THE RYA'S POSITION ON OFFSHORE RENEWABLE ENERGY DEVELOPMENTS: PAPER 1 (OF 3) – WIND ENERGY
MAY 2012

Executive Summary

This paper sets out the RYA position in relation to the development of *offshore renewable wind energy*. It is intended to enable developers accurately to take account of recreational boating concerns when developing their Environmental Statements and Navigational Assessments.

In summary, the RYA believes that the impact that offshore renewable wind energy has on recreational boating can be minimised provided developers fully consider the following key points which are drawn from the paper below:

- **Collision risk**. The RYA believes that the collision threat posed by wind farms and associated works to recreational yachts can be minimised by specifying a minimum rotor tip air draft of 22 metres above Mean High Water Springs and a minimum underwater clearance of 4 metres below chart datum.

- **Marking and Lighting**. The RYA supports the guidance provided by the General Lighthouse Authorities and works with them to identify site specific issues that may occur.

- **Navigational and communication equipment**. Any proposed development should account for the effect on small craft navigation and communication equipment in detail.

- **Location**. Recreational routes, general sailing and racing areas must be accounted for when examining the impacts of wind farm developments.

- **Sailing and racing areas**. Any interference in wind speed and/or turbulence created by a wind farm in a racing area would create a significant negative impact on the event site and diminish its value.

The Royal Yachting Association – who we are

The RYA is the national body for all forms of recreational and competitive boating. It represents dinghy and yacht racing, motor and sail cruising, RIBs and sportsboats, powerboat racing, windsurfing, inland cruising and personal watercraft. The RYA manages the British sailing team and Great Britain was the top sailing nation at the 2000, 2004 and 2008 Olympic Games.

The RYA is recognised by all Government offices as being the negotiating body for the activities it represents; as such, it takes an active role in influencing policy and has been a voice for recreational boating for more than a century.

The RYA currently has over 100,000 personal members, the majority of whom choose to go afloat for purely recreational non-competitive pleasure on coastal and inland waters. There are an estimated further 500,000 boat owners nationally who are members of over 1,500 RYA affiliated clubs and class associations.

The RYA also sets and maintains an international standard for recreational boat training through a network of over 2,200 RYA Recognised Training Centres in 20 countries. On average, approximately 160,000 people per year complete RYA training courses. RYA training courses form the basis for the small craft training of lifeboat crews, police officers and the Royal Navy and are also adopted as a template for training in many other countries throughout the world.

The RYA Position

The RYA supports the UK Government's and devolved administrations' efforts to promote renewable energy[1]. We note that it is Government policy that wind farms should not be consented where they would pose unacceptable risks to navigational safety after mitigation measures have been adopted[2]. Our primary purpose in engaging in consultation regarding the development of offshore energy developments is to secure navigational safety and to ensure that recreational boating interests are not adversely affected. The RYA has made objections to some of the proposed developments on grounds explained in this document. As more issues have come to light, we have reviewed our position on offshore energy development. We recognise that some marine renewable schemes may provide opportunities to benefit recreational sailors, e.g. active breakwater types of power generation can provide areas of sheltered water.

This position paper sets out our concerns from a general perspective regarding wind energy and should enable developers accurately to take account of recreational boating concerns in their environmental impact assessments. This paper is one of three position papers discussing renewable energy, with the other two addressing wave and tidal energy.

In summary the concerns of recreational boating and offshore renewable energy developments relate to:

1. Navigational safety
    a. Collision risk
    b. Risk management and emergency response
    c. Marking and lighting
    d. Effect on small craft navigational and communication equipment

1 The UK Renewable Energy Strategy 2009
2 National Policy Statement for Renewable Energy Infrastructure (EN-3)

2. Location
    a. Loss of cruising routes and impact on offshore racing
    b. Squeeze into commercial routes
    c. Effect on sailing and racing areas
    d. Cumulative and 'in combination' effects

3. End of life
    a. Dereliction
    b. Decommissioning

4. Consultation

The MCA has developed guidance[3] on the issues that need to be taken into consideration when assessing the impact on navigational safety and emergency response (search and rescue and counter pollution) caused by offshore renewable energy installation developments, proposed for United Kingdom internal waters, territorial sea or in a Renewable Energy Zone beyond the territorial sea. The RYA expects this guidance to be used by offshore renewable energy developers seeking consent to undertake marine works. Furthermore, the RYA expects to be consulted on matters that may affect recreational craft during any type of assessment on proposed marine works.

