

Wave & Tidal Health & Safety Guide

Principles & Practice



Status of this document

These guidelines are intended to be read in conjunction with the Offshore Wind and Marine Energy Health & Safety Guidelines (2014). In addition attention is drawn to the reference sources in this document as well as the information and guidance published by the organisations listed at the end of this document.

Health & Safety Guidelines are intended to provide information on a particular technical, legal or policy issue relevant to the core membership base of RenewableUK. Their objective is to provide industry specific advice or guidance where current information is either inadequate or incomplete. Health and safety guidelines will be subject to periodic review and updating and so the latest version of the guidelines must be referred to. Attention is also drawn to the disclaimer below.

Scope of wave & tidal devices

For the purpose of this guide wave & tidal devices (Terms used based on DD IEC/TS 62600-1:2011 — Marine energy — Wave, tidal and other water current converters. Part 1: Terminology) are considered to relate to Tidal Energy Converters (TEC) (Device which captures energy from tidal currents and converts it into another form.) and Wave Energy Converters (WEC) (Device which captures energy from surface waves and converts it into another form.) including the associated balance of plant and project infrastructure.

Disclaimer

The contents of these guidelines are intended for information and general guidance only, do not constitute advice, are not exhaustive and do not indicate any specific course of action. Detailed professional advice should be obtained before taking or refraining from action in relation to any of the contents of this guide, or the relevance or applicability of the information herein.

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Introduction

The RenewableUK Offshore Wind and Marine Energy Health & Safety Guidelines were launched in 2013 and were further updated in 2014. They provide an invaluable reference source for:

- Designers and manufacturers of wave & tidal devices
- Landlords, owners & developers
- Contractors & supply chain partners
- Professional and technical advisers

The guide does not aim to address the Health & Safety issues associated with the manufacture or assembly of devices. This introductory guide sets out the basic principles and practices to enable the safe and successful design, installation and operation of Wave & Tidal devices relevant to the health & safety risks associated with those technologies. It aims to take account of the:

- Differences in the design and operation of W&T technologies
- Potential variability in organisational experience regarding H&S knowledge
- Complex operating environment devices and projects are required to operate in

The guide is structured around 4 key topic areas covering:

1. Leadership

2. Compliance

3. Risk Management

4. Specific Topics

It is emphasised that this guide only provides a high level overview of the principles or practices to manage the Health & Safety risk of wave and tidal projects. Therefore not every risk or activity has been necessarily been considered.

1. Leadership

Why important?

High standards of health and safety performance depend on the commitment and leadership of senior management. Health and safety must be regarded as a key risk-management issue, to be driven from the highest levels of an organisation; failure to do so can put employees and members of the public at risk and expose the organisation, its directors, senior managers and employees to legal, contractual and financial consequences.

The expectations from regulators and stakeholders is very clear and includes demonstrable evidence of:

- Strong and active leadership from the top
- Active worker involvement
- Robust processes of assessment and review.

These principles and practice apply equally to large and small companies and to all wave & tidal devices/projects whatever their stage of development or deployment.

What can we do & check?

Senior management must take ownership and be visibly responsible for H&S. This could include asking:

- Are senior management fully aware of their H&S responsibilities
- Have you signed the RenewableUK Offshore H&S Accord?
- Have you checked the relevant HSE leadership guidance?
- Have you signed up to RISE – the industry incident reporting scheme?

Organisations must take a proactive role in engaging with employees and contractors. Therefore do you know if you have:

- Effective processes for consulting employees?
- Effective processes for consulting contractors & suppliers?

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See:

A:2 Leadership & Culture

A:3 Workforce Engagement

2. Compliance

What are our responsibilities?

UK health & safety laws imposes general duties upon:

- Employers, employees and the self-employed
- Those who have control of workplaces
- Designers, manufacturers, importers and suppliers of articles and substances for use at work

Duty holders are required to ensure, so far as is reasonably practicable, the health and safety of those who may be affected by their actions or omissions, whether they be employees, users of equipment or premises, or members of the public. Employers have an additional duty to ensure the welfare of their employees at work.

In general terms health & safety regulations **require** employers to:

- Assess the risks to the H&S of their employees and others
- Put in place suitable arrangements to manage H&S risks
- Establish plans for the response to emergencies & involvement of emergency services
- Provide clear information and training to employees
- Ensure cooperation between contractors and subcontractors

There are also numerous specific regulations that cover specified risks or activities. The legal duties **cannot** be delegated or contracted out. Numerous regulations also apply that place specific duties and responsibilities on duty holders to manage the health and safety risk they are responsible for. Offshore Renewable Energy Installation (OREI) development is also subject to marine regulations that must also be checked.

