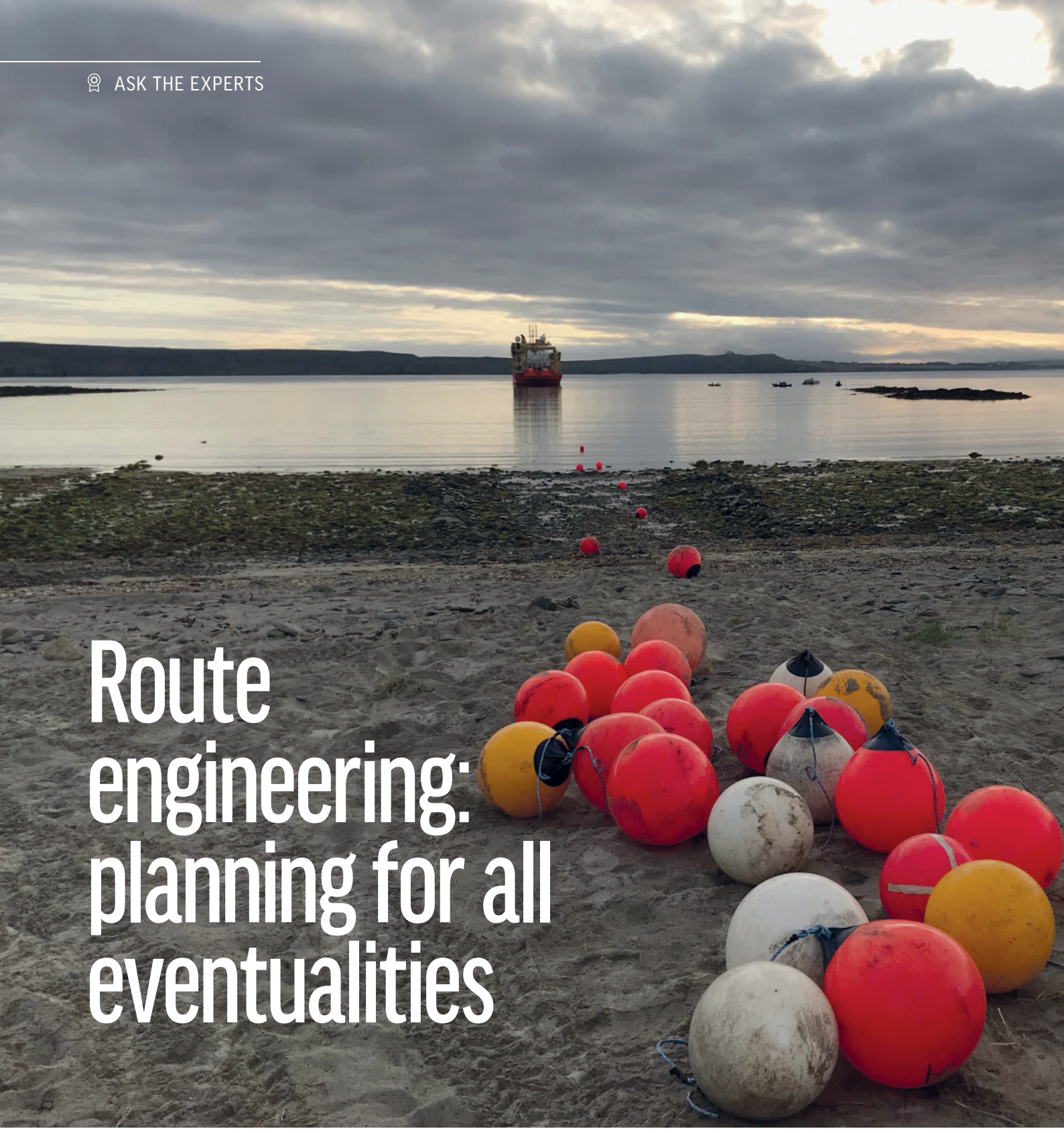
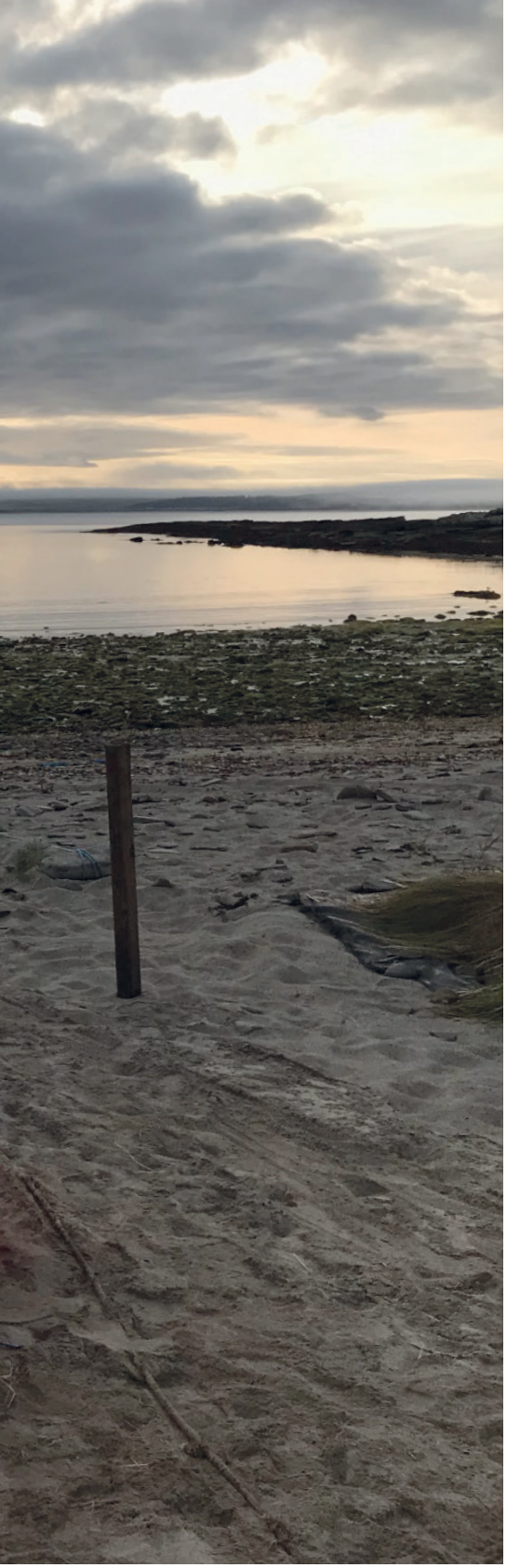