1 Navigational Safety

Prior to departure, mariners are required to make a passage plan based on assessments of weather, tides, limitations of the vessel and crew, and navigational dangers. Offshore renewable energy developments are an additional navigational hazard to the mariner. However, if sited sensitively, designed well and managed effectively these developments can satisfy the safety issues of concern to recreational boating.

Since 2004, a total of 12 offshore wind farm sites have been commissioned and a further 7 sites are under construction. In that time, there have been no recorded incidents involving recreational craft and offshore wind farms since the start of operations around the UK coast.

Collision risk

The RYA believes that wind farm design must adhere to certain design parameters to reduce the risk of rotor blade collision with recreational craft which is a main cause for concern. Sub-surface structures, inter-array and export cable protection, rock armour and scour protection associated with wind turbines could similarly pose a threat of underwater collision. Navigating around static hazards is part of sailing and only in rare situations, such as in narrow channels with strong tidal flows, do static installations pose a threat.

The RYA believes that the threat posed by wind farms and associated works to recreational yachts can be minimised by specifying:

- **a minimum rotor tip air draft of 22 metres above Mean High Water Springs (MHWS)**[4]
- **a minimum underwater clearance of 4 metres below chart datum**

[3] (MGN 371(M+F) Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response Issues, MGN 372(M+F) Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs.

[4] The UKHO references air draft to Highest Astronomical Tide (HAT) and all other heights to Mean High Water Springs (MHWS). Maintaining a design requirement of 22 metres MHWS is consistent with our past approach and each wind farm will have its air draft in relation to HAT marked on UKHO charts.

The RYA has developed its position on minimum clearances on the available data. Firstly an estimation of the air draft of the national fleet of yachts around the UK was established in the knowledge that these types of yachts may be found in all UK waters, these data are taken from the Royal Ocean Racing Club (RORC) Rating Office's database. For more detail see the final section on *Developing RYA policy on minimum clearance height and depth*.

Risk management and emergency response

Risk management provisions should be formulated from the results of a site specific risk assessment that accounts for small craft of less than 24m LOA recognising the significant differences between small and large vessels. This distinction is important when it comes to equipment and other requirements for small and large craft. Furthermore, it must be understood that the total number of vessels is not necessarily the important factor during any traffic survey; it is the number in the area during adverse conditions that may have the predominant impact on hazard and risk. Guidance was developed in 2005 to outline the requirements for assessing the navigation impacts of offshore wind farms[5] and should be closely followed throughout any assessment.

For recreational craft, such an assessment should take into account the following parameters:

- The number, size and type of local vessels
- The number, size and type of national and international vessels
- Annual events that are not covered in a short term monitoring
- Wave height and sea state conditions
- Seasonal variations including weather conditions
- A range of possible incidences

Risk assessment consists of an objective evaluation of concrete and potential hazards and subsequent evaluation of any associated risks, during the assessment, assumptions and uncertainties must be clearly considered and presented. Part of the difficulty in risk management is that measurement of both of the quantities in which risk assessment is concerned - potential loss and probability of occurrence - can be very difficult to measure and the chance of error in measuring these two concepts is large. Commercial offshore wind farms have now been deployed in UK waters since 2004, and to date there have been no recorded life threatening incidents involving small recreational craft reported to HM Coastguard. This experience should be factored into any navigational risk assessment to provide an accurate and realistic predicted level of risk and to enable proportionate and practical measures to be implemented where a risk is shown to be intolerable.

In order to effectively manage the risk of a vessel in distress drifting towards an installation, there needs to be an effective *Emergency Response System* in place. This will require the ability to shut down the moving parts, such as the turbines, when an emergency call is reported. In some cases, where traffic is high, a stand-by safety vessel may be required.

