EMPIRE
engineering

An introduction to Empire Engineering

We’re on a mission to support the offshore wind industry with advice, insight and technical know-how.

Introduction

Offshore wind is important. To address the Climate Crisis we must switch from fossil fuels to renewable energy. Offshore wind is one of the few technologies demonstrated to meet this demand at scale. But it's not easy. Ours is a relatively young industry, which continues to evolve at an astounding pace. As boundaries are pushed, with larger turbines in deeper water, further from shore with the technical challenges increase, sometimes exponentially. As a business, we take great satisfaction in assisting our clients to overcome technical adversity.

At Empire, we take a collaborative approach with our clients. We also place value on speed. Empire can respond swiftly and safely. We are never reckless. I am proud of EACH MEMBER of my team who between them have decades of experience in not just structural engineering but specifically in the challenges that are unique to offshore wind.

As we look to the years ahead, the global commitment towards net zero emissions places yet more importance on the need to deliver renewable energy at the macro scale. At Empire, we are committed to providing the expert support and advice that is needed to realise collective vision.

"For a technical company, keeping up with all the industry developments is not undertaken lightly. It's a huge challenge... and we love it."

By Karl Davis

Our Values

Our purpose is to give confidence by simplifying complexity.

Our niche is offshore wind foundations and support structures in renewables.

We are dedicated

We place an emphasis on reliability

We focus on clear communication

We are passionate about what we do

We like to keep things simple

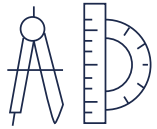
We are approachable

What we do

Empire is an engineering consultancy supporting the offshore wind industry with advice, insight and technical know-how

Project Delivery

Sometimes an engineering project needs a little extra horsepower. We can deploy one of our world class engineers quickly, reliably and safely, wherever help is needed.



Concept Design

Empire is at the cutting edge of engineering design. Specifically, we deliver early stage design of Monopile, Jacket and Gravity Base Foundations.

Specialist Engineering

Independent expert advice when you need it and at any project stage. Whether it's evaluating early stage opportunities, rethinking design choices or overcoming an immediate challenge.

Emergency Response

Emergency incidents can involve risks to the integrity of the foundation structure and turbine. This may lead to significant business interruption. We are on hand for whenever you need us most.

Floating Wind

Empire offers engineering services for floating wind including independent technical advisory, engineering management, structural and mooring design and advanced analyses.

Strength in depth

Empire Engineering in numbers

100+
Projects completed

2400T
Heaviest monopile

31,251
Coffees consumed

20+
Developers helped

3.6GW
Largest OWF project

8 Floating
FOW projects

18
Foundation concepts designed

125,000
Person hours

18 People
Permanent staff members

We enjoy what we do

We all know the best are hard to find in this industry. We've got a whole team of them

The team are hand-picked problem solving experts Collectively, we can draw on our knowledge from successfully delivering projects all around the globe.

At Empire we also value soft skills: we know there is a right way to working closely together over an extended period, especially when the stakes are high.

Benoît Brière
Partner, Lead Floating Wind Engineer

Louise Coles
Partner

Richard Krasenberg
Head of Delft Office

Shen Cao
General Manager, Empire China

Eleni Minga
Fathom Lead, Structural Engineer

Saurabh Gunecha
Senior Structural Engineer

Leah Ewart
Senior Engineer

Samuel Nicolas
Senior Structural Engineer

Žiga Vrhunec
Senior Engineer

Lewis Geddes
Senior Project Engineer

Yulong Zhang
Structural Engineer

Jiang Du
Structural Engineer

Ian Tran
Structural Engineer

Romero Moreira
Offshore Wind Engineer

Amir Jafari
Floating Wind Engineer

Karl Davis
Managing Director

Nick Howard
Partner, Principal Engineer

Project delivery

Expert advice on hand, when you need it most

Successful project delivery is the product of the right mix of people, processes and technology. At Empire, our approach is to begin by defining what is the key focus for the client and understand how this fits in relation to the context of the wider OWF development.

