GLOBAL WIND ORGANISATION

Basic Safety Training Standard (BST)

V17

Publication date: 2 May 2023

CONTENTS

1. LIST OF ABBREVIATIONS

AED	Automatic External Defibrillator
ANSI	American National Standards Institute
AS/NZS	Australia and New Zealand Standard
BST	Basic Safety Training
BSTR	Basic Safety Training Refresher
BWH	Basic Working at Height
CO_2	Carbon Dioxide
CPR	Cardiopulmonary Resuscitation
CSA	Canadian Standards Association
EN	European Standards
EPIRB	Emergency Position Indicating Radio Beacon
ERC	European Resuscitation Council
GWO	Global Wind Organisation
GMDSS	Global Maritime Distress and Safety System
H.E.L.P.	Heat Escape Lessening Posture
HSE	Health and Safety Executive (UK)
ILCOR	International Liaison Committee on Resuscitation
LSA	Life Saving Appliances
PLB	Personal Locating Beacon
MES	Marine Evacuation Systems
MOB	Man Overboard
PPE	Personal Protective Equipment
PTSD	Post-Traumatic Stress Disorder
SAR	Search and Rescue

SART	Search and Rescue Transponder
SRL	Self-retractable Lifeline
T.I.L.E.	Task Individual Load Environment
TPA	Thermal Protective Aid
WTG	Wind Turbine Generator
WTG TP	Wind Turbine Generator Transition Piece

2. TERMS AND DEFINITIONS

Term	Definition
Additional fall protection	Describes the use of an independent, additional suitable fall protection system in conjunction with a primary fall protection system. Typically, used during training to provide fall protection to participants as they learn to use fall protection equipment. Additional fall protection may sometimes be referred to as a “backup”. The additional fall protection system should be chosen in such a way that it will not hinder the exercise. Preferably this additional fall protection is not even noticeable by the participant.
As low as reasonably practicable	This means that a risk is identified and controlled to a lower level weighted against the effort, time and money needed to control it
Fall arrest	Preventing the user of a personal fall protection system from colliding with the ground, structure, or any other obstacle during a free fall
Fall arrest system	Preventing the user of a personal fall protection system from colliding with the ground, structure, or any other obstacle during a free fall
Fall prevention	Preventing the user of a personal fall protection system from going into a free fall
Hip overhang	A technique used during the rescue of a casualty from a ladder where the rescue line is diverted using the side D-ring located at the hip of the rescuer’s harness. This creates greater space between the casualty and the ladder
Manual handling	The transporting or supporting of a load (including lifting, putting down, pushing, pulling, carrying, or moving by hand or by bodily force)
Must	For clarity where the word ‘must’ is used in this standard it shall have the same meaning as ‘shall’
Personal fall protection system	Assembly of components intended to protect the user against falls from height, including a body holding device and an attachment system, which can be connected to a reliable anchorage point
Rescue system	Personal fall protection system by which a person can rescue themselves or others, in such a way that a free fall is prevented
Restraint system	Personal fall protection system which prevents the user from reaching zones where the risk of a fall from height exists
Shall	Verbal form used to indicate requirements strictly to be followed in order to conform to this training standard and from which no deviation is permitted
Should	Verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

Work positioning system	Personal fall protection system which enables the user to work in tension or suspension in such a way that free fall is prevented

3. CHANGE LOG

Amendment date	Version	Approved by & date	Description of changes
2 May 2023	17	GWO TC 2023	

Changes throughout:

- New layout
- MAC deleted throughout the standard
- GWO Requirements for Training – title updated

Section 2. Terms and definitions:

- Definition for “as low as reasonably practicable” added
- Definition for “additional fall protection” added

Section 4. Scope:

- Revised and updated

Section 5.4. Duration:

- Text updated to clarify instructions

Sections 5.7 and 5.8. Participant Prerequisites for the BST Modules:

- Text simplified with “All personnel participating must meet the participant prerequisites described in the GWO Requirements for Training.”

Section 5.9. Training Equipment:

- Text Deleted

Section 6. Understanding the GWO Taxonomy:

- The section Understanding the GWO taxonomy has been replaced with a general instruction and referral to the GWO taxonomy found in the GWO Requirements for Training

BST First Aid Module

Section 7.2. Duration of the BST First Aid Module:

- Text updated

Section 7.5. First Aid Module Timetable:

- Text updated

BST Manual Handling Module

Section 8.2. Duration of the BST Manual Handling Module:

- Text updated

Section 8.5. Manual Handling Module timetable:

- Text updated

Element 2.3

- Text updated with the removal of “four”

BST Fire Awareness Module

Section 9.2. Duration of the BST Fire Awareness Module:

- Text updated

Section 9.5. BST Fire Awareness Module timetable:

- Text updated

BST Working at Heights Module

Section 10.2. Duration of the BST Working at Heights Module:

- Text updated

Section 10.4. Equipment BST Working at Heights Module

- Text revised and updated, including:
    - Explanation of generic training “This enables the participants to conduct pre-use inspection and to use other safety equipment products compared to those taught during this module (based on the manufacturer’s user manual). However, a location specific risk assessment might identify the need for additional instructions.
    - The introduction of safety instruction “Additional fall protection must always be used during training activities at height. The training provider shall introduce control measures that lower the risks and hazards associated with a fall from height to an acceptable level, following the Hierarchy of Controls in their risk assessment.”

Section 10.5. BST Working at Heights Module Timetable:

- The table is updated according to changes in the lesson 8 and the accompanying text has been updated.

Element 5.2 – Pre-use inspection

- Learning objective 30 updated
- 5.2.2, 5.2.4, 5.2.6 and 5.2.7 updated

Element 5.3 – Correct attachment and Detachment

- Text updated

Element 5.4 – Correct use

- Text updated

Lesson 8 – Self Retracting Lifelines

- Entire lesson has been updated. Backup lines has completely been removed and focus has been placed on the use of SLRs in actual work in wind turbines.

Element 9.1 – Measures to prevent injury during training

- 9.1.5 Instructions about additional fall protect are updated

Section 10.7

- Assessment instructions made clearer to read

BST Working at Heights & Manual Handling Module

Section 11.2. Duration of the BST Working at Heights & Manual Handling Module:

- Text updated

Section 11.4. Equipment BST Working at Heights Module & Manual Handling Module

- Text revised and updated, including:
  - Explanation of generic training “This enables the participants to conduct pre-use inspection and to use other safety equipment products compared to those taught during this module (based on the manufacturer’s user manual). However, a location specific risk assessment might identify the need for additional instructions.
  - The introduction of safety instruction “Additional fall protection must always be used during training activities at height. The training provider shall introduce control measures that lower the risks and hazards associated with a fall from height to an acceptable level, following the Hierarchy of Controls in their risk assessment.”

Section 11.5. BST Working at Heights & Manual Handling Module Timetable:

- The table is updated according to changes in the lesson 8 and the accompanying text has been updated.

Element 5.2 – Pre-use inspection

- Learning objective 30 updated

- 5.2.2, 5.2.4, 5.2.6 and 5.2.7 updated

Element 5.3 – Correct attachment and Detachment

- Text updated

Element 5.4 – Correct use

- Text updated

Lesson 8 – Self Retracting Lifelines

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Section 11.7

- Assessment instructions made clearer to read

BST Sea Survival Module

Participant prerequisites (deleted):

- Working at heights prerequisite removed

Section 12.3 Instructors:

- Text updated

Section 12.4. Duration of the Sea Survival Module:

- Text updated

Section 12.7. BST Sea Survival Module timetable:

- Text updated

Element 6.4:

- 6.4.1 and 6.4.2 have been updated to make the instructions clearer

Annex 1

Section Annex 1:

- Equipment list for working at heights and working at heights & manual handling has been updated
  - All EN/ANSI/GB/BS EN numbers have been updated
  - “Work restraint lanyards” has been changed to “fall restraint lanyards”

- “Vertical fall arrest system” has been changes to “vertical fall arrest system on a rigid anchor line”
- “Fixed length fall arrest lanyard” has been changed to “fall arrest lanyard including energy absorber”
- “Helmets” have been updated to “industrial safety helmet with a chin strap that is released with a force of no less than 150 N and not more than 250 N”
- “Carabiners” has been changed to “connectors (carabiners)”
- “Evacuation and rescue devices” has been split into two categories: “Rescue devices with lifting capacity” (EN 1496) and “devices for emergency decent” (EN 341)

- Equipment list for Seas Survival has been updated
  - Rigid life jackets have been removed
  - Evacuation and rescue devices has been replaced with descender devices for rescue (EN 341)
  - Fixed length fall arrest lanyards has been changed to fall arrest lanyard including energy absorber

4. SCOPE

Global Wind Organisation is a non-profit body founded by the wind turbine manufacturers and owners. Our members strive for an injury free work environment in the wind turbine industry, setting common international standards for safety training and emergency procedures.

This standard describes the requirements for Basic Safety Training Standard courses that are recommended by the members of GWO. The full standard comprises of six modules:

1. First Aid
2. Manual Handling
3. Fire Awareness
4. Working at Heights
5. Working at heights & Manual handling combined
6. Sea Survival

The members of the Global Wind Organisation (GWO) recognise trained persons as competent within basic safety in the wind industry and accept the trained person as possessing the required knowledge to stop an unsafe situation where they as duty-holders are accountable for safety.

This standard has been developed in response to the demand for recognisable safety training in the industry and has been prepared in co-operation between the members of GWO based on risk assessments and factual incident and accident statistics from G+ and the wind industry.

General feedback on this document can be sent to info@globalwindsafety.org. See globalwindsafety.org on how to raise a complaint about a training provider or report a safety incident occurring during training.

5. GENERAL REQUIREMENTS FOR THE BASIC SAFETY TRAINING

Upon completion of the Basic Safety Training modules, participants will be able to possess an awareness of the hazards encountered when working within the wind industry and how to control and mitigate these hazards.

The BST will also equip participants with the knowledge, skills, and confidence to appropriately respond in the event of an emergency and to increase their safety through proper use of personal protective equipment, emergency equipment and procedures.

The approved GWO Basic Safety Training (BST) provides participants with important skills, which include fire awareness, first aid, working at heights, and manual handling. To enable participants to work in the offshore environment, an additional GWO Sea Survival Module training shall be completed.

5.1 Overview

The GWO Basic Safety Training is divided into the following six modules:

Module 1: First Aid
Module 2: Manual Handling
Module 3: Fire Awareness
Module 4: Working at Heights
Module 5: Working at Heights & Manual Handling combined
Module 6: Sea Survival

Note *Working at Heights & Manual Handling Combined is a combined module comprising the lessons and elements from both the Working at Height Module and the Manual Handling Module and is intended to be delivered in two days. The combined Working at Height & Manual Handling Module can be delivered instead of the two standalone modules, where the combined course is delivered, then the participants shall receive two training records: one for working at height and one for manual handling.*

5.2 Target Group

Personnel who will be working in the wind industry or related fields and will have their duties in a wind turbine environment, usually in physical contact with a wind turbine or WTG structure.

Personnel that perform job functions that have been risk assessed by their employer or their workplace duty holder as a function, where training according to one or more modules of the BST standard may mitigate of the identified risks.

5.3 Aims and Objectives

Training in accordance with this Basic Safety Training will enable participants to support and care for themselves and others working in the industry by possessing the knowledge and skills of first aid, working at heights, manual handling, fire awareness, sea survival and in case of an emergency, to be able to evacuate, rescue and provide appropriate first aid to casualties.

5.4 Duration of the BST Standard Modules

The total contact time for completing the Basic Safety Training Standard is to be *33 hours and 50 minutes.* This is based on the times given in the module timetables and summarised in table 5.4.1 below.

Modules	Duration
First Aid	7 hours
Manual Handling	3 hours 35 minutes
Fire Awareness	3 hours 20 minutes

Working at Heights	13 hours 25 minutes
Working at Heights & Manual Handling Combined	14 hours 40 minutes
Sea Survival	6 hours 30 minutes

Table 5.4.1 – Duration of the GWO BST Modules

The training provider must not exceed the time per day given in table 5.4.2 below.

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 days

Table 5.4.2 – Maximum durations for training days

Note *The delivery of this module must comply with the requirements described in the GWO Requirements for Training.*

The total training day includes contact time, meals and breaks and travel between training sites (where applicable).

Within the module timetables, approximate durations of each of the lessons are given. The training provider may choose to deliver elements of the training according to other timetables, as long as the total duration is not reduced, and practical elements are not reduced in length. Theoretical elements may be delivered during the practical exercises when feasible.

If a participant fails to meet the demands of the BST Module, they shall attend a new BST.

5.5 Validity Period

Basic Safety Standard training is valid for the period stated in Table 5.5.1 (below). Certificates and training records shall be renewed before the end of a given validity period. A certificate or training record can be renewed up to two months prior to expiry and maintain the original certification date by uploading the previous certificates valid until date in WINDA.

If a certificate or training record is renewed outside of two months of expiry, it must carry the new date of certification.

If a certificate is or training record is expired, the participant must attend the applicable BST module(s) training(s) to obtain a new training record.

The validity period is automatically calculated by WINDA by entering the course completion date.

Course/module	Certificate Validity (Months)
First Aid	24
Manual Handling	24
Fire Awareness	24
Working at Heights	24
Working at Heights & Manual Handling Combined	24
Sea Survival	24

Table 5.5.1 – GWO BST certificate validity periods

5.6 Course Codes

Module	Course Code
First Aid	FA
Manual Handling	MH
Fire Awareness	FAW
Working at Heights	WAH
Working at Heights & Manual Handling Combined	WAH/MH
Sea Survival	SS

Table 5.6.1 – GWO BST Module course codes

Note *The BST Working at Heights Module is not intended to test a participant's fear of heights*

5.7 Participant Prerequisites for the BST

All personnel participating must meet the participant prerequisites described in the GWO Requirements for Training.