All new equipment including W&T devices are subject to UK law which in many situations will also implement the applicable European requirements for safety and health (e.g. Machinery Safety Standards). For example most new equipment must be CE marked and be accompanied by a unique certificate known as a Declaration of Conformity. Duty holders should have in place suitable arrangements to confirm all devices and operating practices comply with applicable UK health & safety legislation.

What can we do & check?

Ignorance of the law or any associated guidance/standards is not an adequate defence. Senior management, where necessary with the support of competent advisers, must fully understand the scope of H&S duties they are both responsible for and can also have control and influence over. For example:

- Do you know what your legal H&S duties are?
- Are these clearly identified and documented in relevant policies?
- Do you know how the landlord/site management and employer interface responsibilities will be applied?
- Do you know and understand the scope and interface with marine regulations?
- Do you know the responsibilities and powers of the regulators and investigation authorities?
- Have you appointed/nominated competent H&S advisers?

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- A.1 Legal framework
- A.1.4 & B.3 Construction
- A1.6 Machinery
- A1.9, C.12, C.13, C.14 & C.21 Marine & Vessels

3. Risk Management

What are the key principles?

All employers are to establish a health and safety policy, organisation and arrangements, and to document the system so as to ensure the effective implementation of the policy. W&T projects development generally involves multiple organisations, from a range of backgrounds, working together; given that each organisation will have its own safety management systems, effective bridging processes will be needed at interfaces.

In putting these policies into effect evidence of effective processes for the management of risk is therefore vital to ensure the safe development and operation of complex projects. W&T development involves undertaking projects in a hostile environment, often including the use of new technologies and methods, and therefore requires particularly thorough risk management processes.

See also 4.1 Settings out the importance of a life cycle approach to looking at Health & Safety risks.

What can we do & check?

Are there suitable safety management systems in place including evidence of:

- A clear H&S **policy**
- **Organisation** by defining roles and responsibilities
- **Planning and implementation** of safety controls
- **Measurement** of H&S performance (e.g. audits & investigations)
- **Review** – by checking systems remain effective

Additional risk control measures specific to offshore operation during installation should include (but not be limited to):

- Issue **notices to mariners** with all the relevant information about offshore work
- **Marking and lighting** of vessels and associated installation equipment used for offshore operation
- Appropriate vessel **routeing measures &/or safety zones** to protect the offshore working area and minimize the risk of collision
- Appropriate H&S procedures for working in **adverse weather** conditions;
- Incident reporting procedure and **emergency response plan** to effectively manage any incidents arising during installation. These emergency response procedures should be registered with the local emergency and rescue services.

Effective risk management of wave & tidal projects needs to be an active process with particular attention to the suitability of the risk assessment/method statement processes (RAMS), an effective approach to managing change and attention given to situations involving SIMOPS.

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- A.6 Management Systems
- A.7 Risk Management
- A.9 Safe Systems of Work
- A.10 Simultaneous Marine Operations (SIMOPS)
- A.13 Management of change

4.1. Project/Asset Lifecycle Thinking



What do we need to think about?

UK law requires that the safeguards needed to ensure that the Health and Safety of people working on, or affected by, a Wave or Tidal energy development have been considered at the earliest stage possible in the development lifecycle. This is important as many decisions made early on can adversely or positively affect the project at later stages, and the opportunity to eliminate risk reduces once you are further into a project.

Wherever possible W&T device developers should aim to eliminate risk at the earliest stages of the project lifecycle but when this is not possible there should be suitable arrangements to control the risk put in place and then maintained throughout the project lifecycle. The benefits and importance of adopting an iterative risk assessment approach and ensuring experiences are properly learned and shared cannot be underestimated when development progresses from:

- Concept/tank testing modelling; to
- Scale/Full scale sea trials; to
- GWh production & arrays

Particular consideration should be given to the challenging environmental and sea conditions that may be encountered at wave and tidal sites. High tidal ranges, extreme sea states and complex and rapid surface currents must all be properly considered and risk assessed to take account the health and safety hazards across the whole project life cycle.

What can we practically do?

This can be seen as a challenging area for managers, designers engineers and other professionals. Whilst it will always be important to ensure intellectual property and commercial interests are taken into account – good businesses can always ensure health & safety experiences and lessons learned are properly shared. Practical steps to take include:

- Have effective **incident/near miss systems** in place
- Aligning engineering, quality & health & safety **report systems**
- **Training** key employees on the importance & benefits of safe by design concept
- Ensuring there are means to share H&S **lessons learned** both internally & with industry peers
- Put in end of **project/contract review** processes
- Signing up to and participating in **RISE**

Attention is drawn to 4.2 below with regards to design and construction risks and specifically the potential scope and application of The Construction (Design and Management) Regulations 2007.