Route engineering: planning for all eventualities

To connect a cable from one landing point to another is no mean feat, and one that is made more difficult due to the plethora of obstacles and challenges presented, not only by the marine environment, but by human hands too. Careful consideration of all the external factors which could have a detrimental impact on the safety and integrity of new subsea cable routes falls into the capable hands of highly-trained route engineering teams worldwide.



OceanIQ's Marketing Manager Mike Bird, sat down with the company's Route Engineering and Survey Manager, Stuart Wilson to get his insight into the role that route engineers play in planning the safest cable routes for proposed subsea cable systems. What are the many factors which come into play when fulfilling their duties to ensure the success of these networks?

Mike Bird: What is route engineering?

Stuart Wilson: Route engineering is the process of designing a cable route to maximise the cable system's future security, whilst making sure that it is safe and economical to install. Throughout the process, we utilise a huge wealth of Geographic Information System (GIS) data via specialist software, so that cable route engineering decisions can be made that protect the cable throughout its design life, such as cable armouring levels, final cable routes, cable burial and more.

MB: How important is route engineering when planning a new submarine cable system?

SW: Route engineering is extremely important for a new system. Without investigation and avoidance of hazards along the route, the cable may be subject to many heightened risks, including inadequate armouring, damage to cable burial equipment, existing infrastructure such as oil and gas pipelines, installation vessels, or simply that the cable will be uninstallable due to excessive alter courses required by the installation vessel and burial tool.

MB: Is there a set process that you follow when you approach route engineering for a new project?

SW: Any project that we approach presents its own unique set of criteria to work with, as they are set in different geographical locations and have differing amounts of data that are available for us to work with. Our approach is therefore flexible and adaptive, rather than following a prescribed process, all whilst following a set of procedures designed to ensure the quality of our work, including a customer feedback system to provide continuous improvement of our services.