6. USING THIS STANDARD TO DEVELOP TRAINING

The training in this standard is designed around the GWO taxonomy described in the GWO Requirements for Training. Theoretical and practical activities must be delivered according to the defined taxonomic level in order to reach the described learning objectives.

When teaching safety equipment, a generic approach to shall be applied aiming to avoid additional potential product specific formal training after completion of this training. However, national or regional legislation, company gap analysis and location specific risk assessments may require additional product specific familiarisation which is the responsibility of the duty holder.

In addition to this, all training based on this standard including all related resources shall, as a minimum, meet the requirements described in the GWO Requirements for Training.

GLOBAL WIND ORGANISATION

First Aid Module

(FA)

7. BST FIRST AID MODULE

7.1 Aim and Objectives of the BST First Aid Module

The aim of this module is to enable participants, through theoretical and practical training, to recognise signs and symptoms of life threating situations and administer safe and effective first aid in the wind turbine industry/WTG environment in order to save lives and prevent further injury, until the casualty can be handed over to the next level of care.

After having successfully completed this BST First Aid Module, the participants will have the ability to:

1) **Act independently** in recognising, assessing, and prioritising the need for basic first aid and providing lifesaving first aid until the casualty can be handed over to the next level of care in case of an incident in the wind turbine industry/WTG environment (Ability, intermediate level)

2) **Take responsibility** for recognising their limitations as a basic first aider, calling for help and enable evacuation off the casualty in case of an incident in the wind turbine industry/WTG environment (Ability, intermediate level)

7.2 Duration of the BST First Aid Module

The total contact time for completing the BST First Aid MFodule is estimated to be 7 hours and 0 minutes.

The training provider must not exceed the time per day given in the Table 7.2.1 (below).

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 hours

Table 7.2.1 – Maximum durations for training day

Note *Contact time includes delivery of course lesson content, practical exercises and activities directly related to these*

The total training day includes contact time, meals and breaks and travel between training sites (where applicable)

7.3 First Aid Module Participant Ratio

The ratio shown for theory sessions indicates the maximum number of participants per instructor attending the course.

Practical ratios indicate the maximum number of participants to be supervised by an instructor during each activity.

Module	Session	Instructor to Participant Ratio
BST First Aid	Theory	1:12
	Practical	1:6

Table 7.3.1 – GWO First Aid Module instructor to participant ratio

7.4 Equipment for the First Aid Module

The equipment required for training as listed in Annex 1 must be available and must fulfil national legal requirements.

7.5 First Aid Module Timetable

The order in which elements of this BST Module training are delivered may vary according to the didactical choices of the delivering training provider.

The delivery of this module must comply with the requirements described in the GWO Requirements for Training.

Lesson		Element		Duration
1.	Introduction	1.1	Safety instructions and emergency procedures	
		1.2	Facilities	
		1.3	Introduction	
		1.4	Scope and main learning objective	
		1.5	Ongoing assessment (participant assessment form)	
		1.6	Motivation	
		1.7	Human factors	
			TOTAL	30 min.
2.	Lifesaving first aid using primary survey and the first aid structure	2.1	Management of a first aid incident in a WTG environment	
		2.2	Primary survey ''C''- A - B - C	
		2.3	''C'' – Catastrophic external bleeding	
		2.4	Unresponsive	
		2.5	Obstruction of airways	
		2.6	CPR – Unresponsive, not breathing	
		2.7	Bleeding and shock	
			TOTAL	180 min.
3.	Providing first aid to relevant incidents in the wind industry	3.1	Burns	
		3.2	Chemical contacts to the eye	

		3.3	Medical emergency situations heart attack & stroke	
		3.4	Hypothermia	
		3.5	Fractures	
		3.6	Head-to-toe examination	
			TOTAL	60 min.
4.	Scenario-based training	4.1	Scenario-based training	
			TOTAL	135 min.
5.	Training review	5.1	Training review	
		5.2	Feedback session	
			TOTAL	15 min.
			GRAND TOTAL	420 min.

Table 7.5.1 – GWO First Aid Module timetable

7.6 Detailed Description of the First Aid Module

LESSON 1 - INTRODUCTION TO THE TRAINING

30 min.

The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.

After having successfully completed this lesson, the participants can:

3) **Recognise** what is expected of them throughout the module (Knowledge, basic level)

4) **Name** and point out local emergency procedures and facilities (Knowledge, basic level)

5) **Discuss** the relevant human factors and explain their implications (Knowledge, intermediate level)

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

6) The participant **shows interest** or curiosity in the safety and emergency procedures at the training facility (Ability, basic level)

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. Safety instructions according to internal procedures

b. Emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures

ELEMENT 1.2 - FACILITIES

Learning objective:

7) The participant can **recognise** the location of facilities at the training location (Knowledge, basic level)

The instructor shall:

1.2.1 Present a general description of the facilities at the training location (administration, dining area, restrooms, toilets, etc.):

1.2.2 Alternative activity: lead a tour and point out facilities

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt

ELEMENT 1.3 - INTRODUCTION

Learning objective:

8) The participant **shows interest** in fellow participants and the course content and design (Ability, basic level)

The instructor shall:

1.3.1 Explain the timetable of the BST First Aid Module, including breaks and mealtimes

1.3.2 Give a short introduction to themselves, including their backgrounds as instructors

1.3.3 Ask for participants' expectations of the training and their learning or development

The participants shall:

1.3.4 Give a short introduction to themselves, including job function and expected primary geographic work location and share expectations of the training

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVES

Learning objective:

9) The participant can **recognise** the scope and main objectives of the BST First Aid Module (Knowledge, basic level)

The instructor shall:

1.4.1 Present the scope and main learning objectives of the BST First Aid Module through a scenario, a challenge or; "your goal with the basic First Aid Module, should you choose to accept is…"- message

Note *A suggested learning activity could be to share stories, present scenarios or personal experiences that show the importance of being able to do basic first aid in the wind industry (what is in it for the participants)*

Where possible PowerPoint slide(s) should be avoided, as part of the introduction. Instead use stories, examples or personal experiences that shows the importance of being able to provide basic first aid in the wind industry and the importance of the BST First Aid Module

1.4.2 Involve participants with questions on understanding and individual experiences on BST First Aid

The participants shall:

1.4.3 Engage in answering questions and share experiences on BST First Aid

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT PERFORMANCE ASSESSMENT FORM)

Learning objective:

10) The participant can **recognise** the assessment procedure and the aim of the ongoing assessment (Knowledge, basic level)

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment

1.5.2 Explain the layout of the GWO participant performance assessment form and how it will be used

The participants shall:

1.5.3 Engage in discussions and (when in doubt) ask questions - relating to the assessment procedure

ELEMENT 1.6 - MOTIVATION

Learning objective:

11) The participant **shows interest** and willingness to engage in the learning activities (Ability, basic level)

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. the importance of personal involvement in the course

b. the definition of and the need for BST First Aid training understandings and abilities

Note *Positive motivation is the driving force for commitment, and the instructor should make a focused effort to support growth of the necessary attitude and motivation in the participants*

The participants shall:

1.6.2 Engage in discussions and share experiences on BST First Aid training

Note *When the participants succeed by trying out on their own, bring their relevant experience into play and apply learning points from the instructor's feedback, the participant develops a positive attitude and responsibility towards the subject and the performance in the work situation*

ELEMENT 1.7 - HUMAN FACTORS

The aim of this element is to draw the participants' attention to how human performance and taking responsibility influences a safe work environment, and to prepare for the continued focus on human factors during practical training and exercises.

Learning objectives:

12) The participant can **describe** human factors relevant to the wind industry (Knowledge, basic level)

13) The participant **shows interest** and willingness to focus on human factors during the following practical exercises (Ability, basic level)

The instructor shall:

1.7.1 Present how human factors influence accidents in the wind industry (relevant injury statistics should be referenced and presented from e.g. G+)

1.7.2 Lead a discussion about the role of the individual in improving human performance and how this can improve the safety of operations in the wind industry

1.7.3 Ensure that constructive feedback on the participant's performance involve human factor criteria when these are defined in the learning objective such as the ability to take responsibility or to act independently

Facts and Human Factors Criteria:

How accidents in the wind industry are influenced by the consequences of human factors and may include the following terms and conditions:

a. attention and perception

b. group behaviour and peer pressure weather conditions

c. weather delays noise levels

d. site layout and housekeeping fitness and health

e. domestic and work-related stress workload (both overload and underload) fatigue

f. time pressure and deadlines

g. alcohol, medication, and substance abuse

The participants shall:

1.7.4 Engage in discussions and share experiences on how human factors influence accidents in the wind industry, engage in and reflect on received feedback and take responsibility on their own performance and development during the training

LESSON 2 - LIFESAVING FIRST AID USING PRIMARY SURVEY AND THE FIRST AID STRUCTURE

180 min.

The aim of this lesson is to enable the participants to recognise signs and symptoms of life threating situations and save lives and preventing injury to the casualty by being able to use primary survey to provide the correct and effective lifesaving first aid in case of an emergency situation in the wind industry.

Additionally, this lesson is to enable the participants to manage an incident and call for help in a wind turbine environment and enable evacuation of the casualty(s) off the turbine in order to save lives.

After having successfully completed this lesson, the participant can:

14) **Solve** how to manage different first aid incidents in a WTG environment in terms of the approach and assessments made (Ability, basic level)

15) **Act independently** in providing lifesaving basic first aid by using primary survey to identify and treat life-threatening conditions in a prioritised order in a first aid incident in a WTG environment (Ability, intermediate level)

The mentioned life-threatening conditions include:

a. catastrophic external bleeding

b. obstruction of airways

c. unresponsive casualty

d. unresponsive not breathing casualty

e. bleeding and shock

ELEMENT 2.1 - MANAGEMENT OF A FIRST AID INCIDENT IN A WTG ENVIRONMENT

Learning objective:

16) The participant can **explain** how safely manage a first aid incident in a WTG environment (Knowledge, intermediate level)

The instructor shall:

2.1.1 Explain and demonstrate example(s) of how to manage a first aid incident in a WTG environment:

a. how to follow an efficient and correct first aid structure

a.i to ensure scene safety (including electrical hazards)

a.ii providing lifesaving first aid using the primary survey

a.iii call for help

b. analysis and management of an incident call for help

c. call for help

2.1.2 Facilitate a learning activity for the participants such as leading a discussion, asking the participants scenario-based questions or share a questionnaire about how to safely manage a first aid incident in a WTG environment

The participants shall:

2.1.3 Engage in the learning activity and share understandings about how to safely manage a first aid incident in a WTG environment

Note *Element 2.1 may be carried out during as part of the practical training e.g. in the scenario- based training in Lesson 4*

ELEMENT 2.2 - PRIMARY SURVEY "C" A - B – C

Learning objectives:

17) The participant can **name** the steps in the primary survey "C"- A – B – C (Knowledge, basic level)

18) The participant can **describe** the purpose of doing a primary survey (Knowledge, basic level)

19) The participant can **explain** how to do a primary survey in incidents from the wind industry (Knowledge, intermediate level)

20) The participant can **perform** a correct primary survey in incidents (Skills, intermediate level)

The instructor shall:

2.2.1 Present primary survey "C" A-B-C and the purpose of the primary survey in patient assessment and treatment:

a. C – Catastrophic bleeding

b. A - Airway

c. B - Breathing

d. C - Circulation

2.2.2 Ask the participants involving questions about if they have any experiences with primary survey "C" A - B - C or lead discussions with the participants about the real-life challenges and benefits of primary survey "C" A - B – C

2.2.3 Explain and demonstrate how to use the Primary Survey ("C" A-B-C) in example(s) of incident(s) from the different incident types from the wind industry (see Lesson 3) including:

a. key signs of normal body functioning such as respiratory rate and capillary refill

b. how to spot threats to the nervous, respiratory, and circulatory systems

c. how a minor incident can escalate to a serious incident in a WTG environment and what to do prevent this

2.2.4 Ask the participants to identify the similarities and differences between the examples of the primary survey shown:

a. what happened?

b. how did the basic first aider(s) act in the examples shown?

c. in those actions, which were the most important?

d. why were these key actions performed?

