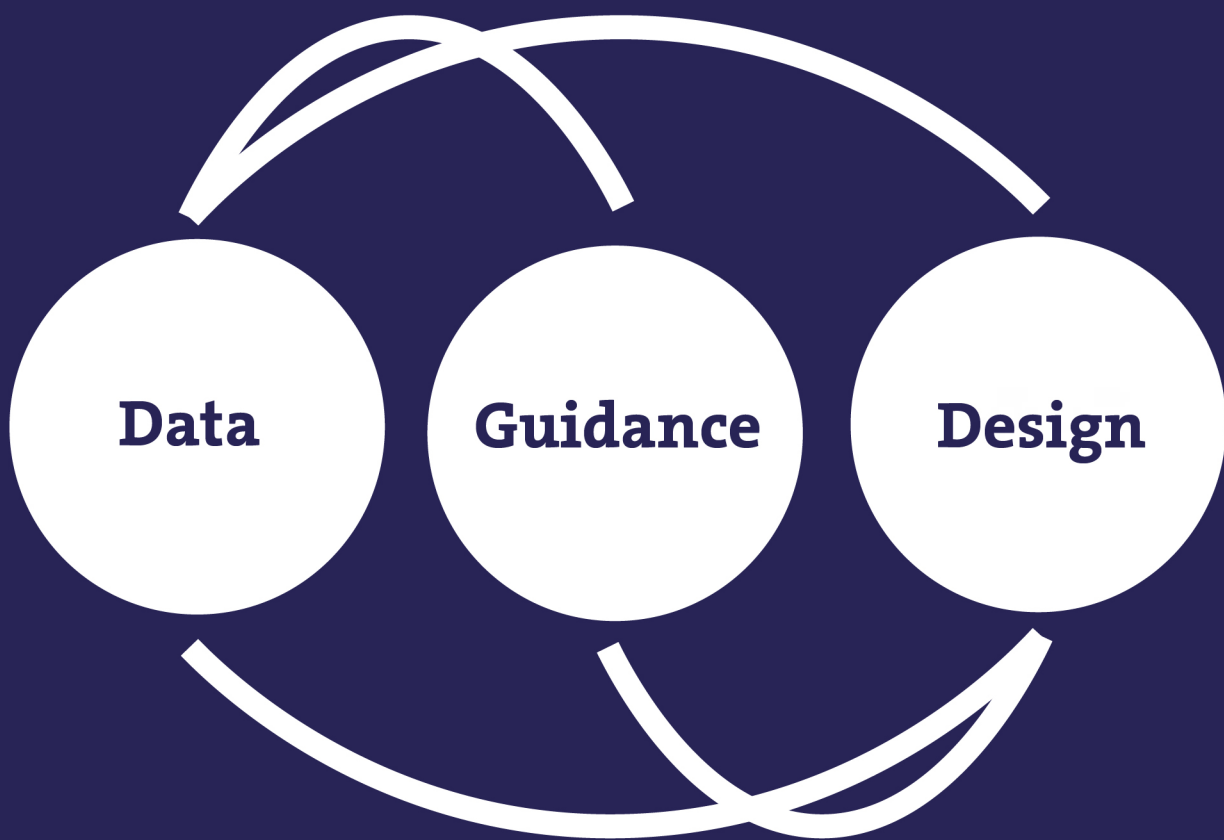




# The right stuff



Incident Data Reporting:	Good Practice Guidance:	Safe by Design Workshops:
Because transparent reporting and knowledge sharing are the bedrock of a safe industry.	Because experience, expertise and consensus give us the safest ways to work.	Because design stage improvements reduces incidents throughout the lifecycle of an offshore wind farm.

## Introduction to the G+ Work Programme

The G+ exists to deliver world class health and safety performance in the global offshore wind industry. G+ members and associate members include the sector's key players, including developers, manufacturers and service suppliers who commit resources and actively support our work. Working in close collaboration with partners from offshore wind and adjacent industries such as oil & gas, marine and construction, we drive a global health and safety agenda through our work programme which includes incident reporting, Safe by Design workshops and Good Practice Guidance.



### The right data

Transparent reporting and knowledge sharing are the bedrock of a safe industry. Our membership provide data on incidents so we can continuously improve health and safety.

### For everyone

G+ Annual reports and interactive tools are available for everyone to read and use.



### The right design

Design stage advice can reduce incidents throughout the lifecycle of an offshore wind farm. Holding a Safe by Design workshop allows industry to combine their knowledge and see where improvement or harmonisation is needed to create a safer, healthier industry.

