

# Lessons Learned from Offshore Wind (OSW)

# Data Background



## Members



## Associate Members



## OSW Safety statistics for 2020

	2014	2015	2016	2017	2018**	2019	2020
Hours Worked*	23,710,000	21,220,000	21,726,000	26,815,000	25,359,000	22,374,000	25,318,000
Fatalities	0	0	0	0	0	0	0
Lost work day injuries	44	41	43	49	39	62	43
Restricted work day injuries	14	32	35	30	34	23	30
Medical treatment injuries	85	53	42	78	45	38	22
Total	143	126	120	157	118	123	95
<b>Total recordable injury rate (TRIR)</b>	6.03	5.94	5.52	5.85	4.65	5.50	3.75
<b>Lost time injury frequency (LTIF)</b>	1.86	1.93	1.98	1.83	1.54	2.77	1.70

# OSW 2020 Key facts and figures

## Key facts

743	Reported incidents and injuries <sup>2</sup>
0	<b>Fatalities</b>
43	total <b>lost work day</b> injuries
20	incidents resulting in an <b>emergency response or medical evacuation</b>
386	incidents occurred on <b>operational</b> sites <sup>4</sup>
306	incidents occurred on <b>construction</b> sites <sup>5</sup>
43	incidents occurred on <b>development</b> sites <sup>7</sup>

## Top three work process

94	incidents during <b>lifting operations</b> <sup>3</sup>
60	incidents during <b>manual handling</b>
57	incidents during <b>access/egress</b>

## Incident areas

241	Incidents occurred in a <b>turbine</b> <sup>6</sup>
232	Incidents occurred on <b>vessels</b> <sup>8</sup>
207	Incidents occurred <b>onshore</b> <sup>9</sup>

## OSW Incident area analysis: Crew Transport Vessels (CTVs)

CTVs are used to transfer personnel to and from offshore wind farms. Therefore, incidents involving CTVs can impact many individuals. In 2020, one incident involving a CTV caused three first aid injuries.

- Main incident area in 2020:
  - 79 incidents
  - 27% of the incidents were high potential
  - 37% of lost work day incidents – manual handling
- Improvement measures:
  - Constant overview on the bridge
  - Mandatory use of seatbelts
  - 2021 G+ CTV workstream focus on: fatigue, manning levels, vessel suitability and manual handling improvements



## OSW Incident area analysis: Nacelle

The nacelle is the housing at the top of a wind turbine which houses the generating components such as generator, gear box, and drivetrain. It is the area with the greatest number of accumulated historical incidents.

Most incidents within the nacelle occurred while undertaking routine maintenance tasks.

Lost workday injuries within nacelle increased by 33% as a result of manual handling incidents.

Improvement measures:

- Turbine design
- Maintenance practices to decrease exposure to hazards
- Standardization of procedures within the nacelle



## OSW Lost work day injuries

A total of 43 lost work day injuries were reported in 2020

- 40% of lost work day injuries occurred predominantly within the nacelle
- 38% occurred within a vessel
- Manual handling activities accounted for the majority of lost work day incidents
  - Over 50% leading to back injuries.

Improvement measures:

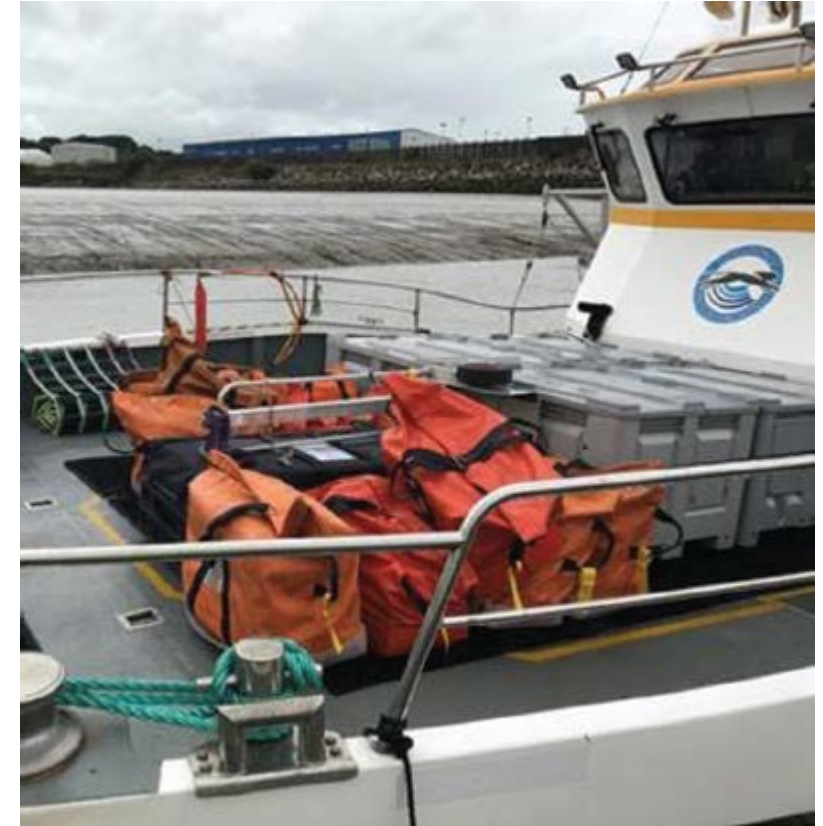
- G+ is currently working on a guidance document for assessing the specific physical requirements of offshore wind farm technicians.
- In 2020 the G+ published a case study to provide a summary of key learnings and requirements for effective prevention of manual handling injuries