Having clarity on focus, enables us to deliver value for the client. The Empire team can feed in their expertise to help shape what will be delivered in order to meet project goals.

At Empire we understand the importance to adhere to both deadlines and budget constraints as part of the path to success. Client work is everything to us. Our aim is to prove ourselves as a trusted partner for future collaborations.

Read the case study

CASE STUDY: PROJECT DELIVERY

Management of Foundations Detailed Design

Parkwind engaged Empire Engineering to manage the detailed design of the monopile foundations for the OHVS and WTG structures

Northwester 2 is the seventh windfarm on the Belgium Coast and represents a €700 million investment to bring renewable energy to 220,000 Belgian homes. The part consists of 23 monopile WTG structures supporting MHI Vestas V164 turbines and 1 OHVS delivering approximately 220MW of power.

Empire initially joined the Parkwind design team with three engineers, greatly increasing the capability and experience base of the Client. By utilizing the Empire team, the project was able to produce the initial documentation to act as the input to the detailed design process which otherwise might not have been completed and would have introduced delay to the project.

Empire engineering supported the project with the primary and secondary steel design of the WTG and OHVS foundations, whilst also providing support on geotechnical, metocean, corrosion protection, and driving related topics.

Key project summary

Client
Parkwind

Key services
Engineering oversight, Foundation design, Project delivery.

Wind farm
Northwester 2.

Results

No negative feedback
An operational windfarm that has been installed and operated without any negative feedback relating to design items.

Certified
Project being guided through a challenging certification process.

Ongoing support
Additional support provided by the broader Empire team on technical matters, to allow informed decision making without over-reliance on the designer.

Concept design

Expert input right from the very start of a project

At Empire Engineering, we believe that successful concept design follows taking the correct approach. It is essential that we understand both the client's costs and risk drivers. Our recommended way of working is to begin by agreeing and communicating those drivers and this is best done through the medium of a workshop.

Once the design phase is underway, Empire Engineering will present the client with a number of structures, supported by studies that give commentary on both what will and will not work for the client.

The emphasis here is on providing the client with the information so that they can then be sure of making informed decisions for the good of their project.

Read the case study

Jacket concept design

Taiwan looks towards renewable energy

Taiwan relies heavily on imported energy to power the island, up to 97-99% needs to be imported to sustain their power supply. Offshore wind is looked upon as one of the most attractive forms of renewable energy to be developed. The Taiwan Strait, with its strong winds, has potential capacity for 10GW of offshore wind farms that could be modelled on European experience.

Between February and May 2018, Dr Alan Marson from Empire Engineering was engaged by K2 Management to work on concept designs for an offshore wind farm in Taiwan. Concept designs were created and assessed for four steel jack foundations incorporating 3-legged structures supporting an MHI Vestas turbine in 20m and 40m water depths. There was also a 4-legged structure supporting a larger Siemens Gamesa turbine, also in 20m and 40m water depths.

Key project summary

Client
K2

Key services
Concept design, Project analysis.

Wind farm
Confidential, Taiwan.

Results

Efficiency
Efficient designs delivered on time and within budget.

Optimization
Design optimized for fabrication, transport and installation as well as operations.

Communication
Clear communication with the client throughout the project. Concise technical reports delivered including relevant inputs, analysis methodology and findings of the project.

