formal control system for authorising high-risk activities.
- Project crew – technicians or specialists performing work from or on a vessel but not part of the marine crew.

R

- Risk assessment – a structured process identifying hazards and implementing controls for safe operation.
- ROV – a tethered subsea vehicle used for inspection, maintenance and intervention.

S

- Safety management system (SMS) – the documented system used to manage safety onboard a vessel.
- Service operation vessel (SOV) – a DP-equipped vessel providing accommodation and access for long-term offshore maintenance.
- SIMOPS – concurrent operations that may interfere with each other and require additional coordination and controls.
- Survey vessel – a vessel equipped with sensors for geophysical, geotechnical or environmental survey operations.

T

- Tow/tug vessel – a vessel providing towing or anchor-handling capability.
- Transfer (marine) – the movement of personnel from one vessel to another or to an offshore structure.

U

- UXO (unexploded ordnance) – historical munitions that may be present on the seabed and require specialist survey and clearance.

W

- Walk-to-work (W2W) – access system enabling technicians to safely cross from a vessel to an offshore structure.
- Weather window – a period where environmental conditions fall within safe operational limits.

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