MB: What information does OceanIQ require to engineer a viable cable route?

SW: We try to collect as much data as possible. Almost any piece of information that we can acquire on the conditions that the cable would be exposed to along the route, whether they are natural, environmental, or those caused by human interference, can have some bearing on the route engineering choices we make.

In the first instance, good bathymetry data is key, to let us know where there are subsea obstacles and steep slopes that might be a risk to installation equipment. OceanIQ's unrivalled database of existing cables is essential to engineering good crossings and avoiding lying directly over existing cables. In many parts of the globe the seabed is congested, and this is a big risk both to the security of the cable and to the process of acquiring permits.

MB: Are there any industry standards that route engineering must adhere to and if so, how does OceanIQ meet these requirements?

SW: There are several sets of different standards that may apply to a new cable system depending on its type, that is power,

Stuart Wilson

telecoms or umbilical, purpose and location.

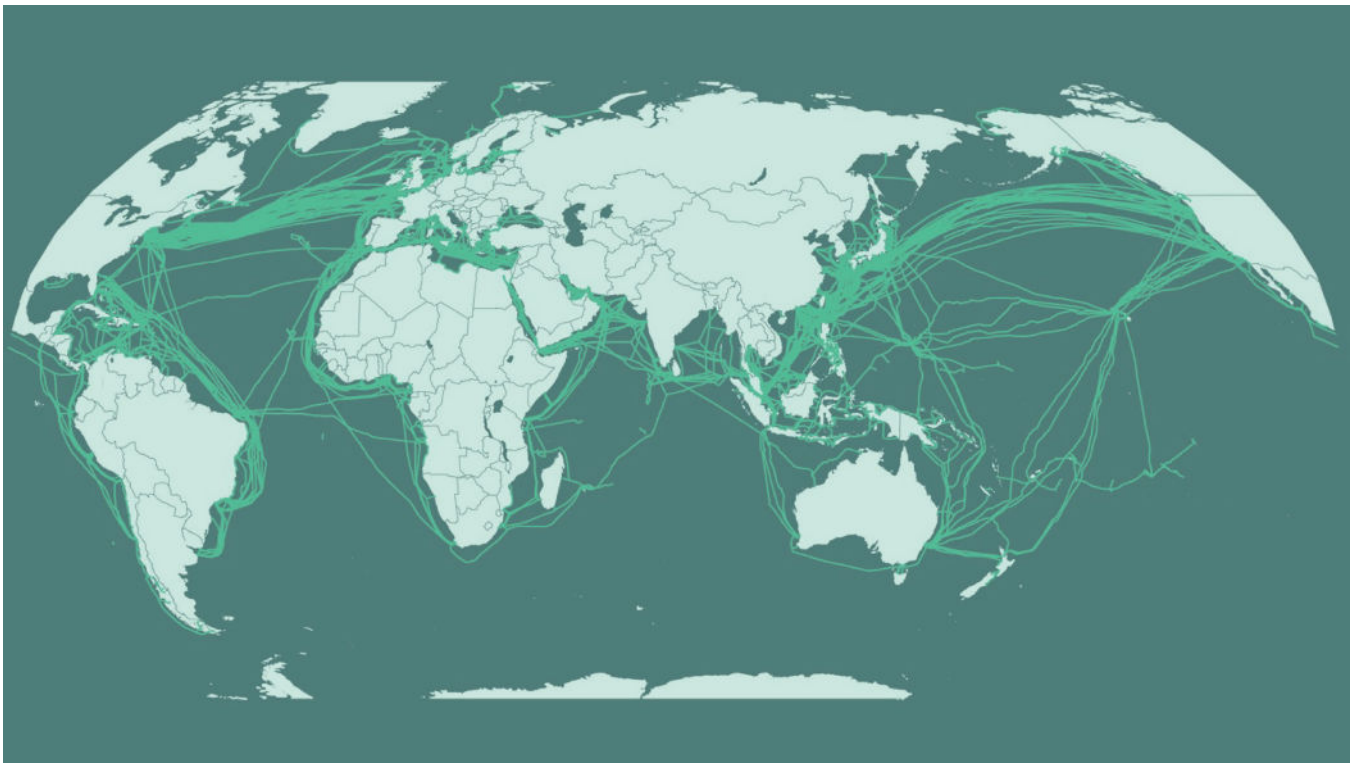
The most widely applicable are the International Cable Protection Committee (ICPC) recommendations. These are a set of guidelines, of which there are presently 18 in total, that cover many aspects of subsea cable integrity from power safety to recovery of retired cables. The two most pertinent for route engineers are Recommendation 2 – Cable Routing and Reporting Criteria and Recommendation 9 – Minimum Technical Requirements for a Desktop Study, but many of the other recommendations come into play in various situations and over the course of a cable's lifetime.