### For everyone

The G+ Safe by Design Workshop Reports are available for everyone to read and use.



### The right guidance

Experience, expertise and consensus are essential for a safe working environment. Our series of Good Practice Guidance documents cover a range of subjects to provide the information you need.

### For everyone

The G+ Good Practice Guidance are available for everyone to read, use and continually develop.



## How to get involved with the G+

We invite participation from all organisations and individuals with an interest in improving health and safety performance in offshore wind. If you would like to be involved with any element of our work, or would like to be kept informed, please get in touch.

Email: [gplus@energyinst.org](mailto:gplus@energyinst.org)

[www.gplusoffshorewind.com](http://www.gplusoffshorewind.com)





**Tove Lunde**

Head of Safety, Security and Sustainability in New Energy Solutions at Equinor.

---

## A message from the G+ Chair



I'm delighted to be chairing the G+ in a period of continued growth and internationalisation. Offshore wind has been on a remarkable journey and taken massive leaps in technology innovation, cost reduction and output. And so too has our safety performance.

But as the workforce grows, so too does the exposure to potential hazards associated with operating in offshore environments; and data collected by the G+ still indicates that we have a way to go in this area. Every single day, a person working for us gets injured, either through a first aid incident or something more serious. To me that is just not good enough. We have to strive for zero harm to our people and the environment that we operate in.

The G+ exists to drive world class health and safety performance through robust practices and transparent reporting. To do this effectively, we have to collaborate. Sharing our members' expertise and experience and engaging stakeholders all over the world, including developers, service suppliers, regulators and policy makers in producing best safety practices and sharing our learning across the industry.

Fostering a safe workplace is the right thing to do, because we cannot accept that people get hurt working for us.



# 1. The right data - Health and Safety Incident Reporting



Because of the G+ incident data reporting, we've now got very clear, industry-wide data which helps us analyse what we need to do next and define our work packages.

David Griffiths  
Head of Safety, Health and Environment  
SSE Renewables

## Introduction

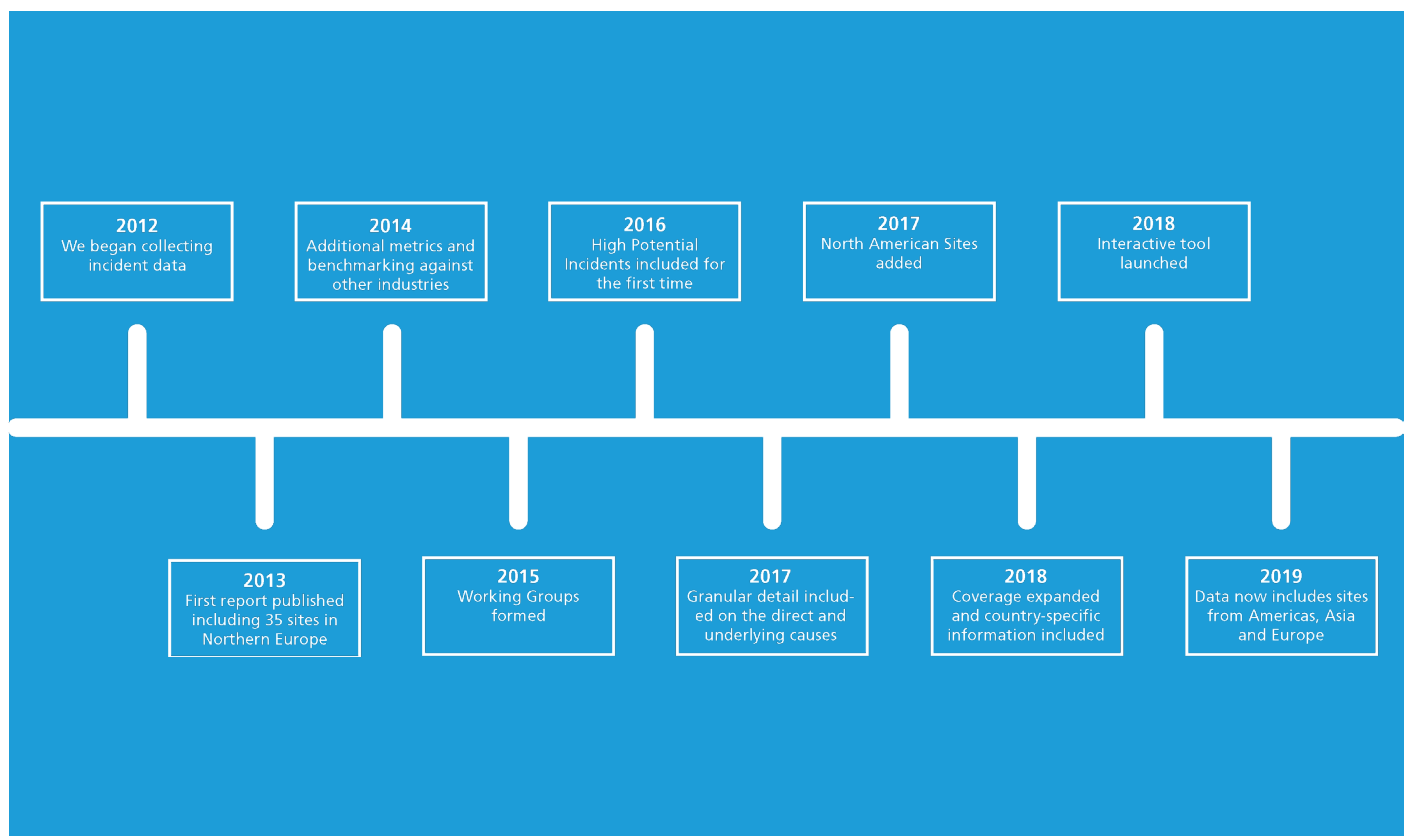
Transparent reporting and knowledge sharing are the bedrock of a safe offshore wind industry. The G+ was founded on the principal that, by developing a data-led risk profile for the sector, we can turn the spotlight on the critical activities, locations and processes and apply our combined resources to minimise the associated risks.

