



GLOBAL WIND
ORGANISATION

Ensuring a safe and renewable future

Why we need to
commit to the
right training

November 2021

Global Wind Organisation creates and maintains the benchmark for safety training standards in the wind energy sector. Its standards were designed by the industry for the industry. GWO's members are the leading global wind turbine manufacturers and owners, representing most of the installed wind energy capacity around the world. It's their employees who go to work every day to help produce clean energy at cheap prices. Safety matters. That is why GWO was created in 2012, as a non-profit organisation formed by those member companies to introduce standards such as Basic Safety Training (BST) to ensure a baseline of competence in the industry. There should be no doubt that the standards GWO has introduced since its foundation have met the challenge to produce a framework for training that is specific to a wind energy environment. This has been confirmed by the rapidly growing network of training providers around the world, certified according to GWO Requirements. A network that is also providing affordable training to match the needs of the wind energy sector. In this report, GWO will underline the importance and relevance of its training standards. It will also highlight why domain specific training is superior to training not designed for the wind industry. This evidence-based argument, supported by a gap analysis, will dispel the myth that the skills and the training in the wind sector should be the same as that for other industries. Any delay in adopting GWO standards will cause harm to the industry. Now is the time to commit to the right wind training training.

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Introduction

Jakob Lau Holst, CEO Global Wind Organisation



As efforts to combat the threat of climate change ramp up across the global economy, the role of the wind industry in powering the low carbon energy transition has never been more significant.

Globally, wind is set to become a \$1 trillion industry by 2030, according to the IEA, and has already grown by over 30% per year between 2010 and 2019. With COP 26 marking a key point in 2021, GWO and Global Wind Energy Council took the opportunity to have looked at the implications for new workers focus with a new report, The Global Wind Workforce Outlook 2021-2025.

Its conclusions were that by 2025, over 480,000 GWO trained wind technicians will be required in construction, installation, operations and maintenance. More than this, the impacts of these jobs ripple out to further job creation in supporting value chains and exciting new job markets. Close to home this means many more instructors to help create a workforce with the right skills and safety mindset to avoid injury on site. For training providers, colleges, universities, and other institutions the opportunities are tremendous.

To fuel this growth new employees often transition from other sectors. Since 2012 they have benefitted from a standardised framework for safety training easing their access into wind energy careers. This is particularly true in relation to technicians working on construction, installation, operations and maintenance of wind farms.

A large background image showing a sunset over a body of water. In the foreground, several people are silhouetted against the bright, low sun, appearing to be working on a beach or tidal flats. In the background, a line of offshore wind turbines stretches across the horizon. The sky is a mix of orange, yellow, and blue.

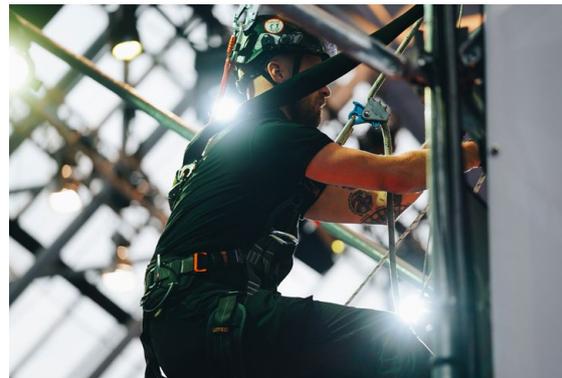
Offshore wind is set to become a **\$1 trillion** industry globally by 2030

These new roles provide a bright future and one of the most important pathways for the many specialist workers transitioning from the oil & gas (O&G) industry. This sector's long-term employment prospects are declining rapidly, with an estimated 12,000 North Sea jobs lost in 2020 alone¹ and in the USA oil field services employment fell by 15.5% from 2019 to 2020, represent annual wages of approximately \$13.1 billion.

This transfer of human capital is a critical element of the journey to greening global energy operations. Yet the wind power work environment differs greatly from O&G in health and safety terms, presenting a very different context for workers.

While there is inevitably crossover between the hazards encountered on turbines and rigs, the working environment is, in many respects, fundamentally alien to O&G workers. For example, contact with specialist machinery is vastly different, as are the most common risks of working at height, dropped objects, electrical hazards, fire and a working environment that makes rescues and first aid situations more difficult in wind turbines.