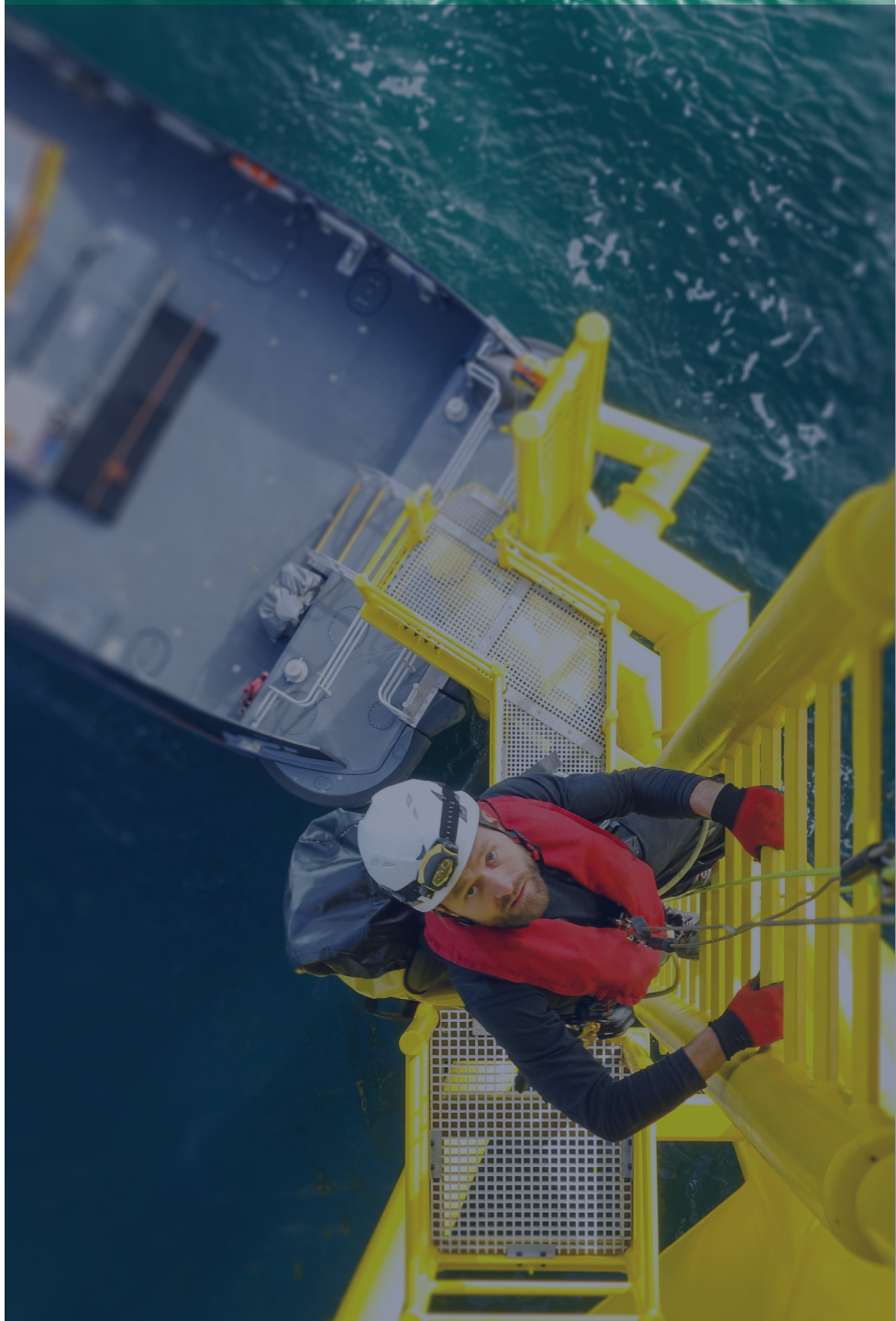
Specialist engineering

Independent expert advice when you need it and at any project stage

The team at Empire Engineering are on hand for those moments when the project needs a little extra horsepower. Our experts can be brought in to help with a range of technical discussions to solve specific and more tactical issues within the context of a wider OWF project.

Our specialist engineering service can be deployed quickly and safely, giving our clients just the help they need at a crucial stage of their project. Whether it's evaluating early stage opportunities, rethinking design choices or overcoming an immediate challenge, the Empire Engineering team are ready to support.

Read the case study



Engineering support of the Neart na Gaoithe project

Empire Engineering worked with EDF Renewable Energy UK to support the Engineering Manager on the Neart na Gaoithe project

The Neart na Gaoithe (NnG) offshore wind farm will be located 15.5 km off the Fife coast and covers an area of approximately 105 km2. EDF Renewables UK acquired the project in May 2018 as part of a competitive bidding process.