This is why, shortly after the G+ was created in 2012 (as a partnership with the Energy Institute), we began collecting incident data from all of our members. The data covered everything from near misses to lost time incidents on all member project sites, from development to decommissioning.

The first report captured incidents in 2013 from 35 sites in Northern Europe. We analysed the data to understand the risk profiles for different project phases, work processes and incident areas. This analysis identified the areas of highest risk: lifting operations, working at height and marine operations. To address this, the G+ (then called G9) established working groups to address and develop good practice guidance for each of these, directed by established Energy Institute processes.

That first report laid the foundations for a standard approach to data collection and analysis, with key benchmarks for consistent measurement and year-on-year comparison. As part of the analysis process, it was agreed that subsequent data collection should include number of hours worked, in order to capture frequency data and improve the accuracy of benchmarking and trend analysis.

So, from 2014 onwards key metrics have included Lost Time Injury Frequency (LTIF), a ratio of serious injuries per one million hours worked and Total Recordable Incidents Rate (TRIR) which measures all reported injuries per one million hours worked. This provides a quick and meaningful snapshot of annual outcomes and trends as well as a benchmark against other industries.



## Continuous improvement

**As the number of sites reported on has grown year-on-year, the data has become increasingly meaningful. And as the data became richer, the analysis became more sophisticated – drawing out deeper insight and understanding of the dynamics affecting health and safety performance across the burgeoning sector.**

For example, when the 2015 report demonstrated that manual handling and dropped objects were areas of higher risk, the G+ Focal Group investigated both topics and proposed scopes of further work. These were supported by the Board and taken forward as workstreams for delivery. Dropped objects is now the subject of special focus, in partnership with the organisation DROPS (Dropped Objects Prevention Scheme).

Similarly, the 2016 data captured high potential incidents for the first time, and this revealed that they were not consistent with lost workday incidents. Clearly, this was a significant disconnect and showed that a deeper understanding of the operational causes was needed. So, from 2017 onwards members began to submit more granular detail on the direct and underlying causes of lost work time incidents. This enabled the G+ to apply barrier-based incident analysis (standard practice in other industries) and also helped to inform the broader G+ work programme, including the Safe by Design workshops.



**The G+ is very, very good at being data-driven. It means that as an industry they're really open to using the evidence to inform the activity they do and, as a result of that, they have a really positive impact on the health and safety performance of the industry.**

Henrietta Frater,  
Head of HSE and Wellbeing  
The Crown Estate

Internationalisation is an increasingly strong driver, as the G+ is uniquely placed to support health and safety in emerging markets.

The 2017 report saw the addition of North American development sites and, for the first time, the data captured the country in which each incident took place.

In 2018, the coverage expanded to include an APAC site and country-specific information. We also created an interactive tool to enable users to quickly and easily interrogate the data and extract exactly the insights they need.