Safety zones

The RYA's opinion remains that the creation of safety zones around wind turbines or other installations that exclude small craft on a wholesale basis are likely to be unnecessary, impracticable and disproportionate. In our view, such a restriction on the small craft's right of navigation is not justifiable in terms of safety alone and it must be recognised that there is little possibility of enforcing such zones. In some locations, a safety zone may increase risk of collision if small craft are consequently forced to use commercial craft shipping lanes. Wind farms have been proposed where turbines are mounted on floating towers which are anchored to the seabed by cables extending over a much wider area. It is important that the size of any safety zone for such devices should be proportionate to the risk involved to vessels and should not be derived from the perimeter of the anchor locations.

[5] Guidance on the Assessment of the Impact of Offshore Wind Farms: Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms. 2005. DTI.

European standards are now being considered where small craft, under 24 m, are exempt from any operational safety zones. The German Government was the first to recognise the negative implications of imposing safety zones on small craft and has exempted small craft from such zones. In fact, where a wind farm is next to a busy shipping lane an aspect of mitigation might be to exclude large vessels from the wind farm to permit small craft to pass through in safety. In principle the RYA has no objection to the creation of *advisory or precautionary zones* but such zones must be designed and implemented on a case-by-case basis and with due respect to the right of navigation. The RYA believes that the purpose of any *advisory or precautionary zones* should be to warn vessels to navigate with particular caution but they should not permanently restrict navigation or exclude recreational vessels.

The RYA does, however, foresee occasions when it may be prudent to impose short-term temporary restrictions, for example during engineering, maintenance or construction works. Such temporary restrictions should be promulgated through Notices to Mariners. Many vessels visit the UK from continental Europe and this should be taken account of in any communication.

Cables and anchoring

In most cases, small craft will not anchor within an offshore energy 'farm'. However, in emergency situations this may be the only way of securing a drifting vessel to ensure no damage is done. To secure the safety of navigation, cables should be buried to a sufficient depth to avoid being uncovered. This should take into account shifting sediments on the seabed.

Marking and lighting

The requirements for marking and lighting offshore wind sites should be consistent with IALA requirements and guidelines. Much work has been done in this field and guidance supported by RYA is available from the General Lighthouse Authorities. As a minimum, each turbine should be clearly marked in high visibility yellow paint to a height of 12 m, low level lighting should allow the turbine number to be read from a 'safe' distance, corners of the wind farms should be marked and any other points or routes through the wind farm marked accordingly. In some cases local conditions may justify marker buoys off corners. These conditions should be discussed with the General Lighthouse Authorities.

The RYA supports the guidance provided by the General Lighthouse Authorities and works with them to identify site specific issues that may occur.

Effect on small craft navigational and communication equipment

Most small craft will have some form of navigational equipment on board. The most common will be a magnetic compass. Large quantities of steel, cabling and the transmission of electrical power may produce interference with the magnetic compass. Studies have shown that the effect on systems such as GPS, VHF and mobile phones from wind farms is negligible. However, there is a demonstrable 'echo' effect on some marine radar systems which may reduce the visibility of small craft on larger commercial vessels where radar scanners are often poorly sited and affected by the vessels superstructure. Adjustment of gain settings can minimise the unwanted effects, but over-reduction and consequential loss of small targets is of concern. For these reasons small craft may well be safer within wind energy sites and particular attention should be paid to developments that are sited close to commercial shipping lanes and which may obstruct small craft avoiding the commercial routes.

Any proposed development should account for the effect on small craft navigation and communication equipment in detail.

2 Location

The location of offshore energy installations may well lead to the potential loss of amenity for recreational craft. It should also be noted that commercial routes and shipping lanes do not represent those routes taken by the vast majority of recreational craft. The RYA, has collated recreational routes into the *UK Coastal Atlas of Recreational Boating* which is available from the RYA. The lines in the atlas represent corridors of varying width that are used as cruising routes. In addition, the atlas marks sailing areas, racing areas and the location of marinas, RYA affiliated clubs and RYA Recognised Training Centres. The *UK Coastal Atlas of Recreational Boating* should be used to inform decision making when planning the location of offshore energy developments. When writing an Environmental Statement local knowledge should be sought through the RYA.