For the offshore wind sector construction and operational maintenance add additional risks, such as harsh weather, falling into water and unforeseen vessel movements from large waves when transferring from the crew transfer vessel onto the foundation transition piece of an offshore turbine.¹



¹ <https://osha.europa.eu/en/publications/reports/occupational-safety-and-health-in-the-wind-energy-sector>.



“All GWO training modules are more in-depth than BOSIET training – especially working at height”

Paul Bellingham
OSW worker
(previously O&G)

As the market continues to grow, ensuring that the right training and standards are in place is key to establishing and maintaining a safe working environment, building a strong foundation to safeguard the OSW workforce for years to come.

The Global Wind Organisation (GWO) Basic Safety Training Standard (BST) is a qualification mandated by wind energy employers as a prerequisite for their own staff and contractors to be completed before they are allowed on site. Each aspect of the course is designed to ensure safe working conditions in and around the unique requirements of offshore wind turbine construction, installation, and maintenance, with core elements structured around:

- First Aid
- Fire Awareness
- Manual Handling & Working at Heights
- Sea Survival

An independent gap analysis (see page 13) demonstrates that there is only a 15% overlap between the learning objectives contained within BOSIET (basic offshore safety induction and emergency training mandated in the O&G industry) and three of the GWO Basic Safety Training (BST) modules (Sea Survival, First Aid and Fire Awareness).² **The other two BST Modules (Working at Heights and Manual Handling) are not covered at all**, further reducing equivalence between the basic safety training packages of the two industries to below 10%.

There is significant work to be done to ensure that all workers are sufficiently trained, upskilled and protected to face a plethora of risks in the OSW context.

² GAP Analysis, Global Wind Organisation

Domain Specific Training

Why safety dictates you should 'train as you fight'

All GWO standards are designed to achieve learning objectives, so the participant can demonstrate to their instructor that they have the knowledge, skills, and ability required to work safely in a wind turbine environment.

Like a sparring match before the big fight, GWO course modules are therefore designed to match as closely as possible the scenarios a technician will encounter at work on a wind turbine.

First Aid

GWO First Aid sets the standard for first aid training in the global wind energy and renewables industry onshore and offshore. A combination of practical and theoretical training provides the skills and knowledge to administer safe and effective first aid and enables work in a safe manner that meets emergency response requirements in accordance with GWO Basic Safety Training (BST).

The use of scenario-based training is a foundation of GWO First Aid, allowing participants to demonstrate their abilities in as realistic scenario as possible. Such training embraces the knowledge and the skills participants need to be able to assess, assist and provide correct first aid during an incident.

With GWO First Aid training, participants are able to demonstrate their ability to:

- Manage incidents by approach and through assessment
- Provide the necessary lifesaving first aid in an incident
- Use first aid equipment correctly
- Display the knowledge and skills for automatic external defibrillator (AED) safety procedures and use an AED correctly

This scenario-based training takes place in groups with one or more participants acting as first aiders, while the others act as casualties or observers. Each participant acts as the first aider at least once. Training providers combine the first aid situations and must include one scenario-based on an electrical incident.

The ability to train in as realistic environment as possible is highlighted by recent findings from the G+ Global Offshore Wind Health and Safety Organisation 2020 incident data which demonstrate that the nacelle, a remote area of the turbine with heavy equipment inside such as the gearbox, is the area with the greatest number of accumulated historical incidents from 2014 to date.

G+ reported that in 2020, the nacelle was the second highest area for the number of incidents and injuries, amounting to 78 – a year-on-year decline of 18%, and the lowest since 2017.³ Despite increased working hours in 2020, 17 recordable injuries were reported with no change on the year before.

Most incidents within the nacelle occurred during routine maintenance tasks. However, incidents during lifting operations and working at height in the nacelle decreased by 33% and 80% respectively from the previous year, because of improved turbine design, improved maintenance practices to decrease exposure to hazards, as well as standardisation of procedures within the turbine.

Although high potential incidents within the nacelle in 2020 (16) were the lowest since 2015 (33), lost workday injuries rose by 33% due to manual handling incidents – the largest on record.



Fire Awareness

Like the O&G industry, offshore wind also has a risk of fire or explosion, due to the nature of working with various mechanical and electrical components where failures can occur and potentially lead to fire.

Although the blades are constructed from combustible materials, potential ignition sources are mainly inside the nacelle, where there are hot surfaces in the gearbox, generator, brake system, pumps and transformer. In combination with the possible presence of combustible hydraulic and lubricant oil and solid combustible material in the nacelle, a fire can ignite and develop.