2.2.5 Facilitate participants' practice in how to do a primary survey ("C" A-B-C) in incident(s). Provide a lot of support and guidance to the participants

2.2.6 Give constructive feedback to the participants' performance throughout the activities of this element

The participants shall:

2.2.7 Engage in the learning activity and share understandings about:

a. the similarities and differences between the examples of the primary survey shown

b. the right way of doing a primary survey

2.2.8 Practice how to do a primary survey ("C" A-B-C) in incident(s)

2.2.9 Reflect on the received feedback and use the feedback to improve their performance

ELEMENT 2.3 - "C"- CATASTROPHIC EXTERNAL BLEEDING

Learning objectives:

21) The participant can **explain** how to control catastrophic external bleeding (Knowledge, intermediate level level)

22) The participant can **explain** the risk of and how to detect catastrophic external bleeding (Knowledge, intermediate level)

23) The participant can **solve** how to detect catastrophic external bleeding (Ability, basic level)

24) The participant can **perform** the correct treatment of a casualty with catastrophic external bleeding including the use of first aid equipment (Skills, intermediate level)

The instructor shall:

2.3.1 Present how to control catastrophic external bleeding i.e. through the use of a torniquet, direct pressure and pressure dressings

2.3.2 Show example(s) of the threat of, and how to detect, catastrophic external bleeding

2.3.3 Lead discussions or ask the participants involving questions about:

a. how to control catastrophic external bleeding

b. the threat of, and how to detect, catastrophic external bleeding

2.3.4 Facilitate guided practice for the participants in detecting catastrophic external bleeding eg:

a. present examples of 'bleeding' casualties; some casualties with catastrophic external bleeding and some casualties that are bleeding, but not considered to be catastrophic external bleeding (e.g. examples of casualties with arterial bleed and examples of other casualties with venous bleed)

b. ask the participants to detect which are the casualties with catastrophic external bleeding and why

2.3.5 Demonstrate correct treatment of a casualty with catastrophic external bleeding including the use of first aid equipment:

a. direct pressure

b. pressure dressings

c. correct use of a tourniquet

d. use of improvised techniques to control catastrophic external bleeding e.g. improvised tourniquet

2.3.6 Facilitate practice for the correct treatment of a casualty with catastrophic external bleeding including the use of first aid equipment:

a. direct pressure and pressure dressings

b. correct use of a tourniquet and improvised tourniquet (two tourniquets may be required to control bleeding)

2.3.7 Give constructive feedback to the participants performance throughout the activities of this element

The participants shall:

2.3.8 Engage in the discussions or answering the questions and share understandings about:

a. how to control catastrophic external bleeding

b. the threat of and how to detect catastrophic bleeding

2.3.9 Engage in the learning activity and practise how to detect catastrophic bleeding

2.3.10 Engage in the practice of how to correctly treat a casualty with catastrophic external bleeding including the use of first aid equipment:

a. direct pressure and pressure dressings

b. correct use of a tourniquet and improvised tourniquet (two tourniquets may be required to control bleeding)

2.3.11 Reflect on the received feedback and use the feedback to improve their performance

ELEMENT 2.4 - UNRESPONSIVE

Learning objective:

25) The participant can **perform** first aid to an unresponsive casualty (Skills, intermediate level)

The instructor shall:

2.4.1 Explain and demonstrate how to provide first aid to an unresponsive casualty including:

a. reasons for unresponsiveness

b. threats to the casualty airway

c. primary survey (“C” A - B - C)

d. unresponsive and breathing casualty should be managed using positional techniques such as the recovery position (or other national/regional established practices)

2.4.2 Facilitate practice for the participants in providing first aid to an unresponsive casualty

2.4.3 Give constructive feedback to the participants’ performance in providing first aid to an unresponsive casualty

The participants shall:

2.4.4 Engage in answering the questions and share understandings about providing first aid to an unresponsive casualty

2.4.5 Practise providing first aid to an unresponsive casualty

a. threats to the casualty´s airway

b. primary survey (“C” A - B - C)

c. recovery position; first aider recovery position

2.4.6 Reflect on the received feedback and use the feedback to improve their performance

ELEMENT 2.5 - OBSTRUCTION OF AIRWAYS

Learning objective:

26) The participant can **perform** first aid in case of foreign body airway obstruction (Skills, intermediate level)

The instructor shall:

2.5.1 Explain and demonstrate first aid for obstruction of airways

a. primary survey (“C” A - B - C)

b. reasons for obstruction of airways

c. mild vs. severe adult airway obstruction

2.5.2 Facilitate practice for the participants in providing first aid in case of obstruction of airways

2.5.3 Give constructive feedback to the participants´ performance in providing first aid in case of obstruction of airways

The participants shall:

2.5.4 Practise providing first aid in case of obstruction of airways e.g mild and severe adult choking

ELEMENT 2.6 - CPR: UNRESPONSIVE, NOT BREATHING

Learning objectives:

27) The participant can **describe** how CPR can preserve important life conditions for the human body (Knowledge, basic level)

28) The participant can **perform** the correct first aid to an unresponsive, not breathing casualty (Skills, intermediate level)

29) The participant can **recognise** AED safety procedures (Knowledge, basic level)

30) The participant can **apply** an AED safely and correctly following the AED safety procedures (Skills, intermediate level)

The instructor shall:

2.6.1 Lead discussions or brainstorms with the participants about how CPR can preserve important life conditions for the human body; such as CPR providing sufficient oxygen to the brain to minimise injury

2.6.2 Explain and demonstrate first aid for unresponsive and not breathing casualty including:

a. primary survey (“C” A - B - C)

b. reasons for being unresponsive and not breathing

c. performing CPR on adults both with, and without, the use of AED and a pocket mask in accordance with regional first aid guidelines (including AED safety procedures)

2.6.3 Facilitate participants’ practice in how to use an AED correctly and safely

2.6.4 Facilitate participants’ practice in how to provide first aid for an unresponsive and not breathing casualty

2.6.5 Give constructive feedback to the participants performance in providing first aid to an unresponsive casualty and not breathing casualty

The participants shall:

2.6.6 Engage in the discussions or brainstorms and share understandings about how CPR can help maintain important life conditions for the human body such as CPR providing enough oxygen to the brain to prevent further injury

2.6.7 Practise CPR on adults both with, and without, the use of AED and a pocket mask

2.6.8 Engage in the practice of how to provide first aid for an unresponsive and not breathing casualty:

a. primary survey (“C” A - B - C)

b. performing CPR on adults both with, and without, the use of an AED in accordance with regional first aid guidelines

ELEMENT 2.7 - BLEEDING AND SHOCK

Learning objectives:

31) The participant can **perform** the correct first aid for external bleeding (Skills, intermediate level)

32) The participant can **apply** dressings on a casualty correctly (Skills, intermediate level)

33) The participant can **identify** the symptoms of hypovolemic shock and perform the correct first aid for hypovolemic shock (Skills, intermediate level)

The instructor shall:

2.7.1 Explain and demonstrate how to identify the symptoms of hypovolemic shock and provide the correct first aid for hypovolemic shock:

a. primary survey (“C” A - B - C)

b. signs and symptoms of hypovolemic shock (including delayed capillary refill)

c. reasons for hypovolemic shock (e.g. external, and internal bleeding, open fractures, burns)

d. associated risks with hypovolemic shock

e. use of first aid techniques / methods i.e. psychological first aid, positioning, protecting against the environment e.g. blanket to keep warm

2.7.2 Explain and demonstrate first aid for external bleeding:

a. primary survey (“C” A - B - C)

b. use of first aid dressings

2.7.3 Facilitate practice for the participants in:

a. first aid for shock

b. first aid for external bleeding

Note *Please give feedback to the participants’ performance throughout the activities of this element*

The participants shall:

2.7.4 Practise first aid for shock

a. first aid primary survey (“C” A - B - C)

b. use of first aid techniques / methods i.e. psychological first aid, positioning, protecting against the environment e.g. blanket to keep warm

2.7.5 Practise providing first aid when a casualty is bleeding externally

a. primary survey (“C” A - B - C)

b. use of first aid equipment (tourniquet and bandages)

c. use of improvised techniques to control external bleeding

LESSON 3 - PROVIDING FIRST AID TO RELEVANT INCIDENTS IN THE WIND INDUSTRY

60 min.

Note *As far as possible, this lesson must be facilitated by the instructor in an interactive and practical way with engagement of the participants. Lesson 3 may also be carried out as scenarios or practical exercises or selected elements may be supplemented with a practical part, if deemed possible by the instructor*

The aim of this lesson is to enable the participants to provide the correct and effective first aid in case of relevant incidents where a wind turbine technician needs to be able to provide basic first aid in the wind industry in order to save lives and prevent further injury.

After having successfully completed this lesson, each participant can:

34) **Solve** how to provide the correct basic first aid to a casualty in relevant incidents in a WTG environment (Ability, basic level)

The relevant incidents are:

a. burns

b. chemical contacts to the eye

c. medical emergency situations: heart attack and stroke

d. hypothermia

e. fractures

ELEMENT 3.1 - BURNS

Learning objective:

35) The participants can **explain** how to provide the correct first aid to treat burns (Knowledge, intermediate level)

The instructor shall:

3.1.1 Explain and demonstrate example(s) of how to provide the correct first aid to treat burns including electrical burns and how the availability of water can influence how burns should be treated

3.1.2 Lead discussions with the participants about the example(s) of how to provide the correct first aid to treat burns, for example:

a. how did the instructor provide first aid to treat burns?

b. why were the actions performed?

The participants shall:

3.1.3 Engage in the discussions about the example(s) shown and share understandings about how to provide the correct first aid to treat burns

ELEMENT 3.2 - CHEMICAL CONTACTS TO THE EYE

Learning objective:

36) The participants can **explain** how to provide the correct first aid to chemical contacts to the eye (Knowledge, intermediate level)

The instructor shall:

3.2.1 Explain and demonstrate example(s) of how to provide the correct first aid for chemical contacts to the eye

3.2.2 Lead discussion with the participants about the example(s) of how to provide the correct first aid for chemical contacts to the eye

The participants shall:

3.2.3 Engage in the discussion about the example(s) shown and share understandings about how to provide the correct first aid for chemical contacts to the eye

ELEMENT 3.3 - MEDICAL EMERGENCY SITUATIONS: HEART ATTACK & STROKE

Learning objective:

37) The participants can **explain** how to provide the correct first aid in medical emergency situations: heart attack and stroke (Knowledge, intermediate level)

The instructor shall:

3.3.1 Explain and demonstrate how to recognise and provide the correct first aid in medical emergency situations:

a. heart attack

b. stroke

3.3.2 Facilitate a discussion for the participants to ensure understanding of medical emergency situations relating to heart attack and stroke

The participants shall:

3.3.3 Engage in a discussion and share understanding about how to provide the correct first aid in medical emergency situations heart relating to attack and stroke

ELEMENT 3.4 - HYPOTHERMIA

Learning objective:

38) The participants can **explain** how to provide the correct first aid to a casualty with hypothermia (Knowledge, intermediate level)

The instructor shall:

3.4.1 Explain and demonstrate example(s) of how to provide the correct first aid to treat hypothermia including how to insulate the casualty

3.4.2 Lead discussion or ask the participants involving questions about the example(s) of how to provide the correct first aid to treat hypothermia

The participants shall:

3.4.3 Engage in the discussion or answering the questions about the example(s) shown and share understandings about how to provide the correct first aid to treat hypothermia

ELEMENT 3.5 - FRACTURES

Learning objective:

39) The participants can **explain** how to identify a suspected fracture and provide the correct first aid treatment (Knowledge, intermediate level)

The instructor shall:

3.5.1 Explain and demonstrate example(s) of how to identify a suspected fracture and provide the correct first aid treatment

3.5.2 Lead discussion or ask the participants involving questions about the example of how to provide the correct first aid to a casualty with a suspected fracture

The participants shall:

3.5.3 Engage in the discussions or answering the questions about the example(s) shown and share understandings about how to provide the correct first aid to a casualty with a fracture

ELEMENT 3.6 - HEAD TO TOE EXAMINATION

Learning objective:

40) The participants can **explain** how to correctly perform a head-to-toe examination in accordance with regional guidelines (Knowledge, intermediate level)

The instructor shall:

3.6.1 Demonstrate on a person or dummy how to do a head-to-toe examination and explain the focus on identifying other injuries

3.6.2 Lead discussions with the participants about the example(s) of how to do a head -to-toe examination for example:

a. how did the instructor do the head-to-toe examination?

b. what were the steps or actions of the head-to-toe examination?

c. why were these steps or actions performed?

The participants shall:

3.6.3 Engage in the discussions about the example(s) shown and share understandings about how to do a head -to-toe examination

LESSON 4 - SCENARIO-BASED TRAINING

135 min.

The aim of this lesson is to enable the participants to assess, assist and provide the correct lifesaving basic first aid in an incident in the wind industry.

After having successfully completed this lesson, the participants can:

41) **Take responsibility** for managing first aid incidents with the correct approach and assessments made in a WTG environment (Ability, Intermediate level)

42) **Act independently** in correctly assessing, assisting, and providing the necessary first aid in an incident in a WTG environment (Ability, Intermediate level)

43) **Take responsibility** for the correct use of first aid equipment (Ability, Intermediate level)

44) **Discuss** common and expected reactions to acting as a first aider, to an unusual situation and to a casualty (Knowledge, intermediate level)

Note *The instructor must lead a brief warm up of the participants in accordance with Annex 2 of the BST standard – Guideline For Warm-up Exercises prior to beginning scenario based practical exercises*

The instructor shall:

4.1.1 Explain additional relevant safety procedures in the training area as required

4.1.2 Facilitate practice for the participants in providing lifesaving first aid through scenario- based training. As a minimum, the instructor must ensure that each participant practises the following through the scenario-based training:

a. managing first aid incidents

b. providing necessary lifesaving first aid for a casualty that is unconscious and require CPR

c. correct use of first aid equipment

d. correct and safe use of an AED

4.1.3 Give constructive feedback and debrief to the participants´ performance throughout the scenario-based training:

a. review positive actions observed during exercise

b. suggest points for improvement

c. acting as a first aider e.g. what are their reactions to this?

d. normal reactions to an unusual situation

The participants shall:

4.1.4 Practice providing lifesaving basic first aid through relevant scenarios. As a minimum, the participants must practise the following through the scenario-based training:

a. managing incidents

b. providing necessary lifesaving first aid

c. correct use of first aid equipment

d. correct and safe use of an AED

4.1.5 Engage in the debriefing and share their experiences and attitudes

4.1.6 Reflect on the received feedback and use the feedback to improve their performance

Note *This scenario-based training shall be conducted as group work with one or more participants as first aiders, while the other participants act as casualties or observers. Each participant shall, as a minimum, participate as a first aider (i.e. not as a casualty) at least two times. Relevant first aid equipment shall be available and used at all times during scenario-based training. To ensure all of the above mentioned points are covered during scenario-based training, training providers shall combine several of the following first aid situations mentioned below*

Note *Scenarios from the below lists can be combined at will during the scenario-based training as long as all the mandatory scenarios are covered*

The mandatory scenarios to be covered during scenario-based training are:

a. one electrical incident

b. one incident with either a stroke (circulatory, respiratory, central nervous system) or a heart attack

c. two scenarios must include a head-to-toe examination of the casualty

d. CPR using an AED

Additional scenarios which should be considered included in the scenario-based training are:

e. dropped object: serious injury fall from heights

f. hypovolemic shock

g. serious external bleeding

h. unresponsive with normal breathing

i. serious burns (chemical, electrical, thermal and sun)

j. hypothermia

k. crush injury (e.g. finger injuries)

l. chemical contacts to the eye

m. minor incident escalating to a serious incident

LESSON 5 - TRAINING REVIEW

15 min.