The project has the potential to generate 450MW of renewable energy and will offset over 400,000 tonnes of CO2 emissions each year.

In early 2018 EDF Renewable Energy UK took over the NnG project from Mainstream Renewable Power and was in the process of undertaking Technology Transfer.

It was at this point that Empire Engineering were approached by EDF. After an initial 6 week engagement, it quickly became clear that long term support would be needed in order for the project to reach a successful conclusion. The Empire Engineering team's involvement was extended to nearly 12 months in total.

Key project summary

Client
EDF

Key services
Specialist engineering, Project delivery.

Lead Engineer
Karl Davis.

Windfarm
Neart na Gaoithe.

Emergency response

Emergency incidents can involve risks to the integrity of the foundation structure and turbine. This may lead to significant business interruption

By registering your offshore wind assets with Empire's Emergency Response Service, you can access foundation specialists within the first few hours of an incident.

Our Emergency Response service provides access to Engineering support via nominated points of contact. This includes out of hours 24/7 response. The service goes beyond just having that person at the end of the phone but also covers an accessible backup of core asset data to mitigate against critical data loss at a crucial moment.

Floating wind

From demonstrator to large scale commercial reality. Our industry knows the scale of the opportunity floating offshore wind presents. Now it is time to deliver on it

Empire offers engineering services for floating wind including independent technical advisory, engineering management, structural and mooring design and advanced analyses.

The team at Empire have a breadth of experience on advising for floating offshore wind. From planning and budgeting to concept/prototype selection through to technical evaluation and floating offshore wind structural integrity management (FOWISM) system development, we have advised across a range of projects for our clients.

Floating wind case study

A wide reaching analysis and rating of floating concepts

Empire were to undertake a high level appraisal of floating wind concepts that could realistically be considered for deployment in a European Sea by 2030.

The study focused on concepts that employed steel or concrete as the primary material to understand how they compared against key criteria of LCOE and technical maturity.

Empire reviewed more than 80 concepts in a long list and provided detailed analysis of top ranking concepts and their potential for being selected for further development stages.

Key project summary

Client
Top Secret.

Key services
Floating concept selection.

Results

A long list of floating concepts reviewed.

An agreed grading criteria created and applied vs all reviewed concepts.

A short list of favourable projects created each with their own detailed SWOT analysis and accompanying recommendations.

Helping the best

Our clients are the major developers and their supporting partners in large scale offshore wind farms. As a team we can be deployed anywhere in the world to assist with technical challenges. We've been doing this a while and Empire's success is built on our clients' trust.

Fast, but never reckless: Empire is on-call and ready for when you need our help.

"Many thanks for all your hard work and stepping into the breach to support the project at a very difficult time."

By Peter McCusker, Engineering/Project Manager – NnG, EDF-RE UK

"Empire's team provided sound technical support during the conceptual phase of the project. Their depth of experience led to an excellent deliverable produced on time and on budget."

By Lars Kjuul Kristensen, K2 Management

We're the brains behind Foundation Ex

What makes us special

Foundation Ex is only conference dedicated to technical debate in Offshore Wind Foundations.

In 2019 we launched Foundation Ex and brought together experts from across the world in a series of dynamic keynote talks and workshops in Bristol, UK. For 2020, we kept the conversation going, this time delivered over a series of free monthly live webinars.

In 2022, Foundation Ex was back as a live event. Bigger and better, this time we saw nearly 300 Offshore Wind Experts come together in Bristol for a day of discussion of progress and innovation in our industry.

The day was followed by a much needed party late into the night.

FOUNDATION ex
EXPLORE | EXCHANGE | EXPAND

Offshore Wind Foundations

We wrote the book.

2021

First edition

1000+ downloads referenced in numerous academic publications.

2023

Second edition

500+ downloads in 24 hours.

Get your copy

FOUNDATION ex
EXPLORE | EXCHANGE | EXPAND

Let’s take the next step

By now you should know us a little more. Let’s get the ball rolling.

Why not give our team a call and discuss your project?

We’re ready to help, advise and take the strain with your technical challenges.

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Deep thinking.