Other causes of fire include:

- After maintenance (the highest frequency)
- Lighting strike (although, this has been reduced with design changes)
- Electrical failure
- Hot surface ignition
- Hot work maintenance

³ G+ Global Offshore Wind Health and Safety Organisation 2020 Incident Data

While the risk of fire in offshore wind is rare, the remote location of most wind projects and the sheer height of most turbines mean fire-fighting efforts, if needed, are often too little too late. Once ignited, it is tough to prevent a fire from spreading.

In addition, off shore wind turbines can experience high waves that frustrate fire fighting efforts making it virtually impossible. Other areas for consideration include:

- To what degree do you attempt to put the fire out vs avoiding spread?
- Can you evacuate by the normal access door at the base of the tower?
- What is the means of escape? Do you need to initiate the self-rescue procedure from the nacelle or the rotor?
- Can the escape procedure, such as attaching the ropes/harness for an emergency descent, happen easily in a given scenario?
- When to call land based emergency services, Coast Guard, and marine traffic controller?
- Who is controlling the crew boat for off-shore wind turbine evacuation?

As such, comprehensive fire-safety training is important to effectively avoid risk and serious losses. GWO Fire Awareness training achieves domain specific learning objectives so technicians can:

- Understand the main causes of ignition in a wind turbine, and identify high-risk materials.
- Take measures to reduce the risk of outbreak of fire.
- Extinguish a fire on a wind turbine.
- Evacuate a wind turbine, in the instance of fire or explosion.
- Alerting authorities to an offshore wind fire.

"A great addition to the basic training, when compared to the BOSIET, was the Working at Height training"

Chaz Simpson
OSW worker
(previously O&G)

Manual Handling & Working at Heights

Perhaps owing to the fact wind is a renewable energy source – and therefore seen as environmentally friendly and safe – it is not widely recognised that offshore wind energy operations are hazardous and could be considered a high-risk industry.

On the contrary, the offshore workplace is dangerous. Employees must be able to perform heavy manual labour, including windlass work and frequent climbing of ladders and stairs (e.g. for 30 minutes continuous, usually several times a day). Part of the work must be performed at great heights and under often rapidly changing weather conditions.

Therefore, the process of **working at heights is literally an occupational hazard for the wind turbine technician**. Moreover, industry data shows that injuries occurring in the process of manual handling, for example carrying items, equipment, tools, etc – are the second most common⁴ for a wind turbine worker.

Examples of such hazards include:

- Falls from heights
- Mechanical hazards such as contact with moving parts
- Complex lifting manoeuvres in confined spaces
- Dropped objects

As such, if the potential risk of these scenarios is higher in offshore wind, there must be different hazards and approaches that require specific preparation to work in this environment.

When looking at approaches, other training standards simply do not provide enough training specific to this environment to permit work on a wind turbine (see Figure 1).

GWO training covers how to perform basic rescues at height which is crucial, particularly when considering the difference in environment between an oil rig (with plenty of surface area) and a wind turbine.

Furthermore, the use of standard wind industry fall arrest systems on ladders (including boat landing ladders), and related rescue equipment, is only covered in the GWO WAH syllabus. It is not covered in BOSIET or other rope access training standards.

For both these reasons, the Manual Handling and Working at Heights course module is an essential training for wind turbine technicians.

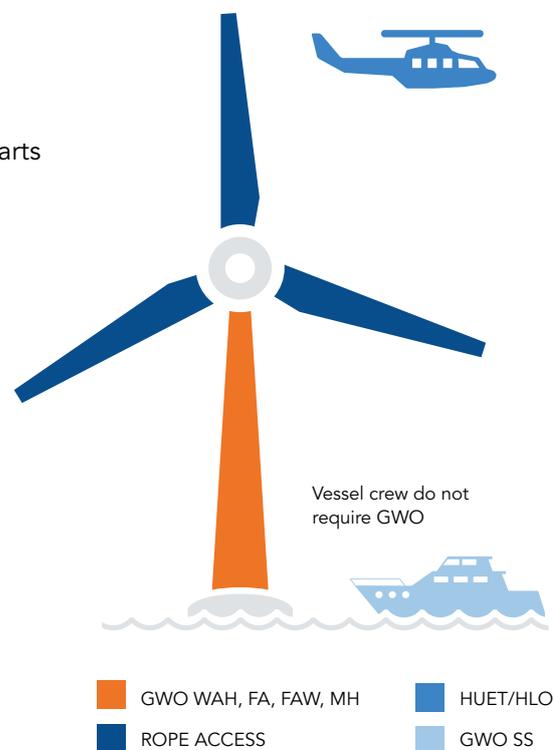


Figure 1: Access Zones for Different Training Standards (Duty holder may request others depending on work order)