Recreational routes, general sailing and racing areas must be accounted for when examining the impacts of wind farm developments.

Loss of cruising routes and impact on offshore racing

When examining the routes and location of turbines it is important to recognise that sailing boats behave differently to power driven craft and that their actual line of travel may 'zigzag' across their intended direction of travel upwind as they are dependent on the wind direction. The *UK Coastal Atlas of Recreational Boating* should be consulted together with other available information to inform the siting of the developments and individual installations and the potential provision of navigation routes through the larger sites.

Along many stretches of coast, recreational craft may need to seek shelter in poor weather. Sheltered harbours and anchorages and routes to these harbours of refuge should be protected. These are identified as essential routes in the Coastal Atlas.

The loss of routes will also lead to an increased distance of travel. This has environmental implications for powered craft and safety implications for all craft. Some routes, typically narrow channels or strong tidal flows, may already be hazardous at times to navigate through and adding hazards in these areas may seriously compromise navigational safety. There are also safety issues with the creation of turbulence and wind shadowing in confined areas where craft may be moving slowly and gusty turbulent conditions may create problems.

Squeeze into commercial routes

Recreational routes differ from commercial routes as recreational craft essentially aim to keep out of the major commercial navigation routes by travelling in the shallower adjacent waters or taking entirely different routes. As a result, the examination of commercial routes through AIS plotting alone will not ensure the safe positioning of OREIs; recreational boating must also be taken into account when assessing the impact on navigational risk. This may require routes through large developments to be identified or inshore routes for smaller craft to be safeguarded. The cumulative impact of all marine developments is becoming increasingly important when assessing these issues of squeeze.

Effect on sailing and racing areas

Most of the general day sailing and racing areas are close to the shore and in sheltered waters. The Strategic Environmental Assessment for Round 3 offshore wind development[6] recognises the busy inshore areas and states that the majority of offshore wind development should be beyond 12nm. The Netherlands and Germany have already excluded any development within 12nm of the shore in order to retain 'open space' for its amenity and recreational value. Recreational activity is important to the health and wellbeing of the community as well as providing economic support for

[6] Offshore Energy Strategic Environmental Assessment: Post consultation report. June 2009. DECC.

the local coastal economies. Retaining the undisturbed remoteness of some waters will be important in terms of its wilderness and amenity value.

Any interference in wind speed and/ or turbulence created by a wind farm in a racing area would create a significant negative impact on the event site and diminish its value.

Cumulative and 'in-combination' effects

As a result of the large increase in the number and scale of projects, it has been recognised that the cumulative effects of offshore wind projects have potential implications for small and large craft alike. Existing and future offshore wind farms developed by other EU Member States may also add to the cumulative effects. There is an awareness that the intended development of offshore wind farms could also lead to in-combination effects (effects arising from these developments with other activities; e.g. wave and tidal renewable installations, fishing and offshore oil and gas activities and those associated with UK and European Marine Protected Areas, including Marine Conservation Zones) that might impact all mariners. The *cumulative and in-combination effects* of offshore energy installations on navigation routes will be increasingly significant and must be taken into account in future siting proposals and plans.

3 End of Life

Dereliction

Whilst we would hope that these installations remain economically viable for the lifetime of the structures, the RYA would support measures taken by Government to secure the financial provision for removing the structures, prior to consents being given. This will ensure that after the installation ceases to produce electricity for whatever reason, derelict structures that are not marked or lit and remain a hazard to navigation or anchoring are removed from UK waters.

Decommissioning

Equally, any decommissioning plan needs to ensure that the structures are completely removed. Any parts of the structure remaining after the commercial operation of the installation may pose a hazard to navigation and should be avoided. However, we recognise that secondary uses may be identified for these structures once energy generation ceases. If structures are to remain in the water, navigational safety must be taken into account and structures should be appropriately marked and lit.

4 Consultation

The RYA's main office in Hamble is a primary point of contact for matters concerning the development of Offshore Renewable Energy Installation sites and the recreational boating sector. Throughout the English regions, RYA Hamble maintains a network of Regional Planning and Environmental Co-ordinators (RPEC) who are able to provide more detailed site specific information for developments that fall within an RPEC's area of responsibility. Developers may find this a useful resource for timely site specific information, particularly at the start-up of any project.