The aim of this lesson is to enable the participants to reflect on and process their learning outcome and key takeaways from the module, aiming to achieve a high learning transfer from the module to their way of working.

ELEMENT 5.1 - TRAINING REVIEW

The instructor shall:

5.1.1 Re-present the overall aims and learning objectives of the module for the participants' comparison of their learning outcome and the achievement of their previously stated expectations for the module

The participants shall:

5.1.2 Reflect on their learning outcome and key takeaways from the BST First Aid Module, aiming to achieve a high learning transfer from the module to their way of working by means of, for example:

a. group discussion or walk and talk

b. questions and answers in class, or where suitable

Note *The instructor may additionally conduct a local evaluation of the training*

ELEMENT 5.2 - FEEDBACK SESSION

The instructor shall:

5.2.1 Give an overall feedback and feed forward on the participants' learning outcome inspired by the training as well as from the training-review session

5.2.2 Encourage the participants to examine and grow awareness of which specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualise and enhance learning transfer)

5.2.3 Encourage the participants to discuss with colleagues about how the BST First Aid Module content, methods and techniques are similar or different to the local specific conditions identified after the module completion

GLOBAL WIND ORGANISATION

Manual Handling Module

(MH)

8. BST MANUAL HANDLING MODULE

8.1 Aims and Objectives for the BST Manual Handling Module

The aim of this module is to enable participants, through theoretical and practical training, to reduce the risk of musculoskeletal injuries for wind technicians in the wind industry and enable participants to perform their tasks and activities in the safest possible way when working in a wind turbine environment.

The BST Manual Handling Module may be delivered at the same time as the BSTR Manual Handling Refresher Module.

The instructor should be aware that this module allows first time participants and refresher participants in the same classroom. Training should therefore incorporate the sharing of knowledge of the more experienced participants.

After having successfully complete this BST Manual Handling module, the participants will have the ability to take responsibility for the use of essential manual handling principles to reduce the risk of musculoskeletal injury when performing physical tasks and activities in the wind industry (Ability, intermediate level)

Definition of manual handling: The transporting or supporting of a load (including lifting, putting down, pushing, pulling, carrying, or moving by hand or by bodily force.[1]

8.2 Duration of the BST Manual Handling Module

The total contact time for completing the BST Manual Handling module is estimated to be 3 hours and 35 minutes.

The training provider must not exceed the time per day given in the Table 8.2.1 (below).

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 hours

Table 8.2.1 – Maximum durations for training day

[1] Ref. https://www.ofi.co.uk

8.3 Manual Handling Module Participant Ratio

The ratio shown for theory sessions indicates the maximum number of participants per instructor attending the course.

Practical ratios indicate the maximum number of participants to be supervised by an instructor during each activity.

Module	Session	Instructor to Participant Ratio
BST Manual handling	Theory	1:12

	Practical	1:6

Table 8.3.1 – GWO Manual Handling Module instructor to participant ratio

8.4 Equipment for the Manual Handling Module

The equipment required for manual handling must be representative to loads commonly handled in the wind industry as well as representative to work situations in the wind industry. Training equipment must fulfil national legal requirements as stated in GWO Requirements for Training.

8.5 Manual Handling Module Timetable

The order in which elements of this module training are delivered may vary according to the didactical choices of the delivering training provider.

The delivery of this module must comply with the requirements described in the GWO Requirements for Training.

Lesson		Element		Duration
1.	Introduction to the training	1.1	Safety instructions and emergency procedures	
		1.2	Facilities	
		1.3	Introduction	
		1.4	Scope and main learning objective	
		1.5	Ongoing assessment (participant performance assessment form)	
		1.6	Motivation	
		1.7	Human factors	
		1.8	Behavioural safety	
			TOTAL	20 min.
2.	Injuries, symptoms, and essential manual handling principles	2.1	How to avoid common musculoskeletal injuries in the wind industry	
		2.2	Typical symptoms of injuries	
		2.3	Essential manual handling principles	
		2.4	Basic dynamic risk assessment and introduction to the TILE principle	
			TOTAL	20 min.
3.	Warm up activities	3.1	Warm up activities	
			TOTAL	20 min.
4.	Manual handling principles	4.1	Working over shoulder height	
		4.2	Working while kneeling	

		4.3	Push and pull	
		4.4	Carrying	
		4.5	Lifting	
		4.6	Work with handheld tools	
		4.7	Awkward postures	
			TOTAL	140 min.
5.	Training review	5.1	Training review	
		5.2	Feedback session	
			TOTAL	15 min.
			GRAND TOTAL	215 min.

Table 8.5.1 – GWO Manual Handling Module timetable

8.6 Detailed Description of the BST Manual Handling Module

Note *The administrative part of the course registration should be carried out before the course commences*

LESSON 1 - INTRODUCTION TO THE TRAINING

20 min.

The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.

After having successfully completed this lesson, the participants can:

1) **Recognise** what is expected of them throughout the module (Knowledge, basic level)

2) **Name** and point out local emergency procedures and facilities (Knowledge, basic level)

3) **Discuss** behavioural safety and the relevant human factors and explain their implications (Knowledge, intermediate level)

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

4) The participants **show interest** in the safety and emergency procedures at the training facility (Ability, basic level)

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. safety instructions according to internal procedures

b. emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures

ELEMENT 1.2 - FACILITIES

Learning objective:

5) The participants can **recognise** the location of facilities at the training location (Knowledge, basic level)

The instructor shall:

1.2.1 Present a general description of the facilities at the training location (administration, dining area, restrooms, toilets, etc.)

1.2.2 Alternatively, lead a tour pointing out facilities

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt

ELEMENT 1.3 - INTRODUCTION

Learning objective:

6) The participants **show interest** in fellow participants and the course content and design (Ability, basic level)

The instructor shall:

1.3.1 Explain and ask involving questions aiming at the program of the BST Manual Handling Module training, including breaks and mealtimes

1.3.2 Give a short introduction to themselves, including their backgrounds as instructors

1.3.3 Ask for participants' expectations of the training and their learning or development

The participants shall:

1.3.4 Give a short introduction to themselves, including job function and expected primary geographic work location and share expectations of the training

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVES

Learning objective:

7) The participants can **recognise** the scope and main objectives of the BST Manual Handling Module training (Knowledge, basic level)

The instructor shall:

1.4.1 Present the scope and main learning objective of the BST Manual Handling Module training

1.4.2 Involve participants with questions on understanding and individual experiences relevant for BST Manual Handling Module

The participants shall:

1.4.3 Engage in answering questions and share experiences relevant for the BST Manual Handling Module

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT PERFORMANCE ASSESSMENT FORM)

Learning objective:

8) The participants **recognise** the assessment procedure and the aim of the ongoing assessment (Knowledge, basic level)

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment

1.5.2 Explain the layout of the GWO participant performance assessment form and how it will be used

The participants shall:

1.5.3 Engage themselves in discussion and (when in doubt) ask questions in relation to the assessment procedure

ELEMENT 1.6 - MOTIVATION

Learning objective:

9) The participants **show interest** and willingness to engage in the learning activities (ability, basic level)

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. the importance of personal involvement in the course

b. the definition of, and the need for, applying manual handling techniques and principles when working in the wind industry

Note *Positive motivation is the driving force for commitment, and the instructor should make a focused effort to support growth of the necessary attitude and motivation in the participant*

The participants shall:

1.6.2 Engage themselves in discussions and share experiences relevant to BST Manual Handling

Note *When the participants succeed by trying out on their own, bring their relevant experience into play and apply learning points from the instructor's feedback, the participant develops a positive attitude and responsibility towards the subject and the performance in the work situation*

ELEMENT 1.7 - HUMAN FACTORS

The aim of the element is to initiate the participants' focus on how human performance and taking responsibility influences a safe work environment, and to prepare for the continued focus on human factors during practical training and exercises.

The instructor shall:

1.7.1 Present how human factors influence accidents in the wind industry. Relevant statistics may be used

1.7.2 Lead a discussion about the role of the individual in improving human performance and how this can improve safety in wind turbine environments

1.7.3 Ensure that constructive feedback on the participant's performance involve human factors criteria when these are defined in the learning objective such as the ability to take responsibility or to act independently

Human Factors Criteria:

The consequences of human factors in accidents in wind turbine environments are influenced by the following terms and conditions:

a. attention and perception

b. group behaviour and peer pressure

c. weather conditions

d. weather delays

e. noise levels

f. site layout and housekeeping

g. fitness and health

h. domestic and work-related stress

i. workload (both overload and underload)

j. fatigue

k. time pressure and deadlines

l. alcohol, medication, and substance abuse

The participants shall:

1.7.4 Engage in discussions and share experiences on how human factors influence accidents related to the BST Manual Handling Module

1.7.5 Engage in and reflect on received feedback and take responsibility on their own performance and development during the training

ELEMENT 1.8 - BEHAVIOURAL SAFETY

Learning objectives:

10) The participants can **describe** how applying manual handling techniques and principles can affect them in relation to work related musculoskeletal injuries, illnesses, and life-long mobility (Knowledge, basic level)

11) The participants can **describe** the causes of injuries, contributing factors and what to do to mitigate these (Knowledge, basic level)

The instructor shall:

1.8.1 Present examples of work-related injuries due to employees failing to apply manual handling principles and techniques when performing manual handling operations. The presentation should be supported by recent injury statistics from the wind industry related to manual handling, such as the current G+ incident data report

1.8.2 Ask the participants involving questions about how work-related injuries and illnesses can affect them and their mobility in the short-term and long-term

1.8.3 Highlight the importance of staying injury free when doing manual handling tasks

1.8.4 Lead a discussion about the causes of injuries and attributing factors. For example:

a. lack of warm-up before manual handling activity

b. time vs effort/conditions/risk

c. putting the job before oneself

d. negative habits

e. previous injuries

f. physical condition

g. and how to mitigate these causes and factors

The participants shall:

1.8.5 Engage in answering the questions about how work-related injuries and illnesses can affect them in the short-term and long-term

1.8.6 Engage in the discussion about the causes of injuries, contributing factors and what to do to mitigate these. Discussions should also cover the individual's responsibility and taking the initiative to conduct warm-up prior to work

LESSON 2 - INJURIES, SYMPTOMS AND ESSENTIAL MANUAL HANDLING PRINCIPLES

20 min.

The aim of this lesson is to create awareness of the risk of musculoskeletal injuries within the wind industry.

After successfully completing this lesson, participants can:

12) **Solve** how to identify typical symptoms of musculoskeletal injuries (Ability, basic level)

13) **Show interest** in the manual handling principles and how these can be used to reduce the risk of injury in their work (Ability, basic level)

Note *Parts of the total learning outcome of Lesson 2 must be covered within the practical exercises in Lesson 4 in exercise introductions and feedback sessions where feasible*

ELEMENT 2.1 - HOW TO AVOID COMMON MUSCULOSKELETAL INJURIES IN THE WIND INDUSTRY

Learning objectives:

14) The participants can **describe** common muscular and skeletal injuries related to manual handling in the wind industry (Knowledge, basic level)

15) The participants can **describe** examples of risks and hazards of manual handling relevant to the job functions within the wind industry (Knowledge, basic level)

The instructor shall:

2.1.1 Present examples of common muscular and skeletal injuries related to manual handling in the wind industry including:

a. back injuries e.g. slipped disc

b. muscle strains

2.1.2 Lead a brainstorm or discussion with the participants about examples of risks and hazards of manual handling relevant to the job functions within the wind industry and the principles of how to improve safety while executing such tasks, such as:

a. working over shoulder height

b. working while kneeling

c. lifting, push and pull

d. carrying

e. working with handheld tools

f. awkward positions

g. forceful exertions

h. repetitive motions

i. twisting

j. contact stress

k. exposure of local body parts and entire body to mechanical vibrations

l. duration of exposure

m. frequency of exposure

n. intensity of exposure

2.1.3 Lead discussions with the participants about:

a. the risks and hazards while executing manual handling related tasks

b. principles of how to improve safety while executing manual handling related tasks

The participants shall:

2.1.4 Engage in the brainstorms / discussions: share experiences and understandings about:

a. common muscular and skeletal injuries related to manual handling in the wind industry

b. risks and hazards of manual handling relevant to the job functions within the wind industry

c. how to avoid injuries, the risks and hazards and improve safety while executing manual handling related tasks

Note *Element 2.1 may be carried out during the practical training in Lesson 4 and in the training review in Lesson 5*

ELEMENT 2.2 - TYPICAL SYMPTOMS OF INJURIES

Learning objectives:

16) The participants can **recognise** typical early symptoms of musculoskeletal injuries (Knowledge, basic level)

17) The participants can **take responsibility** for reacting to early symptoms of musculoskeletal injuries and take initiative for corrective action and seeking medical advice (Ability, intermediate level)

18) The participants can **describe** potential long-term consequences of musculoskeletal injuries (Knowledge, basic level)

The instructor shall:

2.2.1 Facilitate participants' guided practice in identifying key examples of typical symptoms of musculoskeletal injuries

2.2.2 Lead participants in discussions about:

a. experiences with musculoskeletal injuries

b. what to do when typical symptoms of musculoskeletal injuries have been identified

c. the importance of early detection and treatment

2.2.3 Provide constructive feedback to the participants performance in the activities

The participants shall:

2.2.4 Practise how to identify key examples of typical symptoms of musculoskeletal injuries

2.2.5 Reflect on the received feedback, engage in the discussions, and share understandings and experiences about:

a. what to do when typical symptoms of musculoskeletal injuries have been identified

b. the importance of early detection and treatment

ELEMENT 2.3 - ESSENTIAL MANUAL HANDLING PRINCIPLES

Learning objectives:

19) The participants can **describe** essential manual handling principles (Knowledge, basic level)

20) The participants can **describe** the further control measures and how these can be used to reduce risk of injury in the participants' own work (Knowledge, basic level)

The instructor shall:

2.3.1 Explain and demonstrate how to use essential manual handling principles to safely perform frequent manual handling tasks in the wind industry

2.3.2 Ask the participants involving questions during the practical exercises about how to use essential manual handling principles, for example:

a. how are the essential manual handling principles followed?

b. what are the differences and similarities between the principles?

c. how will the participants be able to follow the principles in their own work?

d. in what situations is the principle of 'good housekeeping' relevant for safe manual handling operations?