For that reason, OceanIQ's route engineers work within these specifications wherever possible, and where the demands of a particular cable system mean that it cannot comply with the guidelines whilst remaining safe and economically viable, we will highlight this to the relevant parties involved and give a detailed explanation of why the divergence from standard practice has been necessary and how it benefits their cable system.

MB: Route engineering services are not just restricted to the initial planning stages; what role can it play in the latter stages of a cable's lifecycle, such as during ongoing maintenance whilst the cable is operational?

SW: OceanIQ has several products covering the later parts of a cable's lifecycle. The first is Cable Protection Assessments (CPA). These remedial studies review the fault history of a cable after several years in service and use the original DTS and survey data, as well as new data that has become available, and our experience of maintaining similar systems to devise a range of protection strategies that the cable owner can follow to reduce the fault rate.

We also carry out other studies on request;



types of engineering that have previously been requested include designing a methodology for recovering an out of service cable. Another was a study into how to recover and re-lay an existing cable to a new location, including the distance that would need to be recovered and how to minimise the number of joints in the new system to improve latency.

MB: What technology do you make use of in your day-to-day activities and what benefits do they provide to both you, the engineer, but also to the integrity of the cable?

SW: Our primary tool is Geographic Information System (GIS) technology, particularly the GeoCable® software package. Other key technologies we make use of revolve around collecting and accessing data. This includes survey technologies such as sonar, magnetometry and geotechnical testing but also access and storage tools such as web mapping services and different forms of databases.

MB: It could be perceived that route engineering is restricted to computer screens and office-based activities; are there any requirements for on-site work as part of your role?

SW: On-site work is an essential part of many projects and can take several forms. The most common is during a DTS when OceanIQ route engineers will usually visit the landing points of the proposed system to investigate them and locate potential alternatives.

Our representative will also usually visit government agencies responsible for permits in-country to gain a full understanding of the requirements and any alternative routes that might be chosen to ease the permitting process. This means that the client can rest assured that the cable landing points and route have been chosen with the full knowledge of the local conditions.

Because Global Marine Group is a full-spectrum service provider from the beginning to the end of a cable system's life cycle, there are also other occasions for route engineers to work on site. One of these is to act as client or installer representatives on board survey vessels to ensure the data collected is up to expectations and to carry out real-time route engineering.

We also take other opportunities to have our route engineers observe installation and maintenance operations so that all routes are designed with a full appreciation of the capabilities and requirements of offshore operations.

MB: How do you see route engineering evolving in the future?

SW: The amount of information available from online sources is always increasing and the technology for acquiring more accurate and plentiful data during a cable route survey is continually advancing.

With those two factors at play, route engineers will have to become ever more skilful in working with and interpreting this flood of data for two reasons: firstly, to fully embrace the opportunities in developing cable routes that are more secure from an earlier stage than ever before, and secondly to enable us to present our findings and route engineering decisions clearly and concisely to clients and other interested parties.

OceanIQ is well-positioned to do that, thanks to both our experience with working with large datasets such as our cable database and thanks to our use of the industry-leading GeoCable® GIS software.

Effective route engineering addresses and resolves many of the seen and unseen pitfalls that can be bestowed upon the intricate networks of subsea cables. These systems are crucially important to a continuation of service in many areas of daily life, offering freedom of communication and the sharing of information across vast distances at ever increasing speed.

The intrinsic knowledge and experience retained within OceanIQ is utilised to the benefit of all customers and ensures that all cable route planning and installation is approached with an appreciation for the importance and reliability of these systems, which are so deeply integrated into the daily lives of millions.

https://globalmarine.group/

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