⁴ G+ Offshore Wind 2020 Incident Data Report, p.10

Sea Survival

Working on an offshore wind turbine presents unique risks associated with operating specialist equipment at sea, principally arising during the transfer between boats and the OSW platform and through the course of workers manning equipment in an exposed environment.

While there is clearly overlap between the risks presented to workers in OSW and O&G contexts, life and work on an OSW turbine demands specific expertise regarding safety and survival at sea during everyday operations.

The GWO BST Sea Survival was created in recognition of the domain specific risks associated with the OSW environment, in the absence of any other standardised training that adequately prepares workers for the risks they might encounter while operating an OSW turbine.

By undertaking the GWO BST Sea Survival module, workers are prepared to work on an array of offshore wind installations, whether it be wind turbines, construction vessels, accommodation platforms or transformer stations. Trainees on the programme learn personal survival techniques and methods of safe transfer between vessels and installations, with the practical element of the course delivered in both indoor pool and outdoor contexts.

Following completion of the course, trainees have the demonstrable ability to perform a safe transfer, and knowledge of the range of challenges that they might encounter while operating OSW platforms.



Trainees are fully equipped to face the stress and decision-making pressures of an emergency evacuation by having:

- Knowledge of international and national legislation regarding health & safety.
- Demonstrable abilities to inspect and use the suits and life jackets used in the offshore industry.
- Experience of a range of scenarios, including safe conduct at work situations, emergency situations and contingency plans.

A core part of the module focuses on lifeboats, life rafts, and life buoys, as the principal risks arising during work in the OSW industry occur during the transfer of workers from crew transfer vessels onto OSW platforms. As such, trainees build familiarity with launchable life rafts and are able to respond during a training exercise with a capsized raft.

Techniques to enhance survival at sea, including the treatment of coldness and hypothermia is a key focus area. That said, while drowning and hypothermia are potential hazards to workers in OSW contexts, they are not the major concern for wind turbine technicians and their employers. During boat journeys, the vessel crew assume responsibility for the safety of those on board, with the boat crew's safety skills taking precedent in any incident.



The most common risks associated with this area are during the transfer from boat to the transition piece at the base of a turbine and back. Helicopter hoists, safe entry into water from a height and the operation of life rafts all fall in scope of the module, given that offshore installations and vessels are encountered day to day in the offshore industry.

In light of the variety – and severity of hazards – outlined above, the GWO BST Sea Survival module must be a prerequisite for all workers in an OSW context, regardless of their background. Assumption of past experience, and reliance on BOSIET training, cannot be viewed as sufficient to prepare workers for the specifics of sea survival in an OSW environment.

Debunking the myth

Top 25 hazards and risks

-  Behavior/Human error
Partially covered in several standards
-  Rigging/Slings/Winching
 Slinger Signaller-Rigger
Signal Person
-  Crane use
Not covered
-  Working at heights
 BST Working at Heights
-  Emergency response/First aid
 BST First Aid/Enhanced
First Aid
-  Working with hand
& power tools
 BTT
-  Electricity – working on
energized systems
 Standard being developed
-  Electricity – working in
high voltage
Not covered
-  Ergonomic
 BST (Manual Handling, WaH)
-  Dropped/Falling objects
 BST Working at Heights/Slinger
Signaller-Rigger Signal Person
-  Transfer by Vessel
 BST Sea Survival
-  Falling at the same level
- slip and trip
 BST (various modules)
-  Falling on different level, <2m
 BST Working at Heights
-  Manual handling or carrying
 BST Manual Handling
-  Vehicle driving
Not covered
-  Emergency and rescue (offshore)
 Enhanced First Aid/BST Sea
Survival
-  Fire or explosion
 BST Fire Awareness
-  Working in restricted spaces
 GWO Advanced Rescue
-  Working with lifts/elevators
 GWO Lift user
-  Demolition (decommissioning)
Not covered
-  Exposure to extreme temperatures
 Enhanced First Aid/BST Sea Survival/
BST First Aid
-  Inadequate fitness to work/medical
Not covered
-  Excavation/civil works
 BTT Installation
-  Transfer by helicopter
Not covered
-  Diving
Not covered

Spot the difference(s) between wind safety and oil & gas training

This report has established how domain specific training, like GWO, achieves the learning objects that give training participants the knowledge, skills, and abilities to work safely on a wind turbine.