2.3.3 Present and lead a discussion about further control measures and how to use these to reduce risk of musculoskeletal injury and protect pre-existing injuries. The hierarchy of control measures is illustrated by figure 8.6.1 Hierarchy of controls. Also see Annex 3 for further discussion

2.3.4 Ask the participants involving questions about the further control measures and how these can be used to reduce risk of injury in the participants own work

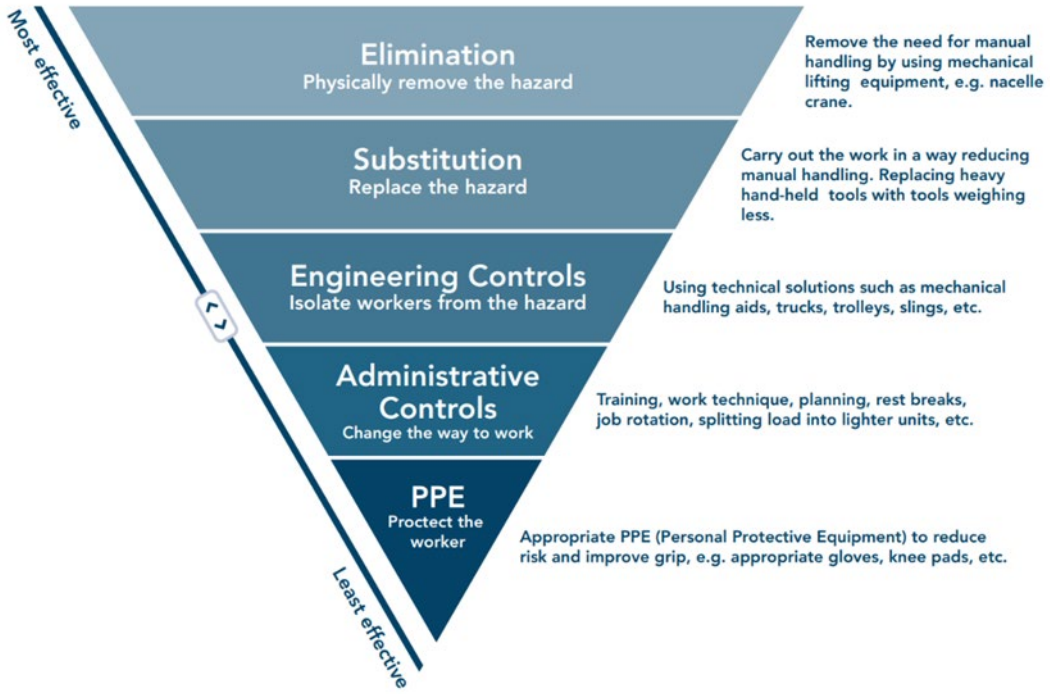


Figure 8.6.1 – Hierarchy of controls

The participants shall:

2.3.5 Engage in answering the questions and share understandings about:

a. the essential manual handling principles

b. the further control measures and how these can be used to reduce risk of musculoskeletal injury in the participants' own work

Note *Loads used for training should be of a realistic and safe weight and must be in line with the guidance in the 'lifting and lowering filter' presented in Annex 3. Also see figure 8.6.2 (below)*

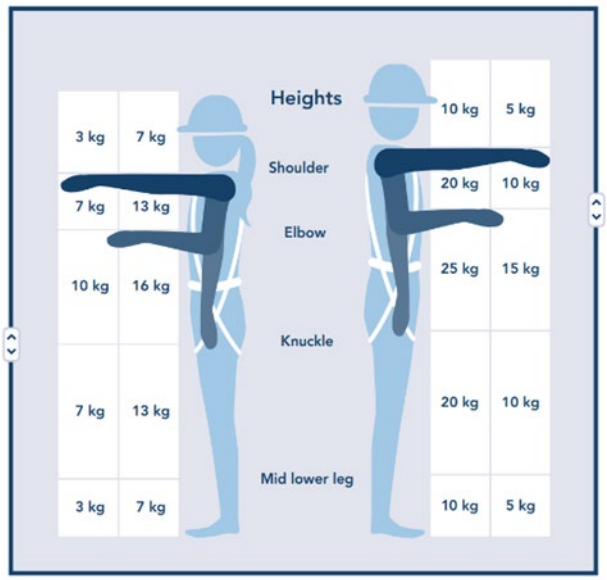


Figure 8.6.2 – Lifting and lowering filter

Note *The use of mechanical and manual aids is recommended wherever possible to reduce risk of musculoskeletal injuries*

ELEMENT 2.4 - BASIC DYNAMIC RISK ASSESSMENT AND INTRODUCTION TO TILE PRINCIPLE

Note *See Annex 3 for TILE principle*

Learning objective:

21) The participants can **describe** the TILE principle and how to apply them in manual handling situations (Knowledge, basic level)

The instructor shall:

2.4.1 Present the TILE principle and their use in relation to basic dynamic risk assessment when planning manual handling operations

2.4.2 Ask involving questions about TILE principle in relation to planning manual handling operations

The participants shall:

2.4.3 Engage in answering questions and share experiences about using TILE principle when planning manual handling operations

Additional optional learning activity. The participants complete a questionnaire covering the main theory topics from Lesson 2. This may be done during rotation exercises in Lesson 4

Note *TILE principle must be addressed at all times (when relevant) during the practical training in Lesson 4*

LESSON 3 - WARM UP ACTIVITIES

20 min.

Lesson 3 should be conducted in connection to the practical training in Lesson 4.

The aim of this lesson is to create awareness of the importance of warming up before manual handling operations to reduce the risk of musculoskeletal injury.

22) The participants can **recognise** the importance of warming up prior to daily physical work tasks to ensure safe working practices and reduce the risks of musculoskeletal injury (Knowledge, basic level)

23) The participants can **take initiative** and responsibility to warm up prior to daily physical work tasks (ability, intermediate level)

The instructor shall:

3.1.1 Explain the importance of warming up as preparation for manual handling operations, including repetitive work, working in awkward positions and heavy lifting

3.1.2 Prompt the participants to share experiences about warming up before manual handling operations

3.1.3 Lead a discussion on how to support a culture about warming up on work sites prior to physical work, including climbing

3.1.4 Lead a warm-up session of the major muscle groups of the body and the ankles, wrists and back, including:

a. mobility of joints

b. increase heart rate to oxygenate the muscles (warm-up)

c. stretching

The participants shall:

3.1.5 Share experiences on manual handling operations and related warm up activities

3.1.6 Discuss advantages and challenges to warming up prior to physical work activities

3.1.7 Take part in the warm-up session of the major muscle groups, ankles, wrists and back

Note *Warm-up activities should be engaging and motivating for the participants, and they should be possible to perform as a daily routine on the work site. This way, transfer between the training and the work situation will be ensured. In Annex 2: Guideline for Warm-up Exercises to this BST Module, a guideline for a warm-up programme is presented*

LESSON 4 - MANUAL HANDLING PRINCIPLES

140 min.

The aim of this lesson is to enable the participants to use essential manual handling principles in a variety of relevant scenarios in wind turbine work environments.

Note *Guidelines on filters for lifting, carrying, and lowering loads, on how to identify low risk tasks, and on good handling techniques are presented in Annex 3*

After successfully having completed this lesson, the participants can:

24) **Take initiative** and **act independently** in using essential manual handling principles to reduce the risk of musculoskeletal injury when working in the wind industry (Ability, intermediate level)

25) **Take responsibility for** mitigating musculoskeletal injuries (when lifting; pushing and pulling loads; and when working in awkward postures) by using suitable manual handling principles and aids where possible (Ability, intermediate level)

Note *The scenario-based training exercises should reflect the environment and the work tasks that wind technicians face on the job enabling the participants to practise how to mitigate the musculoskeletal injuries risks related to manual handling*

Note *Scenario-based exercises must follow the TILE principle and include loads of different shapes, sizes, and weights. The use of manual handling aids must be considered, when planning the manual handling operation and must be included where relevant*

Note *Scenario-based exercises may be conducted as a coherent exercise, where several elements are included*

ELEMENT 4.1 - WORKING OVER SHOULDER HEIGHT

Learning objectives:

26) The participants can **recognise** the risks from working over shoulder heights (Knowledge, basic level)

27) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and using relevant aids when working over shoulder heights (Ability, intermediate level)

Note *Whenever possible, a work task should be planned to reduce activities above shoulder height*

The instructor shall:

4.1.1 Present and explain how to mitigate working over shoulder height and how to mitigate musculoskeletal injuries when working over shoulder height

4.1.2 Facilitate a scenario-based exercise covering working over shoulder height: e.g. placing spare parts and loads; bolt tensioning; reaching and rescue scenarios on ladders

4.1.3 Observe the participant's performance and give constructive feedback throughout on the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids, where possible

c. the use of the manual handling principles

The participants shall:

4.1.4 Take active part in exercises covering working over shoulder height and ask questions when unsure of safe manual handling techniques and principles

4.1.5 Apply TILE principle when planning the manual handling operation

4.1.6 Reflect on the received feedback in order to perform manual handling the best possible way

ELEMENT 4.2 - WORKING WHILE KNEELING

Learning objectives:

28) The participants can **recognise** the risks of musculoskeletal injuries from working while kneeling (Knowledge, basic level)

29) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when working while kneeling (Ability, intermediate level)

The instructor shall:

4.2.1 Explain and present how to mitigate musculoskeletal injuries from working while kneeling. For example: alternating between sitting and standing, organising work task between colleagues and how to mitigate musculoskeletal injuries when working while kneeling (e.g. by using knee pads and mats)

4.2.2 Facilitate a scenario-based exercise covering working while kneeling (e.g. cleaning, preparing rescuing stretchers and tightening bolts)

4.2.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing working whilst kneeling by using suitable handling aids where possible

c. the use of the manual handling principles

d. using e.g. knee pads and mats to mitigate musculoskeletal injuries

The participants shall:

4.2.4 Take active part in exercises covering working while kneeling and ask questions when unsure of safe manual handling techniques and principles

4.2.5 Apply TILE principle when planning the manual handling operation

4.2.6 Reflect on the received feedback in order to perform manual handling in the best possible way

ELEMENT 4.3 - PUSH AND PULL

Learning objectives:

30) The participants can **recognise** the risks from pushing and pulling loads (Knowledge, basic level)

31) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when pushing and pulling loads (Ability, intermediate level)

The instructor shall:

4.3.1 Explain and present how to mitigate musculoskeletal injuries from pushing and pulling loads manually

4.3.2 Facilitate a scenario-based exercise covering moving loads, e.g. when transferring between SOV (walk-to-work) and WTG, and when working in restricted spaces

4.3.3 Observe the participant's performance and give constructive feedback throughout the exercise with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids where possible

c. the use of manual handling principles

The participants shall:

4.3.4 Take active part in exercises covering pushing and pulling loads and ask questions when unsure of safe manual handling techniques and principles

4.3.5 Apply TILE principle when planning the manual handling operation

4.3.6 Reflect on the received feedback concerning pushing and pulling loads in the best possible way in relation to avoid musculoskeletal injuries

ELEMENT 4.4 - CARRYING

Learning objectives:

32) The participants can **recognise** the risks from carrying loads (Knowledge, basic level)

33) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when carrying loads (Ability, intermediate level)

The instructor shall:

4.4.1 Explain and present how to mitigate musculoskeletal injuries from carrying loads by following the TILE principle

4.4.2 Facilitate a scenario-based exercise covering different loads, e.g. shapes, size, weights, in different route scenarios, such as: stairs, hatches, thresholds and ramps

4.4.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids where possible

c. the use of manual handling principles

The participants shall:

4.4.4 Take active part in lifting loads exercises and ask questions when unsure of safe manual handling techniques and principles

4.4.5 Apply TILE principle when planning the manual handling operation

4.4.6 Reflect on the received feedback to perform manual handling in the best possible way

Note *Use relevant lifting equipment when possible and avoid carrying loads on stairs*

ELEMENT 4.5 - LIFTING

Learning objectives:

34) The participants can **recognise** the risks from lifting loads (Knowledge, basic level)

35) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when lifting loads (Ability, intermediate level)

The instructor shall:

4.5.1 Present and explain risks from lifting loads and how to mitigate musculoskeletal injuries from lifting, e.g. weight, grip, posture, and position of the load relative to the body

4.5.2 Facilitate a scenario-based exercise covering lifting different kinds of loads, e.g. liquids in containers, bulky loads, shapes, and unbalanced loads. The exercise must include considerations covering the task, individual capabilities, the load, and the work environment (TILE)