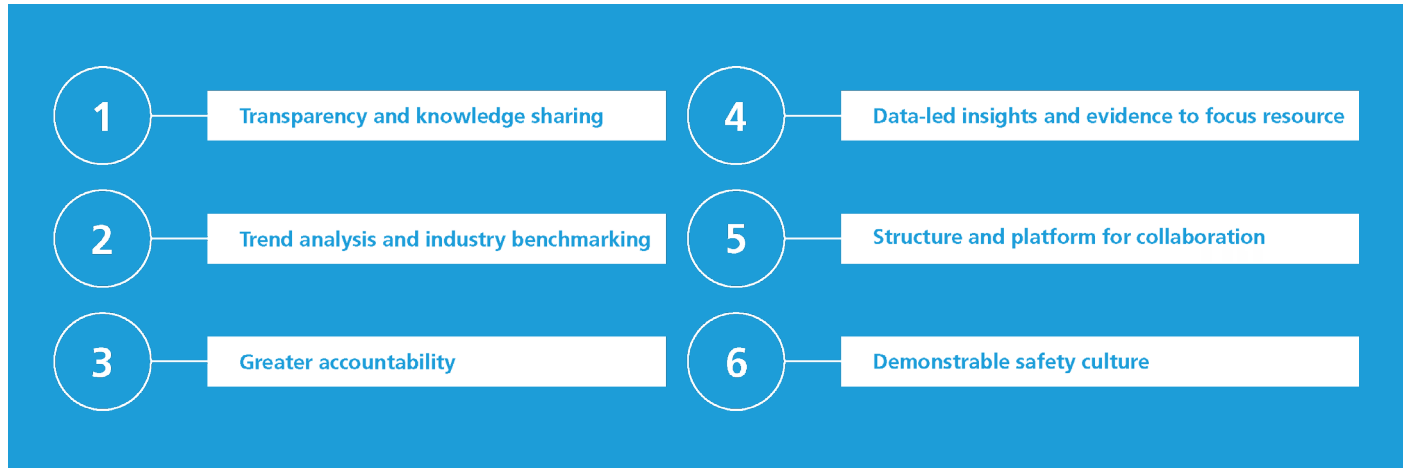
In 2019, the incident data includes a total of 74 sites across Europe, USA and Taiwan. Of these, three are in the USA and one in Taiwan.

Looking ahead, it is a key goal for 2020 to increase the number of sites we report on in the APAC region. In fact, we have recently launched a Focal Group for the APAC region to explore and develop opportunities for greater collaboration and knowledge sharing. We are investigating whether associate members can contribute their site data to increase the input from the region.

## Turning data into action

The incident data is an annual programme. Data is reported quarterly and carefully reviewed at a deep dive session. Each year, there is an annual data reporting review and the collection template is evaluated and refined, based on stakeholder feedback.

This structured approach helps to ensure the integrity of the findings and the decisions they inform. As a result, the incident data has shown itself to be an immensely powerful tool in several critical ways.



## Building on success

The incident reporting programme has evolved a great deal since its inception in 2013. The number of sites included has more than doubled and the global reach expanded to three regions.

But although we have made great progress, there is a long way to go and we are relentlessly driven to do better. That means deepening and broadening our engagement across the growing global sector and facilitating more and more collaboration. We are always looking for new ways to reach new and existing stakeholders; to share information and hear their views on how they use it and what else they need.



You should make decisions on safety using the data you've got. So if you collaborate with other organisations, you can share the data and you can see what the risks are - and if you're solving them. It's a really good thing to work as a team.

Clark MacFarlane  
Managing Director  
Siemens Gamesa

We do this for the same reason we do everything: because it is vital that our resources and activities are focused on the areas where they will make the most critical difference, and it is vital that our outputs are accessible and actionable. And because, ultimately, our activities are only meaningful if they are acted upon and used to bring about changes that make people safer as they carry out their work.



## 2. The right design - Safe by Design workshops



The Safe by Design programme enables experts to talk about a subject together and get the best practice in terms of health and safety into the design of an asset. It's one of the ways the G+ brings the right people together and creates a safe environment to share information and help each other improve health and safety.