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- Part B The Offshore Lifecycle

4.2. Design and Construction

What do we need to think about?

Proper consideration of the design and construction risks associated with the installation, commissioning and operation of wave and tidal devices is essential. The Construction (Design and Management) (“CDM”) Regulations 2007 provides a framework for the management of construction projects with the aim of integrating health and safety into the management of the project and to encourage all those involved to work together to:

- Improve the planning and management of projects from the very start
- Identify hazards early on, so that they can be eliminated or reduced at the design or planning stage, and the remaining risks can be properly managed
- Target effort where it can do the most good in terms of health and safety

Concept/tank testing of devices are unlikely to be covered by construction regulations although it is good practice to consider the relevant design and construction risks which may arise when the projects move to full scale sea trials and beyond, even at this stage.

CDM is not primarily aimed at a facility undertaking the fabrication and manufacture of devices. However it is possible that the CDM may apply for example covering activities involving the testing and assembly of devices outside a main manufacturing site such as at a docks or other areas involved in the mobilisation of the project. Checks should also be made on the scope and applicability of the duties that apply to docks (See HSE L148 Safety in Docks: Approved Code of Practice and guidance (ACOP) especially as specific regulations have been revoked.

CDM defines a number of key duty holders within a project including the Client, CDM Co-ordinator, Designer(s), Principal Contractor; and Contractors. [Note: These regulations are currently being reviewed and it is expected that the scope of these roles may change]. For wave and tidal projects it is quite likely that one organisation may take on multiple roles.

CDM also sets out:

- General management duties applying to all construction projects
- Additional duties where projects are notifiable to the HSE
- Specific health and safety duties applied to construction sites

CDM applies to offshore projects subject to the specific scope and limitations within the regulations.

What can we practically do?

Due to the variety of device designs and the complexity of the commercial and contractual circumstances at a project level it is difficult to provide a simple summary. However in all cases it would be sensible to:

- Check the potential scope and application of CDM to your device(s) &/or projects
- Where applicable, ensure suitably competent persons are appointed to the designated roles under CDM
- Ensure relevant documentation is produced and properly communicated (e.g. Pre-Construction Information, Construction Phase Health and Safety Plans, and Project Health and Safety Files.)
- Ensure all employees and contractors have been properly briefed on their health & safety responsibilities
- Check the relevant requirements for any activities undertaken in docks

The design risk assessment and subsequent practical arrangements need to consider for example the proposed:

- Installation strategy taking account device and site characteristics
- Vessels and access systems to be deployed
- Maintenance strategy covering both planned and unplanned activities

For example when thinking about lifting points on a device, has the designer thought about their suitability not just in deploying the device, but also how subsequent checks and inspections are performed when undertaking for example routine maintenance?

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- A1.4, B.2 & B.3

[HSE webpages should be regularly checked to keep up to date with the proposals to amend CDM]

4.3. Protecting Workers and Contractors



What do we need to do?

UK law requires that employers provide competent personnel in terms of technical requirements and H&S of all parties involved in a project including employees, designers, H&S professionals, contractors, suppliers, etc. Employers are also required to ensure that the relevant health surveillance is in place to prevent the potential for adverse health from work conditions.

The provision of arrangements to consult with employees must be put in place as well as adequate arrangements with contractors and sub-contractors for the transfer of HSE information.

What can we do & check?

Key things to look at would include:

- Reviewing the effectiveness of your **training & competence** assurance processes
- Checking if you have properly thought about **Health & Wellbeing** issues?
- Making sure there are effective arrangements in place to **Consult with Employees?**
- Checking arrangements are in place to transfer **H&S information** between contractors and sub-contractors?
- Checking and testing arrangements are in place **should things go wrong?**

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- A.8 Training and Competence
- A.5 Occupational Health and Medical Fitness to Work
- A.3 Workforce engagement
- A.15 Emergency response and preparedness.

4.4. Marine Co-ordination



What do we need to think about?

The Marine Co-ordination function has a key role in the safe preparation and execution of activities which involve large numbers of people and vessels, working in small groups, in multiple locations, which may include vessels and offshore structures, on a remote site for an extended period.

The Marine Coordinator is a key member of the project management team; offshore operations should only take place when permitted by the Marine Co-ordinator, and in accordance with the method that has been agreed with them.

What can we practically do?

This is a complex area with a rapidly developing understanding of what is good practice. In reviewing the suitability and effectiveness of marine co-ordination proper consideration needs to be given to understanding what are the:

- Direct Health and Safety risks
- Commercial and operational risks
- Indirect and consequential risks

The risk profile will then influence for example:

- When a Marine Co-ordinator should be deployed to the project
- How the role could develop across the lifecycle stages of a site/project
- Proper consideration of the training and competency requirements to fulfil the role(s)

What else do we need to look at?