4.5.3 Observe the participants' performance and give constructive feedback throughout the participants practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids where possible

c. the use of manual handling principles

The participants shall:

4.5.4 Take an active part in lifting loads exercises and ask questions when unsure of safe manual handling techniques and principles

4.5.5 Apply TILE principle when planning the manual handling operation

4.5.6 Reflect on the received feedback to perform manual handling the best possible way

Note *The participants must also practise in teams of two or more persons (or otherwise according to local policy) to perform a safe lift of a load that weighs no more than 30kg and is unwieldy; difficult to grasp; difficult to grip; with contents likely to move or shift (e.g. a rescue dummy and liquids)*

ELEMENT 4.6 - WORK WITH HANDHELD TOOLS

Learning objectives:

36) The participants can **recognise** the risks from repetitive work and from working with handheld tools (Knowledge, basic level)

37) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when working with handheld tools (Ability, intermediate level)

The instructor shall:

4.6.1 Present and explain risks by working with handheld tools; e.g. repetitive work and heavy tools

4.6.2 Facilitate a scenario-based exercise and a discussion covering how to mitigate musculoskeletal injuries from repetitive work and working with handheld tools

4.6.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing musculoskeletal injuries from repetitive work and work with handheld tools

c. the use of manual handling principles

The participants shall:

4.6.4 Take an active part in exercises focusing on how to mitigate injuries from working with handheld tools; ask questions when unsure of safe manual handling techniques and principles and engage in discussions

4.6.5 Apply TILE principle when planning the manual handling operation

4.6.6 Reflect on the received feedback to perform manual handling the best possible way

Note *The instructor should present examples of early symptoms of injuries from vibrating handheld tools, e.g. numbness and reduced blood circulation in fingers (vibration white finger)*

ELEMENT 4.7 - AWKWARD POSTURES

Learning objectives:

38) The participants can **recognise** the risks from working in awkward postures (Knowledge, basic level)

39) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when working in awkward postures (Ability, intermediate level)

The instructor shall:

4.7.1 Present and explain risks from working in awkward postures (such as: when the torso is twisted or bent; in combination with loads and distance away from the body) and how to mitigate musculoskeletal injuries from working in awkward postures

4.7.2 Facilitate an exercise covering working in awkward postures and how to mitigate musculoskeletal injuries, e.g. when working in restricted spaces, working from a ladder and during rescue scenarios

4.7.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. using safe techniques and appropriate planning

b. reducing manual handling by using suitable handling aids and work positions where possible

c. the use of manual handling principles

The participants shall:

4.7.4 Take active part in exercises focusing on how to mitigate musculoskeletal injuries from working in awkward postures and ask questions when in doubt of safe manual handling techniques and principles

4.7.5 Apply TILE principle when planning the manual handling operation

4.7.6 Reflect on the received feedback from performing manual handling when working in awkward postures in the best possible way

LESSON 5 - TRAINING REVIEW

15 min.

The aim of this lesson is to enable the participants to reflect on and process their learning outcome and key takeaways from the module, aiming to achieve a high learning transfer from the module to their way of working.

ELEMENT 5.1 - TRAINING REVIEW

The instructor shall:

5.1.1 Re-present the overall aims and learning objectives of the module for the participants' comparison of their learning outcomes and the achievement of their previously stated expectations for the module

5.1.2 Lead a discussion or Q&A aiming at the participants' reflections of their learning outcome in relation to their ways of working

The participants shall:

5.1.3 Reflect on their learning outcome and key takeaways from BST Manual Handling, aiming to achieve a high learning transfer from the module to their ways of working by engaging in questions and answers in class or where suitable

Note *The instructor may additionally conduct a local evaluation of the training*

ELEMENT 5.2 - FEEDBACK SESSION

The instructor shall:

5.2.1 Give overall feedback and feed forward on the participants' learning outcomes inspired by the training as well as from the training review (Lesson 4)

5.2.2 Encourage the participants to examine and grow awareness of which specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualise and enhance learning transfer). In addition, and after the module completion, to discuss with colleagues about how the BST Manual Handling content, methods and techniques are similar or different to specific, local conditions

GLOBAL WIND ORGANISATION

Fire Awareness Module

(FAW)

9. BST FIRE AWARENESS MODULE

9.1 Aims and Objectives of the BST Fire Awareness Module

The aim of this module is to enable the participants to prevent fires, make appropriate judgements when evaluating a fire, manage evacuation of personnel and ensure all are safely accounted for in the event of an unmanageable fire. If the incident is judged to be safe, the participants should be able to efficiently extinguish an initial fire by using basic handheld firefighting equipment.

Overall learning objectives:

1) The participants can **act independently** to identify fire hazards and prevent fires in a wind turbine environment (Ability, intermediate level)

2) The participants can **take responsibility** for assessing a fire and, if needed, be able to select the right extinguishing media according to the fire classes (Ability, intermediate level)

3) The participants can **take responsibility** for the evacuation of personnel and ensure all are safely accounted for in the event of an unmanageable fire (Ability, intermediate level)

4) The participants can **act independently** in efficiently extinguishing an initial fire by using basic handheld firefighting equipment, if the incident is judged to be safe (Ability, intermediate level)

9.2 Duration of the BST Fire Awareness Module

The total contact time for completing the BST Fire Awareness Module is to be 3 hours and 20 minutes.

The training provider must not exceed the times per day given in table 9.2.1 below.

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 hours

Table 9.2.1 – Maximum durations for training day

Note *Contact time includes delivery of course lesson contents, practical exercises and activities directly related to these.*

The total training day includes contact time, meals and breaks and travel between training sites (where applicable).

9.3 Fire Awareness Module Participant Ratio

The ratio shown for theory sessions indicates the maximum number of participants that can attend the course.

Other ratios indicate the maximum number of participants to be supervised by one (or more) instructor(s) during each activity.

Module	Session	Instructor to Participant Ratio
BST Fire Awareness	Theory	1:12
	Practical	1:6

Table 9.3.1 – GWO Fire Awareness Module instructor to participant ratio

9.4 Equipment for Fire Awareness Module

The equipment required for training as listed in Annex 1 must be available and must fulfil national legal requirements as listed in table A4-1 in Annex 1 where applicable.

9.5 BST Fire Awareness Module Timetable

The order in which elements of this BST Module training are delivered may vary according to the didactical choices of the delivering training provider.

The delivery of this module must comply with the requirements described in the GWO Requirements for Training.

Lesson	Element		Duration
1. Introduction to the training	1.1	Safety instructions and emergency procedures	
	1.2	Facilities	
	1.3	Introduction	
	1.4	Scope and main learning objective	
	1.5	Ongoing assessment (participant performance assessment form)	
	1.6	Motivation	
	1.7	Human factors	
		TOTAL	15 min.
2. Legislation	2.1	Global legislation	
	2.2	National legislation	
		TOTAL	5 min.
3. Fire combustion and fire spread	3.1	Types of fires	
	3.2	Fire triangle	

		3.3	Fire spread	
		3.4	Fire gases	
			TOTAL	20 min.
4.	Fire extinguishing	4.1	Contingency plan	
		4.2	Assessing the fire	
		4.3	Fire classes	
			TOTAL	25 min.
5.	Fire prevention	5.1	Fire hazards	
		5.2	Fire prevention measures	
			TOTAL	20 min.
6.	Firefighting equipment in a WTG	6.1	Pre-use inspection	
		6.2	Correct use of firefighting equipment	
			TOTAL	20 min.
7.	Practice and scenario-based training	7.1	Practice	
		7.2	Scenario-based training	
			TOTAL	80 min.
8.	Training review	8.1	Training review	
		8.2	Feedback session	
			TOTAL	15 min.
			GRAND TOTAL	200 min.

Table 9.5.1 – GWO Fire Awareness Module timetable

9.6 Detailed Description of the BST Fire Awareness Module

LESSON 1 - INTRODUCTION TO THE TRAINING

15 min.

The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.

After having successfully completed Lesson 1 of BST Fire Awareness Module, the participants can:

5) **Recognise** what is expected of them throughout the module (Knowledge, basic level)

6) **Name** and point out local emergency procedures and facilities (Knowledge, basic level)

7) **Discuss** the relevant human factors and explain their implications (Knowledge, intermediate level)

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

8) The participants **show interest** or curiosity in the safety and emergency procedures at the training facility (Ability, basic level)

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. safety instructions according to internal procedures

b. emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures

ELEMENT 1.2 - FACILITIES

Learning objective:

9) The participants can **recognise** the location of facilities at the training location (Knowledge, basic level)

The instructor shall:

1.2.1 Present a general description of the facilities at the training location (administration, dining area, restrooms, toilets, etc.)

1.2.2 Alternative activity: lead a tour and point out facilities

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt

ELEMENT 1.3 - INTRODUCTION

Learning objective:

10) The participants **show interest** in fellow participants and the course content / design (Ability, basic level)

The instructor shall:

1.3.1 Explain and ask involving questions aiming at the programme of the BST Fire Awareness Module training, including breaks and mealtimes

1.3.2 Give a short introduction to themselves, including their backgrounds as instructors

1.3.3 Ask for participants' expectations of the training and their learning or development

The participants shall:

1.3.4 Give a short introduction to themselves, including job function and expected primary geographic work location and share expectations on the training

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVE

Learning objective:

11) The participants can **recognise** the scope and main objectives of the BST Fire Awareness Training Module (Knowledge, basic level)

The instructor shall:

1.4.1 Present the scope and main learning objectives of the BST Fire Awareness Module training

1.4.2 Involve participants with questions on understanding and individual experiences of BST Fire Awareness Module

The participants shall:

1.4.3 Engage in answering questions and share experiences of BST Fire Awareness Module

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT PERFORMANCE ASSESSMENT FORM)

Learning objective:

12) The participants **recognise** the assessment procedure and the aim of the ongoing assessment (Knowledge, basic level)

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment

1.5.2 Explain the layout of the GWO participant performance assessment form and how it is used

The participants shall:

1.5.3 Engage themselves in discussions and ask questions when in doubt in relation to the assessment procedure

ELEMENT 1.6 - MOTIVATION

Learning objective:

13) The participants **show interest** and willingness to engage in the learning activities (Ability, basic level)

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. the importance of personal involvement in the course

b. the definition of and the need for BST Fire Awareness Module knowledge, skills and abilities when working in the wind industry

Note *Positive motivation is the driving force for commitment, and the instructor should make a focused effort to support growth of the necessary attitude and motivation in the participant*

The participants shall:

1.6.2 Engage themselves in discussions and share experiences on BST Fire Awareness Module

Note *When the participants succeed by trying out on their own, bring their relevant experience into play and apply learning points from the instructor's feedback; the participant develops a positive attitude and responsibility towards the subject and the performance in the work situation*

ELEMENT 1.7 - HUMAN FACTORS

The aim of the element is to draw the participants' attention to how human behaviour and taking responsibility influences a safe work environment. In addition, the aim is to prepare for a continued focus on human factors during practical training and exercises.

Learning objectives:

14) The participants can **describe** the relevant human factors, and their implications. (Knowledge, basic level)

15) The participants **show interest** and willingness to focus on human factors during the following practical exercises (Ability, basic level)

The instructor shall:

1.7.1 Present how human factors influence accidents in the wind industry (relevant data may be used)

1.7.2 Lead a discussion about the role of the individual in improving human behaviour and how this can improve the safety in the wind industry

Facts and Human Factors Criteria:

The consequences of human factors in accidents in the wind industry are influenced by the following terms and conditions:

a. attention and perception

b. group behaviour and peer pressure

c. weather conditions

d. weather delays

e. noise levels

f. site layout and housekeeping

g. fitness and health

h. domestic and work-related stress

i. workload (both overload and underload)

j. fatigue

k. time pressure and deadlines

l. alcohol, medication, and substance abuse

The participants shall:

1.7.3 Engage in discussions and share experiences of how human factors influence accidents related to the BST Fire Awareness Module

1.7.4 Engage in and reflect on received feedback and take responsibility on their own performance and development during the training

LESSON 2 - LEGISLATION

5 min.

The aim of this lesson is to enable the participants to comply with legislation and requirements that apply to fire prevention and firefighting equipment related to the industry.

After successfully having completed this lesson, the participants:

16) **Show interest** in adhering to applicable legislation relevant to fire prevention and firefighting equipment (Ability, basic level)

ELEMENT 2.1 - GLOBAL LEGISLATION

Learning objective:

17) The participants can **describe** relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry onshore and offshore (Knowledge, basic level)

The instructor shall:

2.1.1 Present examples of relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry onshore

2.1.2 Present examples of relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry offshore

2.1.3 Ask the participants involving questions about relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry onshore and offshore

The participants shall:

2.1.4 Engage in answering the questions and share their understandings about relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry onshore and offshore

ELEMENT 2.2 - NATIONAL LEGISLATION

Learning objective:

18) The participants can **describe** national legislation relevant to fire prevention and firefighting equipment in relation to the industry (Knowledge, basic level)

The instructor shall:

2.2.1 Present examples of:

a. applicable legislation

b. national legislative requirements

c. legal responsibilities

d. local authorities

2.2.2 Ask the participants involving questions about relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the national legislation

The participants shall:

2.2.3 Engage in answering the questions and share their understandings about relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the national legislation

LESSON 3 - FIRE COMBUSTION AND FIRE SPREAD

20 min.

The aim of this lesson is to enable the participants to understand combustion, fire spread, the different types of fires and the composition of smoke. In addition, to understand the elements needed for a fire (and more importantly) how to extinguish a fire and the dangers of smoke.