Jonathan Cole  
Managing Director  
Iberdrola Renewables Offshore





## Introduction

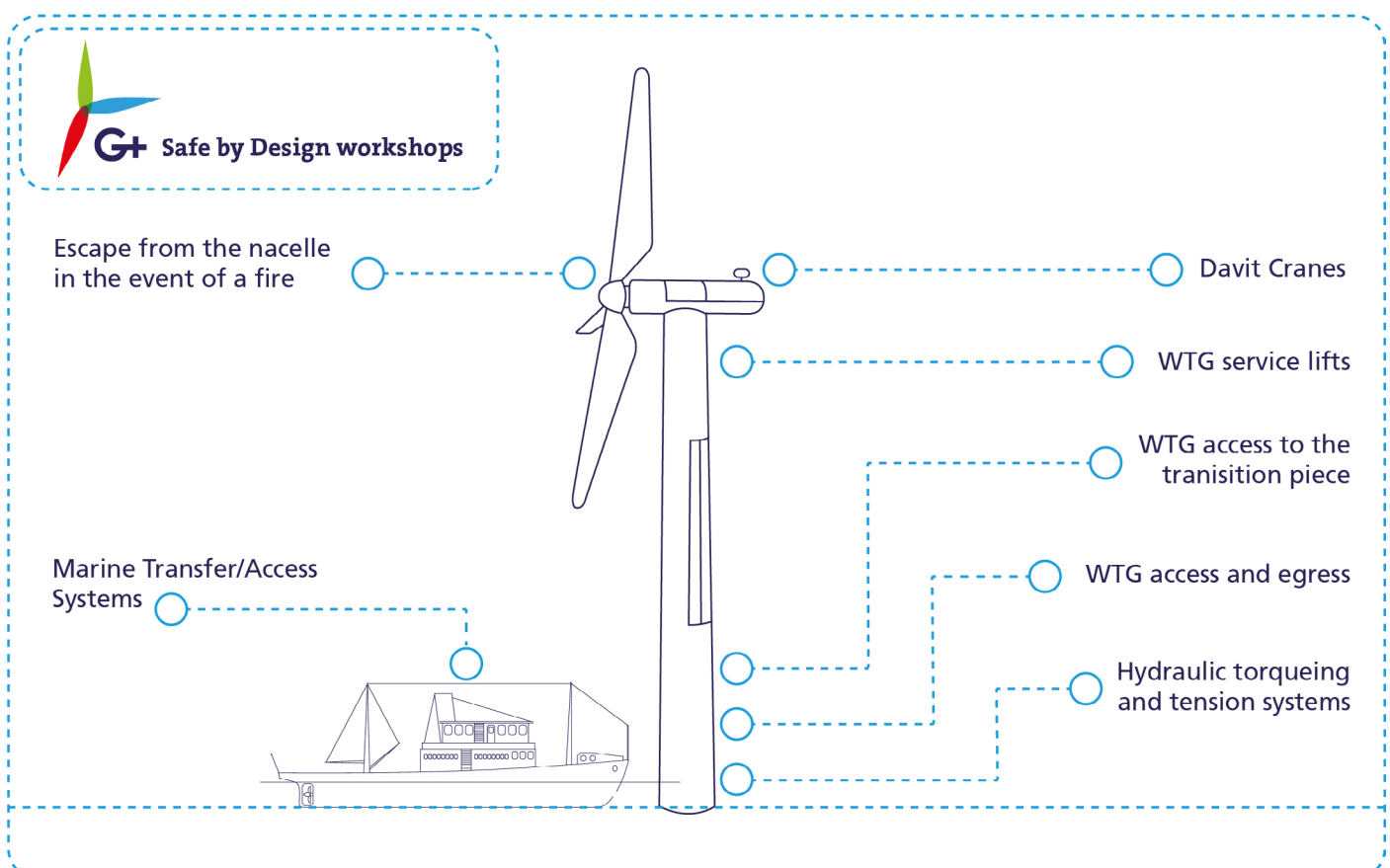
The Safe by Design programme began in 2014 for the purpose of improving health and safety performance across the sector. Each Safe by Design workshop investigates a specific topic with the objective of making improvements at the design stage that will help to reduce incidents throughout the lifecycle of an offshore wind farm.

The purpose is to examine the current design controls, discuss where they have potentially failed and identify opportunities for improvement.

The outputs are used as a reference for the industry and also stimulate further discussion and research. The G+ worked alongside other expert organisations to determine the optimal design and format for the workshops, based on Safe by Design (SbD) principles.

The Safe by Design model mandates the integration of hazard identification and risk assessment methods early in the design process to eliminate or minimise the risks of harm throughout the construction and operational life of the asset. It is a structured methodology that covers hazard identification and mitigation, continuous improvement, design change management, collaboration, site knowledge, professional values and leadership and unsafe situations.

Within this framework, G+ Safe by Design workshops review the current design controls and potential failures, identify opportunities for improvement and demonstrate the potential for risk reduction.



## Learning from doing

**As the number of sites reported on has grown year-on-year, the data has become increasingly meaningful. And as the data became richer, the analysis became more sophisticated – drawing out deeper insight and understanding of the dynamics affecting health and safety performance across the burgeoning sector.**

Selecting and scoping the right topics for the programme is critical to making the biggest impact. This is why we make this a collaborative process, inviting input from organisations and individuals across the sector. As well as canvassing opinion from the G+ Construction and Operations forums, this involves running formal surveys on social media, seeking feedback at other G+ events and keeping an open invitation for direct feedback at any time.