Whoever is in control should ensure there are effective organisational arrangements to oversee all marine operators for that site including the provision of advice to vessel masters or the co-ordination of emergencies or incidents. This could include:

- Provision of a marine co-ordination centre - adequately staffed by competent personnel
- Provision of vessel traffic information
- Management & co-ordination of all site work/activities
- Establishment of emergency response plans.

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- C.11 Marine Co-ordination

4.5. Vessels and Equipment



What do we need to think about?

OREI development involves large numbers of vessels of diverse types, undertaking a wide range of marine operations such as personnel transfer, survey work, movement of materials and components, offshore installation and lifting, dive support and provision of temporary offshore accommodation. In order to procure vessels that can meet these requirements in a safe and efficient manner, a robust vessel selection process is important.

The vessel selection process begins with defining a vessel specification, based on:

- **Activity:** What is the actual task/activity being undertaken taking account its scale & complexity
- **Site:** Taking account the specific conditions and hazards, and methods to be used; and
- **Systems:** That the facilities/equipment that are required on the vessel and vessel management arrangements have been assessed covering:
 - Training & Certification
 - Safety management
 - Communications
 - Capability & capacity of crew to support the intended operations.

What can we practically do?

Vessel selection and management is a complex area and in many situation access to specialist advice may need to be sought. Key areas that need to be considered in the selection of suitable and safe vessels would include checks and processes to ensure:

- **Responsibilities and liabilities** of the vessel are clearly defined
- Effective **Vessel Management** arrangements are in place
- **Monitoring, review and change** management processes adapt to the circumstances
- There are safe method for **access & egress** from the vessel
- Proper processes to enable the correct **selection of tow equipment**
- Clear policies defining **weather limits** supported by effective **forecasting**
- Safe practices for **line handling** when towing
- Robust management protocols for **diving operations** including recompression
- Effective and tested **Emergency Response Planning** systems

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- C 21 Vessel selection

4.6. Subsea



What do we need to think about?

Diving operations is a high risk activity on any project and particularly those that are by definition carried out in high energy locations for wave and tidal activity. Every effort should be made to ‘design out’ diving operations from the project, and where possible, ROV equipment should be used in preference to divers. However, there are some works where diving operations are likely to be necessary.

Diving operations shall, as a minimum standard, be carried out in accordance with the requirements of current UK legislation and pay proper regard to recognised technical and industry standards.

What can we practically do?

Subsea activities can be very challenging especially in the locations where wave and tidal devices are deployed. Specialist advice may need to be sought which should take specific account of their experience in dealing with similarly complex situations.

Key areas that need to be considered when preparing to undertake subsea work include:

- A robust process for suitable **vessel selection**
- Safe methods for **access & egress** from vessel
- Effective **diver competency** standards and verification
- Suitable arrangements for the **management of diving and subsea operations**
- Proper arrangements to take account systems and equipment for **recompression**
- Clear and effective **Emergency Response Planning**

Where can we get more information?

Initial reference can be made to RenewableUK Offshore Wind Health & Safety Guidelines which signpost relevant legislation, HSE guidance and other sources. See for example:

- C 18 Subsea Operations

Further Information

In addition to RenewableUK (RUK) organisations, agencies and stakeholders who may be able to provide further information and guidance include:

- Association of Diving Contractors (ADC):
- Environment Agency (EA)
- European Marine Energy Centre (EMEC)
- Health & Safety Executive (HSE)
- Health & Safety Executive Northern Ireland (HSENI)
- International Jack Up Barge Operators Association (IJUBOA)
- International Maritime Contractor Association (IMCA)
- International Maritime Organisation (IMO)
- Marine Accident Investigation Branch (MAIB)
- Marine Management Organisation (MMO)
- Marine Scotland
- Maritime & Coastguard Agency (MCA)
- National Workboat Association (NWA)
- Offshore Renewable Energy Emergency Forum (OREEF)
- Royal National Lifeboat Institution (RNLI)
- Scottish Environment Protection Agency (SEPA)
- The Crown Estate (TCE)
- Trinity House
- UK Hydrographic Office (UKHO)

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**Our vision is for renewable energy to play
a leading role in powering the UK.**

RenewableUK is the UK's leading renewable energy trade association, specialising in onshore wind, offshore wind, and wave & tidal energy. Formed in 1978, we have a large established corporate membership, ranging from small independent companies to large international corporations and manufacturers.

Acting as a central point of information and a united, representative voice for our membership, we conduct research, find solutions, organise events, facilitate business development, advocate and promote wind and marine renewables to government, industry, the media and the public.

RenewableUK is committed to the environment.
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