After successfully having completed this lesson, the participants can:

19) **Show interest** in the different types of fires and the material state, including the type of material surface (Ability, basic level)

20) **Show interest** in the triangle of combustion (Ability, basic level)

21) **Show interest** in fire spread and hazards of fire gases (Ability, basic level)

ELEMENT 3.1 - TYPES OF FIRES

Learning objective:

22) The participants can **describe** the different types of fires and the material state, including the type of material surface (Knowledge, basic level)

The instructor shall:

3.1.1 Present the types of fires (solid, liquid, gas)

3.1.2 Present material state, including how surface size influences combustion

3.1.3 Facilitate a learning activity such as a quiz, questionnaire or ask the participants involving questions about the types of fires and the state of material, including the influence of the size of the surface

The participants shall:

3.1.4 Engage in answering the activity and share understandings about the types of fires and the state of material, including the influence of the size of the surface

ELEMENT 3.2 - FIRE TRIANGLE

Learning objective:

23) The participants can **recognise** basic fire theory e.g. the triangle of combustion (Knowledge, intermediate level)

The instructor shall:

3.2.1 Present the elements needed for a fire to occur with reference to the three sides of the triangle of combustion (oxygen, material, and temperature):

3.2.2 Facilitate a learning activity such as a quiz, questionnaire or ask the participants involving questions about the elements needed for a fire to occur with reference to the three sides of the triangle of combustion

The participants shall:

3.2.3 Engage in the activity and share understandings about the triangle of combustion

ELEMENT 3.3 - FIRE SPREAD

Learning objective:

24) The participants can **explain** fire spread (Knowledge, intermediate level)

The instructor shall:

3.3.1 Present how fire spreads by (in relation to the wind energy industry):

a. conduction

b. convection

c. radiation

d. direct burning

3.3.2 Facilitate a learning activity such as a quiz, questionnaire or ask the participants involving questions about how a fire can spread

3.3.3 Give constructive feedback to the participants throughout the activity

The participants shall:

3.3.4 Engage in the activity and share understandings about how a fire can spread

ELEMENT 3.4 - FIRE GASES

Learning objective:

25) The participants can **explain** the composition and hazards of fire gases based on the materials in a WTG (Knowledge, intermediate level)

The instructor shall:

3.4.1 Present the composition and hazards of fire gases based on the materials in a WTG

3.4.2 Facilitate a learning activity such as a quiz, questionnaire or ask the participants involving questions about the composition and hazards of fire gases based on the materials in a WTG

3.4.3 Give constructive feedback to the participants throughout the activity

The participants shall:

3.4.4 Engage in the activity and share understandings about the composition and hazards of fire gases based on the materials in a WTG

LESSON 4 - FIRE EXTINGUISHING

25 min.

The aim of this lesson is to enable the participants to assess a fire and, if needed, to be able to identify the right extinguishing media according to the fire classes. Furthermore, this lesson shall enable the participants to act according to the contingency plans in a WTG.

After successfully having completed this lesson, the participants can:

26) **Solve** how to assess a fire (Ability, basic level)

27) **Solve** how to act in a given situation based on an assessment of the fire and, if needed, to select the right extinguishing media according to the fire classes (Ability, basic level)

28) **Solve** how to act according to the continency plans in a WTG (Ability, basic level)

ELEMENT 4.1 - CONTINGENCY PLAN

Learning objectives:

29) The participants can **describe** an example of a contingency plan in a wind turbine (Knowledge, basic level)

30) The participants can **describe** examples of the importance of knowing beforehand what to do in an emergency (Knowledge, basic level)

31) The participants can **explain** when and how to use a personal escape mask if applicable (Knowledge, intermediate level)

The instructor shall:

4.1.1 Share copies of an example of a contingency plan in a wind turbine

4.1.2 Ask the participants involving questions about:

a. the example of a contingency plan for a wind turbine

b. examples of the importance of knowing beforehand what to do in an emergency

4.1.3 Facilitate an exercise where the participants can share understandings about when and how to use a personal escape mask if applicable

The participants shall:

4.1.4 Engage in answering the questions and share understandings about:

a. the example of a contingency plan for a wind turbine

b. examples of the importance of knowing beforehand what to do in an emergency

4.1.5 Engage in the exercise and share understandings about when and how to use a personal escape mask

ELEMENT 4.2 - ASSESSING THE FIRE

Learning objective:

32) The participants can **describe** the fire intensity curve (Knowledge, basic level)

33) The participants can **solve** the challenge of how to assess a fire and how to act based on the assessment of the fire (Ability, basic level)

The instructor shall:

4.2.1 Present the fire intensity curve

4.2.2 Facilitate a learning activity which enables all participants to practise how to assess a fire and how to act based on the assessment of the fire

4.2.3 Give constructive feedback to the participants throughout the activity with an emphasis on ensuring that the participants have a correct understanding of the fire intensity curve; can assess a fire and know what to do based on the assessment of the fire

The participants shall:

4.2.4 Engage in the activity and practise how to assess a fire and how to act based on the assessment of the fire

ELEMENT 4.3 - FIRE CLASSES

Learning objectives:

34) The participants can **describe** the fire classes (Knowledge, basic level)

35) The participants can **explain** methods of extinguishing fire with reference to the fire triangle (Knowledge, intermediate level)

36) The participants can **explain** which extinguishing media found in a WTG can be used for various fire classes (Knowledge, intermediate level)

The instructor shall:

4.3.1 Present the fire classes and show examples of different types of fires according to the fire classes

4.3.2 Facilitate a learning activity, where the participants must share understandings about:

a. the fire classes

b. methods of extinguishing fire with reference to the fire triangle

c. which extinguishing media found in a WTG can be used for various fire classes

4.3.3 Give constructive feedback to the participants throughout the activity with an emphasis on ensuring that the participants have a correct understanding of the fire classes and the various fire extinguishers available for extinguishing various fire types

The participants shall:

4.3.4 Engage in the activity and share understandings about:

a. the fire classes

b. methods of extinguishing fire according to the fire classes

c. which extinguishing media found in a WTG can be used for various fire classes

	Fire Class by Global Region		
Fire Type	Europe	North America	Australia
Combustible Materials	A	A	A
Flammable Liquids	B	B	B
Flammable Gases	C	B	C
Flammable Metals	D	D	D
Electrical Fire	Not Classified	C	E
Cooking Oils and Fats	F	K	F

Table 4.3.1 – Fire classes by region

LESSON 5 - FIRE PREVENTION

20 min.

The aim of this lesson is to enable the participants to take preventive measures to improve fire safety in a WTG.

After successfully having completed this lesson, the participants can:

37) **Solve** the challenge of how to identify and mitigate fire hazards in a WTG environment (Ability, basic level)

38) **Show interest** in the importance of personal behaviour as a fire prevention measure and how to improve fire safety during daily work (Ability, basic level)

ELEMENT 5.1 - FIRE HAZARDS

Learning objectives:

39) The participants can **recognise** fire hazards in a WTG environment (Knowledge, basic level)

40) The participants can **solve** the challenge of how to identify and mitigate fire hazards in a WTG environment (Ability, basic level)

The instructor shall:

5.1.1 Present example(s) of situation(s) or scenario(s) with fire hazards in a WTG environment (manned/unmanned)

5.1.2 Explain and demonstrate in how to identify and mitigate the fire hazards in the shown example(s) of situation(s) or scenario(s) from a WTG environment (manned/unmanned)

5.1.3 Ask the participants relevant questions about how to identify and mitigate the fire hazards in the example(s)

5.1.4 Provide additional examples of situations or scenarios from a WTG environment with fire hazards (manned/unmanned)

5.1.5 Facilitate guided practise for the participants in identifying the fire hazards and deciding how to mitigate these hazards in the additional examples

5.1.6 Give constructive feedback to the participants' practice in identifying the fire hazards and deciding how to mitigate these hazards in the additional examples:

The participants shall:

5.1.7 Engage in answering the questions and share their understandings about how to identify and mitigate the fire hazards in the examples

5.1.8 Engage in the practice of identifying the fire hazards and deciding how to mitigate these hazards in the additional examples

ELEMENT 5.2 - FIRE PREVENTION MEASURES

Learning objectives:

41) The participants can **describe** how to improve fire safety in daily work (Knowledge, basic level)

42) The participants can **recognise** fixed systems in WTGs, including requirements for special training for entering WTGs with fixed systems (Knowledge, basic level)

The instructor shall:

5.2.1 Lead discussion with the participants about how to improve fire safety in daily work

5.2.2 Present example(s) of fixed systems in a WTG, including requirements for special training for entering WTGs with fixed systems

5.2.3 Facilitate a learning activity such as a quiz, questionnaire or ask the participants involving questions about fixed systems in a WTG, including requirements for special training for entering WTGs with fixed systems

The participants shall:

5.2.4 Engage in the discussion and share understandings about how to improve fire safety in daily work

5.2.5 Engage in answering the activity and share understandings about fixed systems in a WTG including requirements for special training for entering WTGs with fixed systems

LESSON 6 - FIREFIGHTING EQUIPMENT IN A WTG

20 min.

The aim of this lesson is to enable the participants to be able to use firefighting equipment in a WTG efficiently without the risk of injuries.

After having successfully completed this lesson, participants can:

43) **Solve** how to do a pre-use inspection of various firefighting equipment found in a wind turbine (Ability, basic level)

44) **Show interest** in distances and correct, efficient, and safe use of various firefighting equipment focusing on equipment found in a wind turbine (Ability, basic level)

45) **Show interest** in advantages and disadvantages of various firefighting equipment with a focus on equipment found in a wind turbine (Ability, basic level)

ELEMENT 6.1 - PRE-USE INSPECTION

Learning objectives:

46) The participants can **describe** the importance of pre-use inspection of firefighting equipment (Knowledge, basic level)

47) The participants can **perform** pre-use inspections of firefighting equipment (Skills, intermediate level)

The instructor shall:

6.1.1 Lead a discussion or brainstorm with the participants about possible consequences if a pre-use inspection of firefighting equipment is NOT done prior to use

6.1.2 Facilitate practical exercise that enable the participants to practise performing pre-use inspections of firefighting equipment

6.1.3 Give the participants constructive feedback throughout the activities

The participants shall:

6.1.4 Engage in the brainstorm and share experiences or understandings about the importance of pre-use inspection of firefighting equipment

6.1.5 Practise pre-use inspections of firefighting equipment

ELEMENT 6.2 - CORRECT USE OF FIREFIGHTING EQUIPMENT

Learning objectives:

48) The participants can **describe** the advantages and disadvantages of various firefighting equipment in WTGs (Knowledge, basic level)

49) The participants can **describe** the safe distance and precautions for various firefighting equipment (Knowledge, basic level)

50) The participants can **describe** how to use various firefighting equipment correctly, efficiently and safely in WTGs (Knowledge, basic level)

The instructor shall:

6.2.1 Present the advantages and disadvantages of various firefighting equipment in WTGs

6.2.2 Demonstrate safe distance and precautions for various firefighting equipment

6.2.3 Demonstrate correct, efficient, and safe use of various firefighting equipment in WTGs

6.2.4 Ask the participants involving questions throughout about the:

a. advantages and disadvantages of various firefighting equipment in WTGs

b. safe distances and precautions for various firefighting equipment

c. correct, efficient and safe use of various firefighting equipment in WTGs

The participants shall:

6.2.5 Engage in answering the questions and share understandings about the:

a. advantages and disadvantages of various firefighting equipment in WTGs

b. safe distance and precautions for various firefighting equipment

c. correct, efficient and safe use of various firefighting equipment in WTGs

Note *As a minimum, the instructor shall demonstrate how to correctly use a handheld carbon dioxide (CO2) extinguhser, a water extinguisher, and a fire blanket. Dry chemical extinguishers shall be explained*

Where possible and in accordance with local legislation this demonstration should be conducted using live fire and active extinguishing agents

LESSON 7 - PRACTICE AND SCENARIO-BASED TRAINING

80 min.

The aim of this lesson is to enable the participants to assess a fire and if needed, efficiently extinguish a small fire without the risk of injuries.

After successfully having completed this lesson, the participants can:

51) **Take responsibility** for the efficient and safe use of the firefighting equipment in a WTG (Ability, intermediate level)

52) **Act independently** in assessing the fire and act in a correct manner upon discovering a fire in a WTG (Ability, intermediate level)

53) **Take responsibility** for the evacuation of personnel and ensure all are safely accounted for in the event of an unmanageable fire (Ability, intermediate level)

ELEMENT 7.1 - PRACTICE

Learning objectives:

54) The participants can **apply** CO2 extinguishers efficiently and safely (Skill, intermediate level)

55) The participants can **apply** fire blankets efficiently and safely (Skill, intermediate level)

The instructor shall:

7.1.1 Facilitate practical exercises that enable the participants to practise the efficient and safe use of:

a. CO2 extinguishers

b. fire blankets

7.1.2 Give constructive feedback throughout the participants' practise of the efficient and safe use of CO2 extinguishers and fire blankets

The participants shall:

7.1.3 Engage in the exercises and practise using CO2 extinguishers efficiently and safely

7.1.4 Engage in the exercises and practise using fire blankets efficiently and safely

ELEMENT 7.2 - SCENARIO-BASED TRAINING

Learning objectives:

56) The participants can **recognise** safety procedures and emergency exits in WTG mock scenarios (Knowledge, basic level)

57) The participants can **describe** how smoke develops in an enclosed area and the correct reaction to such a situation (Knowledge, basic level)

58) The participants can **take responsibility** for the safe evacuation from a smoke filled environment (Ability, intermediate level)

59) The participants can **act independently** and correctly when discovering fire or smoke in a WTG (Ability, intermediate level)

The instructor shall:

7.2.1 Explain safety procedures and emergency exits in WTG mock scenarios

7.2.2 Demonstrate smoke development in an enclosed area and the correct reaction to such a situation

7.2.3 Ask the participants relevant questions about the instructor´s demonstration e.g.

a. what happened?

b. how did the smoke develop?

c. how did instructor react in this situation?

d. of those actions, which were the most important?

e. why were these key actions performed?