The process of selecting topics has evolved alongside the G+. Initially, the Focal Group would identify a general area of high risk (such as lifting), based on member input and incident data. However, it soon became apparent that such broad topics were unlikely to generate sufficiently meaningful and actionable outcomes and so subsequent topics were narrowed down to become more tightly focused (such as Davit cranes).

Another early lesson learned was that bringing in a dedicated facilitator to run the workshop enabled a far greater degree of structure and productivity. It also enhances the integrity of the outcomes, as the facilitation process ensures that all voices are heard and all inputs considered.



**The Safe by Design workshops result in actionable improvements. It involves people who are actually hands-on, and the solutions are practical and achievable. It's really pleasing to see.**

**Trevor Johnson**  
HM Principal Inspector of Health & Safety, Wind and Marine Energy Team  
Health and Safety Executive

## Delivering through collaboration

So far, we have delivered seven Safe by Design workshops and going forward we aim to deliver two workshops each year. The workshops each last for one day and are open for anyone relevant experience or knowledge to attend. This includes recognized experts on the topic and those with direct, relevant on-the-ground experience.

Over time, more and more organisations have taken an active role and, in recent years, this has included developers, regulators, OEMs, component manufacturers, health, safety and environment experts, technical specialists and service providers. This means that the resulting recommendations have genuine authority and are considered conclusive by organisations working in the relevant space.

The workshops follow a robust methodology, beginning with scene-setting by established authorities on the topic. Participants then contribute to hazard identification and analysis processes, using the bowtie method to understand causal relationships in high-risk scenarios and evaluate the control measures and escalation processes. Different aspects of the topic are discussed in breakout groups, before each reports back with findings. During the final plenary session, conclusions and recommendations are agreed which are then taken forward to the workshop report. Finally, participants are asked to give feedback, which becomes another input to the future workshop programme.

During the workshop, participants consider the likely lifespan of the outputs and when the topic should be revisited in light of subsequent developments and innovations within the market and regulatory environment. This is enriched by industry feedback and the incident data we collect from our members.



One of the lessons we've learned is that our strengths come from bringing together the experts in the industry. That helps to improve things in mature markets and establish good practice straight away in emerging markets.

Don MacKay  
Director of Operations  
EdF Energy Renewables

## Enhancing safety through sharing

Of course, recommendations can only be as effective as they are actionable, so the outcomes of the Safe by Design workshops are shared widely within the sector and adjacent industries. This is done through G+ member and associate organisations, industry advocacy and innovation leaders, regulators and other trade organisations.

Ultimately, the Safe by Design workshop programme is an example of the sector and other stakeholders coming together to identify potential hazards; to share knowledge and resources to mitigate risk and minimize threats to life and the environmental ecosystem. More simply, it is evidence of the sector's deep-seated commitment to put collaboration before competition when it comes to preserving life, promoting wellbeing and protecting the environment.

# Safe by Design workshop reports

## Marine Transfer/Access Systems

### Focus Areas

- Ladder and fender design
- Climbing and transfer (access and egress)
- Crew transfer vessel (CTV) design and equipment

[Download Report](#)



## Escape from a turbine nacelle in the event of a fire

### Focus Areas

- Fire mitigation/suppression/detection technologies
- Emergency escape equipment and PPE
- Training and competence of technicians

[Download Report](#)



## WTG Service Lifts

### Focus Areas

- Service lift design and specification
- Service lift operation and maintenance (including maintenance standards)
- The human impact of climbing in the event of service lift unavailability

[Download Report](#)



## Davit cranes

### Focus Areas

- Davit crane specification and design
- Offshore windfarm operation and maintenance (O&M): safe operation of davit cranes
- Alternative technologies and innovation in cargo transfer

[Download Report](#)



## WTG access and egress

### Focus Areas

- Issues associated with access/egress in a WTG and substructure (transfer from vessel/helicopter not in scope) in the offshore environment.

[Download Report](#)



## WTG access to the transition piece

### Focus Areas

- Issues associated with access below the airtight deck in a WTG in the offshore environment
- Focus on monopiles, which make up most of the current installations

[Download Report](#)



## Hydraulic tensioning & torquing systems

### Focus Areas

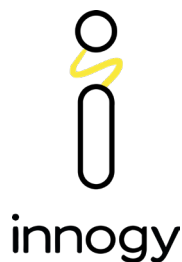
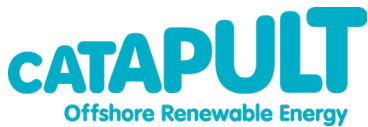
- Issues associated with hydraulic torquing and tensioning on the main flange connections and the associated large fasteners and tooling.