In Addition, the RYA's main office maintains close links with its Scottish, Welsh and Northern Irish offices, which work with the relevant jurisdictions and they can provide detailed site-specific information in the same way as the RPECs do for England.

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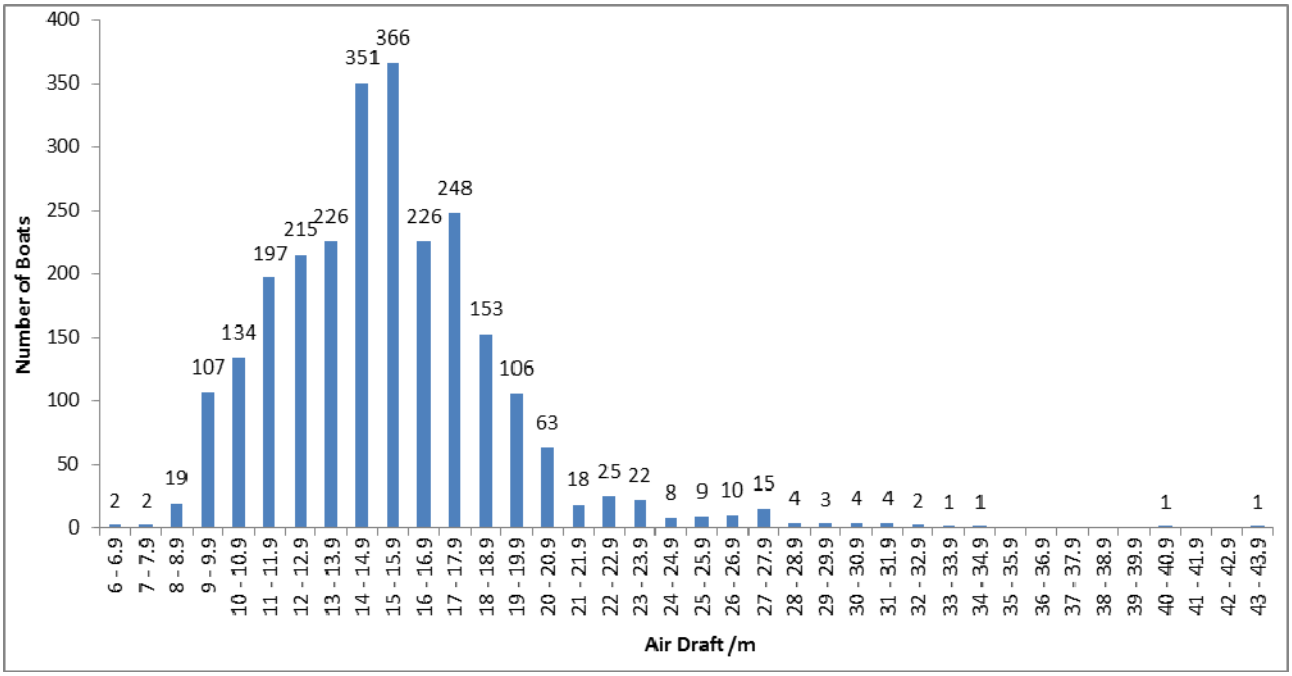
Development of the RYA policy on minimum clearance height and depth

The RYA originally developed its position on clearance height and depth on the available data in 2003. This was based on data taken from the Royal Ocean Racing Club (RORC) Rating's Office database which is representative of the types of yachts that are found in common use in UK Waters. Since then the 'Arkenford' survey[7] carried out by Arkenford, a market research and modelling company, has shown that usage and participation data have remained remarkably stable, which would suggest that the data used for development of the RYA policy on minimum clearance and height is still valid. The graphs shown below are based on RORC data from 2011.

