Case study on reducing manual handling and ergonomics related incidents in the offshore wind industry

G+ Global Offshore Wind
Health & Safety
Organisation

In partnership with

energy institute

CASE STUDY ON REDUCING MANUAL HANDLING AND ERGONOMICS RELATED INCIDENTS IN THE OFFSHORE WIND INDUSTRY

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FOREWORD

Offshore wind industry operators are at risk of musculoskeletal injuries and disorders when performing manual handling (MH) activities, and in particular when those are uncontrolled. These activities can include handling heavy items (tooling, equipment, kit bags and personnel bags), repetitive tasks, working in restricted spaces and working above shoulder height.

The Energy Institute (EI) and the G+ Global Offshore Wind Health and Safety Organisation (G+) have produced this first edition case study on preventing MH and ergonomics (MH&E) related incidents in the offshore wind industry.

The primary audience for this document are those involved in the design, specification and procurement of both offshore and onshore renewable assets. Those involved with the assessment and management of health and safety at work, namely managers, and health and safety (H&S) specialists, may also find the task-based scenarios of particular interest.

The case study is based on analysis of offshore wind industry incidents, assessment of a sample of offshore wind industry activities, a systematic review of regulatory requirements, observation of good practice and stakeholder engagement, including peer review by G+ members.

1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This document provides support and practical examples to help reduce MH&E related incidents in the offshore wind industry.

The requirement for support and guidelines to reduce MH incidents in the offshore wind industry originates from:

- Reporting that indicates that MH injuries are one of the largest causes of lost working day incidents within the offshore wind industry.
- The fact that MH tasks potentially involve handling very heavy items (often as team handling operations).
- The nature of working conditions that increase MH risks, e.g. working in restricted space within the asset, dragging bags/items onboard crew transfer vessels (CTV) and working in adverse environmental conditions.
- The fact that the offshore wind industry is expanding, creating a larger workforce and therefore more opportunities for incidents to occur.

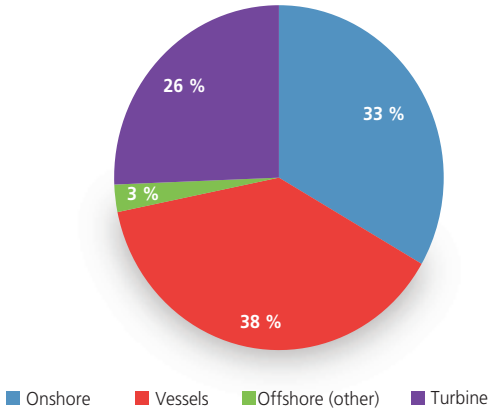

Figure 1: Lost work day incidents in 2018

The primary audience for this document are those involved in the design, specification and procurement of both offshore and onshore renewable assets. Those involved with the assessment and management of H&S at work, namely managers and H&S specialists, may also find the task-based scenarios of particular interest:

- project designers/engineers (the individuals responsible for designing or procuring new wind turbines, ensuring they are easy to operate and maintain);
- managers (decision makers that establish the organisational culture, and develop and enhance management procedures), and
- members of the H&S team (those responsible for protecting the health, safety and wellbeing of people who work, conducting risk assessments and enhancing safety management arrangements, e.g. training, developing procedures).

This document should also be used as a source of valuable experience by companies to inform internal guidance and training for senior technicians and supervisors (those who manage and oversee how work is carried out, and also provide support with MH risk assessment).

1.2 SCOPE OF THE DOCUMENT

The document is aimed at organisations working in the offshore wind industry involved in both construction and operations and maintenance (O&M), but with a specific focus on O&M. The information covered is likely to be relevant for all offshore wind farms, whether their operations are in an early stage of construction or existing operational sites.

Figure 2: Offshore wind industry: construction and O&M

The information provided within this document considers:

– MH issues across a range of areas from shore (warehouse, port/quayside) to vessel to asset (substation/foundation/transition piece (TP)/nacelle), and
– type of MH injuries, including acute (occurs suddenly during activity, often a sprain or strain) and chronic (i.e. pain and injury that develops slowly and is persistent, long-lasting or recurring).

The document does not consider:

– Other types of incidents or injuries that might be associated with construction or O&M tasks in the offshore wind industry, such as injuries relating to electrical shock (e.g. burn, cardiac arrest), falls from height or injuries from dropped tooling and equipment.
– Climbing ladders and working with items at height, which is covered by the G+ *Good practice guideline working at height in the offshore wind industry*.

1.3 DEFINITIONS

1.3.1 MH

The European Council (EC) Directive 90/269/EEC on the minimum H&S requirements for the manual handling of loads where there is a risk particularly of back injury to workers defines MH as:

'*…any transporting or supporting of a load, by one or more workers, including lifting, putting down, pushing, pulling, carrying or moving of a load, which, by reason of its characteristics or of unfavourable ergonomic conditions, involves a risk particularly of back injury to workers.*'

According to the Manual Handling Operations Regulations (MHOR), a manually handled item may be moved or supported by the hands or any other part of the body; for example, the shoulder. MH also includes supporting an item in a static posture, and the dropping or throwing of an item.

Using human effort for a purpose other than to transport or support an item (e.g. using a spanner to loosen a bolt) is not strictly considered to be an MH operation under the EC directive. However, for the purposes of this case study such activities are also considered where incident data indicate the activity to be a risk for injury for technicians carrying out maintenance work in the asset.

MH activities are regulated through EC Directive 90/269/EEC on the minimum health and safety requirements for the MH of items where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC).

1.3.2 MH Injuries

According to guidance on the UK MHOR:

'*Manual handling injuries are part of a wider group of musculoskeletal disorders (MSDs). The term 'musculoskeletal disorders' covers any injury, damage or disorder of the joints or other tissues in the upper/lower limbs or the back.*'

1.3.3 Chronic and acute injuries

MH can cause both acute and chronic injury.

An acute injury occurs suddenly during an activity. These are typically sprains, such as overstretching a ligament connecting bones by overstretching a knee, or a strain of a muscle or tendon, such as due to overstretching and tearing the muscle or tendon.

A chronic injury is typically due to overuse of a part of the body or from long-standing conditions. Typical examples include tendonitis, arthritis, lateral epicondylitis (tennis elbow) and repetitive strain injury (RSI). Repeated acute injuries may also contribute to chronic injuries.

1.3.4 Ergonomics

The International Ergonomics Association (IEA) defines ergonomics as:

'The scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance.'

In the context of this document, ergonomics is considered to relate to design, such as the physical layout of the work environment (e.g. nacelle, vessel, etc.) and the design of equipment and tooling.

The European Directive 2006/42 provides additional advice on the importance of considering ergonomic principles (e.g. when designing machinery, it is important to allow for variability in the technician's physical capability, and to provide sufficient space for technicians to move around and use tooling).

1.3.5 Performance influencing factors (PIFs)

PIFs are defined by the Health and Safety Executive (HSE) as: characteristics of the job (e.g. the working environment); the individual (physical capability to do the work), and the organisation (e.g. time pressure) that influence human performance.

These factors can impact performance in different ways; for example, a wet and windy working environment can make it harder to grip items securely, increasing the risk of MH injuries, as discussed in HSE INDG143 *Manual handling at work. A brief guide*.

Having an understanding of what the PIFs are and how they shape performance can inform ways to minimise the risk of MH injuries, such as through providing appropriate training on MH techniques. This could also potentially enhance performance.