[Download Report](#)





Some of the organisations involved were as follows:







Standardisation is key to driving performance forward at the pace required. Now we are going outside the boundaries of continental Europe, we will work with new suppliers, stakeholders, authorities, investors, JV partners. It's a new modus, and standardisation is critical to succeeding in those new markets.

Hasse Andreasen  
Director, HSE, Offshore  
Ørsted

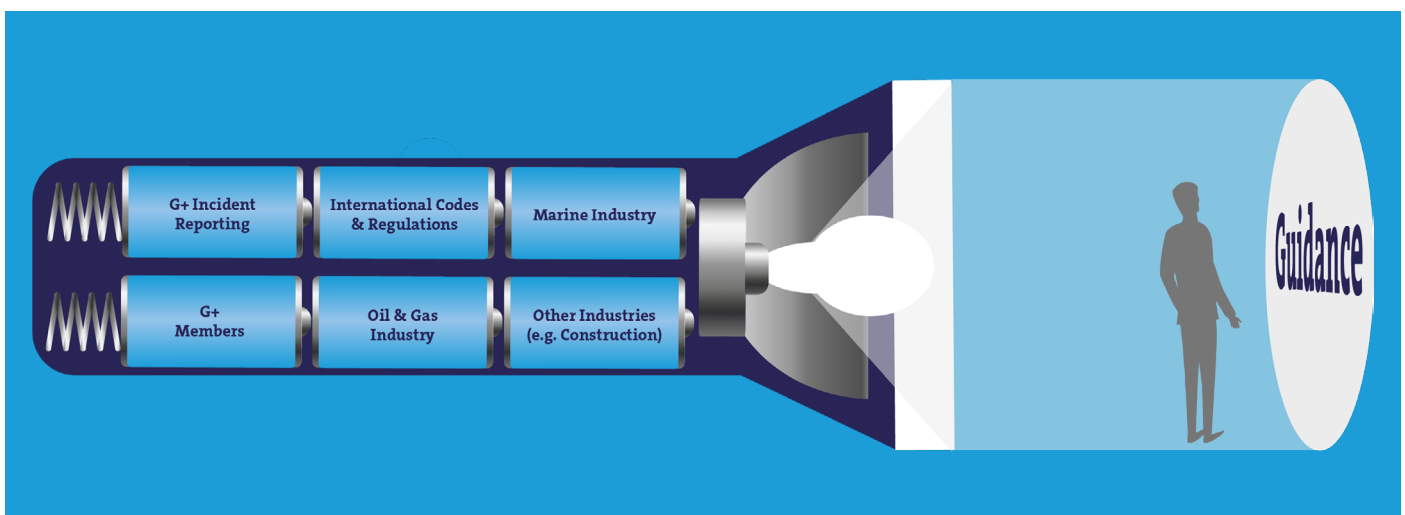


## Introduction

The G+ is uniquely placed to draw on expertise across the whole global sector, as well as adjacent sectors such as marine and oil & gas. This enables us to bring together decades of experience and data to make offshore wind safer.

One of the ways we do this is by producing guidelines on areas of high risk, for the purpose of sharing knowledge and experience and bringing about consensus within the industry. Each Good Practice Guideline (GPG) addresses a specific topic, usually in response to feedback or data that demonstrates the potential for a serious incident.

This is a collaboration between key organisations with expert knowledge of the topic. The aim is not to produce new standards or requirements, but rather to draw together and synthesise existing best practice from diverse, related stakeholder groups. This enables a consensus approach that ultimately delivers an authoritative single reference.



## A standard approach

One of the key tasks that faced the original members of the G+ (then the G9) was to agree on a set of standard definitions and terminology - a core requirement to facilitate knowledge sharing and collaboration. Once in place, this formed a solid basis for discussion, measurement and benchmarking that was formalised within the incident data collection and reporting.

In turn, this shone a light on the areas of high risk. G+ members now had a safe forum in which to discuss what the data was saying versus intuition and previously held beliefs. For example, many had intuitively felt that working at height was one of the critical areas of high risk but the data indicated that manual handling incidents presented more of a hazard.