Although there are other rating systems in use, the RORC system is widely accepted and applied worldwide. Rating is a technical handicapping process that enables adjustments to be made to yacht racing results so as to allow a wide range of different boats to be raced on equal terms. The boats contained in the database are mainly cruisers and yachts. Many yachts taking place in club races are registered with the RORC Rating Office. The RYA believes this data, containing in excess of 2500 records, is a good representation of the type of yacht to be found sailing around the shores of the UK. Although the total number of yachts around the UK has not been specifically quantified because there is no single database that records this information, it is estimated that this represents more than 6% of the total number of boats owned in the UK according to the data on boat ownership and usage supplied by Arkenford and by the British Marine Federation.

'Air draft' as presented here is the distance from the waterline to the top of the mast structure. This is based on the 'p' measurement, boom to top of mast, in the rating system (RORC). Air draft is derived by adding the 'p' value to the sum of estimated values for each boat for midships freeboard and boom above deck. It should be noted that masthead equipment and instrumentation has not been included in the calculation of air draft, although it will also add a further half to one metre to the air draft of a yacht. Loss of this equipment may produce failure in communication from the yacht although not structural failure to the yacht.

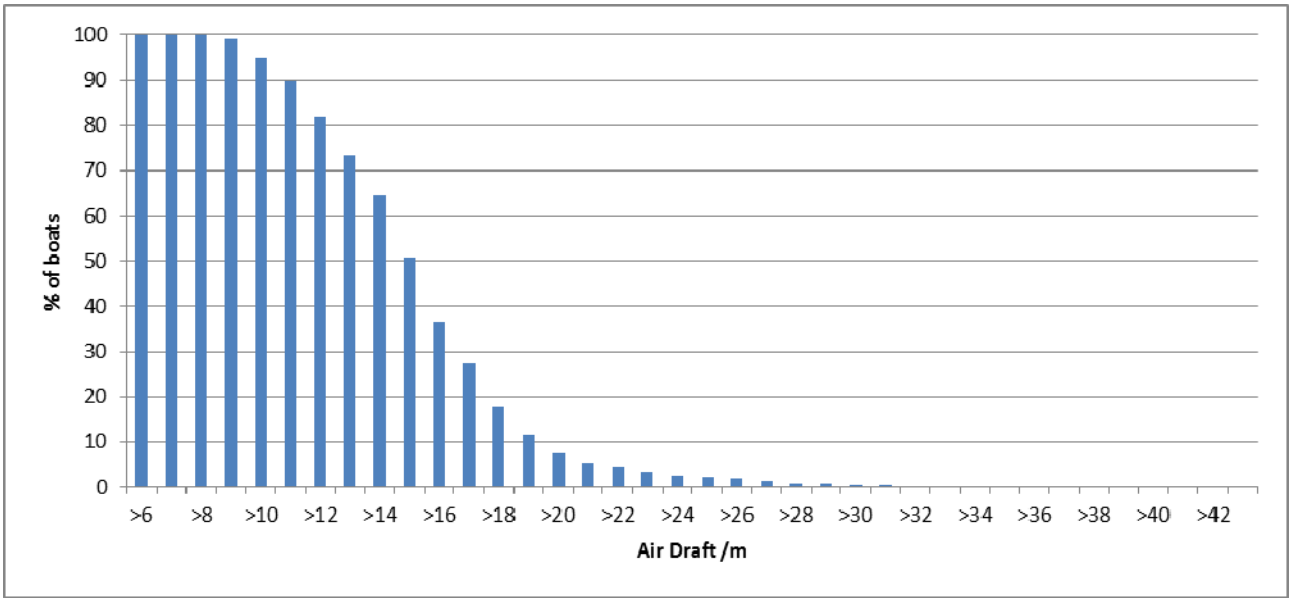
Figure 1: Graph showing the air draft in metres of the boats within the IRC fleet (data collected 2009-2011, sample size = 2543)



[7] Annual Watersports and Leisure Participation Survey carried out on behalf of RYA, BMF, MCA and RNLI

Looking at the above data in the form of percentage of the UK boating fleet, we can see the percentage of recreational yachts at risk from different rotor clearance heights. Figure 2, shows that a clearance height of 14 metres above sea level will put 65% of the national fleet at risk from rotor height collision. Reducing this to 18 metres above sea level, substantially reduces this percentage, however it still leaves 18% of the national fleet at risk from rotor height collision. This is still an unacceptable level of risk to the yachts found in UK waters. A clearance of 22 metres has been shown to be possible in engineering terms, which would put 4% of the national fleet at risk, a more acceptable level of risk in the view of the RYA.