## OSW Case Study of Manual Handling: CTV

Example of incident:

**Moving items around on CTV:** technician strained back while moving equipment around on deck.

- Common for a CTV to transfer number of teams to different assets
- Consequently, can be large number of bags on board
- Space limited so may be need to move and lift over other bags
- This 'double handling' increases frequency of lifts
- Movement of vessel throws people off balance
- Bags vary in weight, shape and size – unanticipated heavy load
- Time pressure may influence poor handling





## OSW Case Study of Manual Handling: CTV (continued)

### Risk controls:

#### *Boat design:*

- Avoid or limit use of CTVs with different levels in deck storage and lifting areas
- Create demarcated areas so items for one asset can be grouped easily

#### *Equipment:*

- Provide scissor lift or equivalent to help raise items to different level
- Provide slip ramps so items can be more easily moved up stairs

#### *Planning/work organization:*

- *Ensure careful work planning when visiting multiple assets*
- *Understand items to be moved and correct order for staging*

#### *Items:*

- Reduce weight of items to be handled
- Color code back for weight identification

#### *Training:*

- Provide training on manual handling and work environment
- Training and guidance on communication protocols for manual handling with teams

#### *Procedures/policy:*

- Comprehensive manual handling policies and procedures
- Utilize good practice guidelines
- Communicate appropriately

# OSW Case Study of Manual Handling: Nacelle

Example of incidents:

**Maintaining equipment in nacelle:** technician was working in nacelle unfastening bolts on brake calipers, the bolt released suddenly and the tech struck head against shaft cover.

**Working in nacelle:** operator tightening bracket down a shaft using long T bar with Allen key end. Small, tight area required arms extended upwards through gap. Report from operator of tingling sensation in hand.

- Majority of service/maintenance activity performed in nacelle
- Despite range of tasks, many similarities, such as:
  - Movement of tools, kit bags, consumables, parts and equipment, etc.
  - Preparation of work area
  - Clean up, pack away, transfer to next task
- Retrofitting equipment after installation can be difficult to complete
- Workspace generally limits
- Floors may not be level in some turbine nacelles
- Limited pace making tool use difficult
- Awkward body positioning – small spaces, tight angles, arms outstretched



## OSW Case Study of Manual Handling: Nacelle (continued)

### Risk controls:

#### *Design for access/layout:*

- At design stage, sizing nacelle for sufficient people access
- Ensure known high failure/service items positioned and located for easier access

#### *Equipment:*

- Where crane not available, alternative systems such as ropes and pulleys, may have to be set up

#### *Planning:*

- Extremes noted in work planning – temperature, night work, rain, etc.

#### *Housekeeping:*

- System of work requiring cleaning of oily surfaces
- Suitable catch pans for persistent leakages occur

#### *Workspace:*

- Design for safe access for maintenance
- Develop custom tools/equipment – lighter, extendable

#### *Training:*

- Provide training on manual handling and work environment
- Training and guidance on communication protocols for manual handling with teams

#### *Procedures/policy:*

- Comprehensive manual handling policies and procedures
- Utilize good practice guidelines
- Communicate appropriately



## Lessons Learned from Offshore Wind (OSW)

© Equinor ASA

This presentation, including the contents and arrangement of the contents of each individual page or the collection of the pages, is owned by Equinor. Copyright to all material including, but not limited to, written material, photographs, drawings, images, tables and data remains the property of Equinor. All rights reserved. Any other use, reproduction, translation, adaptation, arrangement, alteration, distribution or storage of this presentation, in whole or in part, without the prior written permission of Equinor is prohibited. The information contained in this presentation may not be accurate, up to date or applicable to the circumstances of any particular case, despite our efforts. Equinor cannot accept any liability for any inaccuracies or omissions.