The Good Practice Guidelines are not intended to create new protocols necessarily, but to harmonise and align existing best practice and augment them where required for the specific conditions of offshore wind. Sometimes, topics are a closer fit for a G+ partner organisation, in which case the G+ supports and contributes rather than leads the work. The important thing is to bring certainty and consistency to offshore wind stakeholders where previously there was little or none.

## Building a global supply chain

As the market continues its growth on a global basis, emerging markets mature and new markets open up, the supply chain and workforce will expand. There are often very different practices in different countries even where equipment and technology is standard. At best, this forces unnecessary retraining (with the associated impacts on cost and morale) and at worst it exacerbates the chance of errors.

The safest and most efficient way to tackle this is by sharing established ways of working and minimum standards. Standardisation activates a highly skilled, mobile workforce to support projects anywhere in the world. It enables new organisations to successfully participate in the international supply chain. It reduces risk and cost for developers and it gives confidence to policy makers, regulators, investors and communities.

Of course, this is not a simple task and a “one size fits all” approach will not work. Markets around the world are at different stages and growing at different paces. The set of drivers and challenges they each face are unique, as are the legal, political, environmental and commercial models in which they operate.

For this reason, we are working with our international networks and supporting the industry bodies, policy makers and supply chains that are already active. This enables us to identify the gaps we can help to fill and how we can adapt our resources and publications to be most valuable. This includes translations into other languages but it is primarily about engaging, consulting and learning.



If all of our clients had different demands it would be very difficult to train our people in the right way, to develop equipment in the right way. And when we go into new markets, we deal with new suppliers, we evaluate, help and support them. So, we are very happy about G+'s approach to standardising procedures and agreeing on designs. It's cost-effective but, more importantly, it makes working safer.

Fritz Wiedemann  
Head of HSE Offshore Wind and Oil & Gas  
Van Oord

## Leading adoption and change

**Whilst the G+ Good Practice Guidelines are not statutory requirements, they are the minimum standard required to meet industry health and safety expectations.**

They are increasingly adopted by the major developers and supply chain leaders as part of the procurement and contracting process. This helps new supply chain entrants and new markets understand what is expected as a minimum level. Partner organisations such as IMCA share the standards with their members and they are one of the inputs into GWO training courses, which helps to speed up supply chain growth in mature and new markets alike – safely and efficiently.



## Good Practice Guidance Documents

```
graph TD; A[Good Practice Guidance Documents] --> B[Working at height in the offshore wind industry]; A --> C[The safe management of small service vessels used in the offshore wind industry]; A --> D[Good practice guidelines for offshore renewable energy developments]; A --> E[Case study on reducing manual handling and ergonomics related incidents in the offshore wind industry]; A --> F[Reliable securing];
```

### **Working at height in the offshore wind industry** (first published 2014, updated July 2018)

Incident data showed that working at height was one of the areas with the greatest number of high potential incidents reported. The GPG was developed in response to that, and with a view to integrating with other relevant guidelines, such as dropped objects prevention.

[Download here](#)

### **The safe management of small service vessels used in the offshore wind industry** (First published 2014, updated Jan 2018)

Shortly after its inception in 2012, the G+ commissioned this work, recognising that whilst existing guidelines used in the marine and oil and gas sectors are applicable, there are some unique aspects to offshore wind farm projects that warrant specific guidance. As the sector grew, it was recognised that offshore wind farm sites were growing in all dimensions (capacity, area, distance from shore, turbine size). This led to different types of vessels being used and a change to vessel strategies. For that reason, the GPGs were reviewed and updated in 2018.

[Download here](#)

### **Good practice guidelines for offshore renewable energy developments** (Published October 2019)

The GPGs help organisations identify and mitigate risk to life within their operations. They provide a structured approach to assess hazards and identify the most robust and appropriate emergency response measures, based on each organisation's unique operational circumstances.

[Download here](#)

### **Case study on reducing manual handling and ergonomics related incidents in the offshore wind industry.** (Published February 2020)

Offshore wind industry operators are at risk of musculoskeletal injuries and disorders when performing manual handling activities. The case study is based on analysis of incidents, assessment of a sample of industry activities, a systematic review of regulatory requirements, observation of good practice and stakeholder engagement, including peer review by G+ members.

[Download here](#)

### **Reliable securing** (Published June 2019)

HSE incident data collected by the G+ since 2012 demonstrated that dropped objects are a high risk area and represent an important threat to safety. In 2017, 169 incidents were recorded, of which eight resulted in lost work day incidents, and a further 38 % were classified as being high potential. The following year, despite a reduction in the number of dropped object incidents, 59 % of them were classified as high potential.

[Download here](#)



[www.gplusoffshorewind.com](http://www.gplusoffshorewind.com)