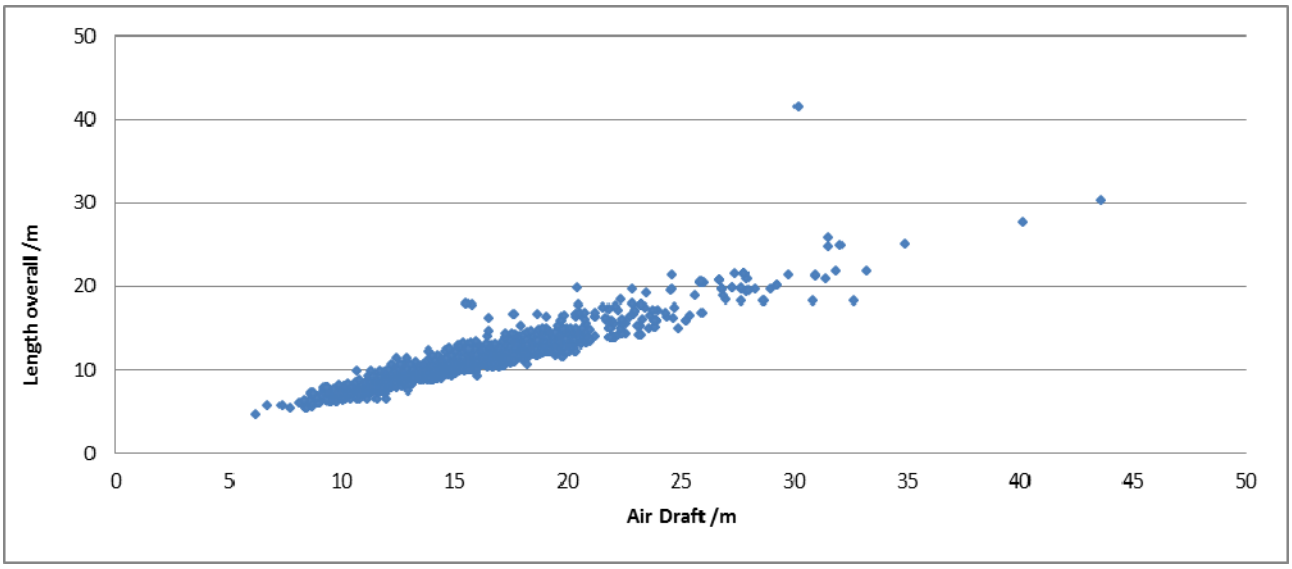
Figure 2: Graph showing the percentage of boats in the IRC fleet with different air draft shown in metres (data collected 2009-2011, sample size = 2543)



As a matter of common observation, larger yachts over 22 metres in length (see Figure 3), representative of this 4% group are more likely to be run by highly experienced crews and skippers. The datum of mean high water springs (MHWS) is taken as the clearance datum rather than mean sea level and then factoring in a site specific wave height parameter. However, wave height should be examined in the risk assessment at each site. It should be noted that 22 metres above MHWS has already been specified as a minimum clearance height in several of the wind farms consented in the first round of consents and is therefore a feasible, cost-effective option for developers.

It should also be noted that while this is currently an acceptable level of clearance, yachts are increasing in size and future developments may require a greater clearance height.

Figure 3: Graph showing the relationship of Length Overall (LOA) in metres and air draft in metres of the IRC fleet (data collected 2009-2011, sample size = 2543)



Additional data is provided showing the relationship between air draft and the depth of water required for clearance below the vessel's keel (Figure 4). Figure 4 shows that a depth of 3.5 metres corresponds to an air clearance of 22 metres above MHWS which is relevant for subsurface wave and tidal developments. Allowing for a safety margin, therefore, the RYA specifies a minimum underwater clearance of 4 metres below Chart Datum to provide a tolerable level of risk.

Figure 4: Graph showing the relationship of keel draft in metres and air draft in metres of the IRC fleet (data collected 2009-2011, sample size = 2543)