It is important to underline the substantial differences between GWO standards and their most frequent comparators. A gap analysis was commissioned by GWO to compare (line by line) the GWO BST and OPITO BOSIET training standards. The analysis was conducted independently by three UK based training providers who deliver both courses. The analysis was carried out in the hope, rather than expectation, that there would be some overlap between the two standards. As you can see from the results below, the cross-over is minimal, underlining further that BST is the passport to working safely in the wind sector.





First Aid

A common theme across the gap analysis is that there is a lack of domain specific scenario-based training in BOSIET that would be appropriate for a wind turbine technician.

For example, of the 27 first aid learning objectives contained in BST, **only 4% are covered in BOSIET training**. This equates to just 27 minutes of training fully covered by BOSIET. Some 285 minutes are not covered. In addition, participants would need another 12.8 hours to catch up between BOSIET and BST in first aid training.

Furthermore, BOSIET features **no scenario-based training and no secondary survey for participants to demonstrate their ability to manage minor incidents**, to assess and apply the necessary first aid and display the correct use of first aid equipment. This demonstrates statistically a lack of overlap in modules between the BOSIET and GWO Basic Safety Training standards.



Fire Awareness

Only 29% of the 17 GWO BST Fire Awareness learning objectives are covered in BOSIET training.

For example, BST includes learning objectives where participants demonstrate knowledge and understanding of hazards unique to a wind turbine, as well as pre-use inspection of various firefighting equipment specifically found in a wind turbine.

The resulting training gap amounts to almost three hours, which participants would have to catch up to meet this employer required training.



Working at Height & Manual Handling

There is no overlap between the training GWO provides for these modules, not only with the BOSIET training, but any other global standard curriculum. The resulting training gap is 16 hours.



Sea Survival

There are major gaps, and minimal overlap, between the BOSIET and GWO BST Sea Survival course module. For example, **only 26% of the 27 Sea Survival learning objectives are covered in BOSIET training** – which equates to just 43 minutes of training that are fully covered compared to almost four hours that are not covered.

Most significantly of all, advanced level skills (including safe transfer between dock, vessel and wind turbine) are absent from BOSIET. Lesson elements that require three hours' training alone.

Summary

Jakob Lau Holst, CEO, Global Wind Organisation

As investment grows in the low-carbon energy sector, demand for jobs in the offshore wind industry are soaring. At the same time, employment in oil and gas is falling off. But the safety training in the two industries is not interchangeable.

To maintain the highest safety standards, as well as encourage productivity, the GWO, a non-profit organisation set up by the industry's leading players, has created a solid framework of safety training standards focused on working in wind energy.

Thanks to the industry-specific nature of the teaching and the scenario-based instruction, GWO's safety training (supplied by a network of certified providers around the world) is superior to all others.

The costs of the GWO training are not prohibitive, either to the prospective employer or employee funding courses.

It is in the best interests of the industry – and those who work in it – for all parties to adhere to GWO's safety training standards.

The transition to OSW is achievable and now is the time for us all to come together and realise that this is a reality for all.

Methodology

Gap analysis with GWO standards is conducted using an Excel based gap analysis matrix, which allows the user to compare any course with its GWO counterpart.

To evaluate similarities and differences between two training courses, each GWO lesson element is compared, line by line with the corresponding training, generating a percentage match with the learning objective of that lesson. The higher the percentage, the greater the similarity with a GWO standard.

The gap analysis between OPITO BOSIET and GWO BST was carried out using this toolkit by three UK based training providers, each of which deliver both standards. This is important as it allows them to conduct a side-by-side comparison of the course materials. Following completion of the three matrixes by each training provider, these were submitted to GWO's training development team for moderation.

About GWO

Global Wind Organisation is a non-profit body founded by leading wind turbine manufacturers and operators, to create a safer and more productive workforce. GWO members strive for an injury free work environment in the wind turbine industry, setting common international standards for safety training and emergency procedures.

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