7.2.4 Facilitate scenarios, where the participants have to practise how to:

a. safely evacuate a smoke filled environment

b. decide and take the correct actions when discovering fire or smoke in a WTG (various mock scenarios in WTGs)

7.2.5 Give constructive feedback to the participants' performance throughout the activities of this element

The participants shall:

7.2.6 Engage in the scenarios and practise how to:

a. safely evacuate a smoke filled environment

b. decide and take the correct actions when discovering fire or smoke in a WTG (various mock scenarios in WTGs)

LESSON 8 - TRAINING REVIEW

15 min.

The aim of this lesson is to enable the participants to reflect on and process their learning outcome and key takeaways from the module, aiming to achieve a high learning transfer from the module to their way of working.

ELEMENT 8.1 - TRAINING REVIEW

The instructor shall:

8.1.1 Re-present the overall aims and learning objectives of the module for the participants' comparison of their learning outcomes and the achievement of their previously stated expectations for the module

The participants shall:

8.1.2 Reflect on their learning outcome and key takeaways from BST Fire Awareness Module, aiming to achieve a high learning transfer from the module to their way of working by means of e.g.

a. group discussions or walk & talk

b. questions & answers in class or where suitable

Note *The instructor may additionally conduct a local evaluation of the training*

ELEMENT 8.2 - FEEDBACK SESSION

The instructor shall:

8.2.1 Give overall feedback and feed forward on the participants' learning outcomes inspired by the training as well as from the training review

8.2.2 Encourage the participants to examine and grow awareness of which specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualise and enhance learning transfer). In addition, and after the module completion, to discuss with colleagues about how the BST Fire Awareness content, methods and techniques are similar or different to specific, local condition

GLOBAL WIND ORGANISATION

Working at Heights Module

(WAH)

10. BST WORKING AT HEIGHTS MODULE

10.1 Aims and Objectives of the BST Working at Heights Module

The aim of this module is to enable the participants, through theoretical and practical training, to use basic personal protective equipment, work safety at height and perform comprehensive basic rescue from height in a remote wind turbine environment.

After having successfully completed this BST Working at Heights Module, the participants have the ability to act safely and responsibly when using basic personal protective equipment, working at heights and performing comprehensive basic rescue from heights in a remote wind turbine environment (Ability, intermediate level).

Note *This course is not designed to test the participants' capability and aptitude for working at height, i.e. it is not a test for fear of heights or designed to overcome fear of heights*

10.2 Duration of the BST Working at Heights Module

The total contact time for completing the BST Working at Heights Module is estimated to be 13 hours and 25 minutes.

The training provider must not exceed the times per day given in Table 10.2.1 (below).

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 hours

Table 10.2.1 – Maximum durations for training day

Note *Contact time includes delivery of course lesson contents, practical exercises and activities directly related to these*

The total training day includes contact time, meals and breaks and travel between training sites (where applicable)

10.3 Working at Heights Module Participant Ratio

The ratio shown for theory sessions indicates the maximum number of participants per instructor attending the course.

Other ratios indicate the maximum number of participants to be supervised by an instructor during each activity.

Module	Session	Instructor to Participant Ratio

BST Working at Heights	Theory	1:12
	Practical	1:6
	Session (Onsite)	Instructor to Participant Ratio
	Theory	1:12
	Practical	1:4

Table 10.3.1 – GWO Working at Heights Module instructor to participant ratio

10.4 Equipment for Working at Heights Module

The equipment required for training as listed in Annex 1 must be available and must fulfil national legal requirements as listed in Table A4-1 in Annex 1, where applicable.

A generic approach to teaching safety equipment is applied to this module aiming to avoid potential product specific additional training on completion of this module, which may be required by the participant's organisation e.g. prior to site or work.

The generic approach is achieved by teaching a variety of safety equipment products within each safety equipment category (e.g., guided type fall arresters). This enables the participants to conduct pre-use inspection and to use other safety equipment products compared to those taught during this module (based on the manufacturer's user manual). However, a location specific risk assessment might identify the need for additional instructions.

Additional fall protection must always be used during training activities at height.

The training provider shall introduce control measures that lower the risks and hazards associated with a fall from height to an acceptable level, following the Hierarchy of Controls in their risk assessment.

GWO recommends a maximum fall factor of 0.5. To calculate this, the following formula has been used (shown below) using the maximum allowed lanyard of length 2.00m and a fall of 1.00m

$$Fall\ Factor\ (FF) = \frac{Distance\ Fallen}{Length\ of\ lanyard}$$

$$Fall\ Factor\ (FF) = \frac{1.00\ m}{2.00\ m}$$

$$Fall\ Factor\ (FF) = 0.5$$

During the evacuation exercises in this module the anchor points used for the attachment of fall arrest lanyard including energy absorbers must be high enough above the ground (or structure below them) that, in the event of a fall, the energy absorber in their fall arrest lanyard can fully deploy and prevent the participants from contacting the ground (or structure directly below the anchor point).

During the evacuation exercise participants must be able to experience a minimum amount of descent (using an evacuation or rescue device) to ensure that they gain the experience of the speed of descent using these devices. This can be achieved by having the participants descend from a minimum height using a rescue or evacuation device.

To ensure enough clearance below the anchor point (for all fall protection equipment that may be used), and to ensure that the participants can experience a descent of sufficient duration for meaningful learning transfer, GWO recommends the anchor point is a minimum of 6.75m above the ground (or structure directly below the anchor point). The recommended 6.75m clearance under the anchor point is explained in detail in Annex 1.

If a training provider deviates from the recommended anchor point height of 6.75m to a lower height, then the following additional control measures must be in place.

The training provider shall document a risk assessment for the lower height. This shall include calculations for the equipment to be used during the evacuation exercises. The calculations shall:

a. use the value for shock absorber elongation that is provided by the equipment manufacturer and,

b. demonstrate that the equipment will prevent the person from coming into contact with the ground or structure directly below the anchor point and,

c. use a formula provided by the equipment manufacturer or national legislation that is for the purpose of calculating anchor point clearance height or, where no such formula exists, use the formula in Annex 1. The potential fall factor shall not exceed 0.5 and participants must experience a descent from a platform that is a minimum of 4.5m above the ground

10.5 BST Working at Heights Module Timetable

The order in which elements of this BST Module training are delivered may vary according to the didactical choices of the delivering training provider.

The delivery of this module must comply with the requirements described in the GWO Requirements for Training.

Lesson	Element		Duration
1. Introduction to the training	1.1	Safety instructions and emergency procedures	
	1.2	Facilities	
	1.3	Introduction	
	1.4	Scope and main learning objective	
	1.5	Ongoing assessment (participant performance assessment form)	
	1.6	Motivation	
	1.7	Human factors	
		TOTAL	15 min.
2. Legislation	2.1	Global legislation	
	2.2	National legislation	
		TOTAL	20 min.
3. Harness	3.1	Pre-use inspection	

		3.2	Fitting	
		3.3	Periodic inspections	
		3.4	Documentation	
		3.5	Maintenance	
			TOTAL	30 min.
4.	Fall prevention	4.1	Fall prevention over fall arrest	
		4.2	Pre-use inspection	
		4.3	Correct attachment to anchor points	
		4.4	Correct attachment to the harness	
		4.5	The importance of using work positioning	
			TOTAL	25 min.
5.	Vertical fall arrest systems	5.1	Legal requirements	
		5.2	Pre-use inspection	
		5.3	Correct attachment and detachment	
		5.4	Correct use	
		5.5	Periodic inspections	
		5.6	Correct documentation	
			TOTAL	25 min.
6.	Fall arrest lanyards	6.1	Legal requirements	
		6.2	Pre-use inspection	
		6.3	Correct attachment to the harness	
		6.4	Fall factor	
		6.5	Fall indicators	
		6.6	Twin and single fall arrest lanyards	
		6.7	Approved anchor points for attachment	
		6.8	The importance of always using fall arrest systems	
			TOTAL	55 min.
7.	Dropped objects	7.1	Risks	
		7.2	Risk reduction	
			TOTAL	15 min.
8.	Self-retracting lifelines	8.1	Fall protection systems during actual work in wind turbines	
		8.2	Different allowed maximum angles	
		8.3	How to attach correctly to the harness	

		8.4	Approved anchor points for SRL fall protection systems	
		8.5	Pre-use inspection	
			TOTAL	10 min.
9.	Measures to prevent injury during training	9.1	Control measures and warm-up	
			TOTAL	20 min.
10.	Practical exercises	10.1	Vertical fall arrest systems	
		10.2	Fall prevention	
		10.3	Fall arrest lanyards	
			TOTAL	60 min.
11.	Workshop – risks/ hazards & suspension trauma	11.1	Using the BST Working at Height Module	
		11.2	Suspension trauma	
			TOTAL	30 min.
12.	Emergency procedures	12.1	Contents of an evacuation kit	
		12.2	Preparing equipment for use	
		12.3	Safe and correct evacuation	
		12.4	Safe behaviour	
			TOTAL	80 min.
13.	PPE review	13.1	The individual parts of the PPE equipment	
			TOTAL	10 min.
14.	Rescue devices and rigging setup	14.1	The individual parts of different rescue devices	
		14.2	Correct use of rescue devices and slings	
			TOTAL	20 min.
15.	Measures to prevent injury during training	15.1	Control measures and warm-up	
			TOTAL	20 min.
16.	Rescue exercises	16.1	Rescue situations in wind turbines	
		16.2	Safe and correct rescue	
		16.3	Correct behaviour on the ladder with PPE	
			TOTAL	355 min.
17.	Training Review	17.1	Training review	
		17.2	Feedback session	

	TOTAL	15 min.
	GRAND TOTAL	805 min.

Table 10.5.1 – GWO Working at Heights Module timetable

10.6 Detailed Description of BST Working at Heights Module

LESSON 1 - INTRODUCTION TO THE TRAINING

15 min.

The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.

After having successfully completed Lesson 1 of BST Working at Heights Module, the participants can:

1) **Recognise** what is expected of them throughout the module (Knowledge, basic level)

2) **Name** and point out local emergency procedures and facilities (Knowledge, basic level)

3) **Discuss** the relevant human factors and explain their implications (Knowledge, intermediate level)

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

4) The participants **show interest** or curiosity in the safety and emergency procedures at the training facility (Ability, basic level)

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. safety instructions according to internal procedures

b. emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures

ELEMENT 1.2 - FACILITIES

Learning objective:

5) The participants can **recognise** the location of facilities at the training location (Knowledge, basic level)

The instructor shall:

1.2.1 Present a general description of the facilities at the training location (administration, dining area, restrooms, toilets, etc.)

1.2.2 Alternative activity: lead a tour and point out facilities

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt

ELEMENT 1.3 - INTRODUCTION

Learning objective:

6) The participants **show interest** in fellow participants and the course content and design (Ability, basic level)

The instructor shall:

1.3.1 Explain and ask involving questions aiming at the programme of the BST Working at Heights Training Module programme, including breaks and mealtimes

1.3.2 Give a short introduction to themselves, including their backgrounds as instructors

1.3.3 Ask for participants' expectations of the training and their learning or development

The participants shall:

1.3.4 Give a short introduction to themselves, including job function and expected primary geographic work location and share expectations on the training

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVE

Learning objective:

7) The participants can **recognise** the scope and main objectives of the BST Working at Heights Training Module (Knowledge, basic level)

The instructor shall:

1.4.1 Present the scope and main learning objectives of the BST Working at Heights Module training

1.4.2 Involve participants with questions on understanding and individual experiences on BST Working at Heights

The participants shall:

1.4.3 Engage in answering questions and share experiences on BST Working at Heights Module

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT PERFORMANCE ASSESSMENT FORM)

Learning objective:

8) The participants **recognise** the assessment procedure and the aim of the ongoing assessment (Knowledge, basic level)

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment

1.5.2 Explain the layout of the GWO participant performance assessment form and how it is used

The participants shall:

1.5.3 Engage themselves in discussions and ask questions when in doubt in relation to the assessment procedure

ELEMENT 1.6 - MOTIVATION

Learning objectives

9) The participants **show interest** and willingness to engage in the learning activities (Ability, basic level)

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. the importance of personal involvement in the course

b. the definition of and the need for BST Working at Heights Module knowledge, skills and abilities when working in the wind industry

Note *Positive motivation is the driving force for commitment, and the instructor should make a focused effort to support growth of the necessary attitude and motivation in the participant*

The participants shall:

1.6.2 Engage themselves in discussions and share experiences on BST Working at Heights

Note *When the participants succeed by trying out on their own, bring their relevant experience into play and apply learning points from the instructor's feedback the participant develops a positive attitude and responsibility towards the subject and the performance in the work situation*

ELEMENT 1.7 - HUMAN FACTORS

The aim of the element is to draw the participants' attention to how human behaviour and taking responsibility influences a safe work environment. In addition, the aim is to prepare for a continued focus on human factors during practical training and exercises.

Learning objectives:

10) The participants can **describe** the relevant human factors, and their implications. (Knowledge, basic level)

11) The participants **show interest** and willingness to focus on human factors during the following practical exercises (Ability, basic level)

The instructor shall:

1.7.1 Present how human factors influence accidents in the wind industry (relevant data may be used)

1.7.2 Lead a discussion about the role of the individual in improving human behaviour and how this can improve the safety in the wind industry

Facts and Human Factors Criteria:

The consequences of human factors in accidents in the wind industry are influenced by the following terms and conditions:

a. attention and perception

b. group behaviour and peer pressure

c. weather conditions

d. weather delays

e. noise levels

f. site layout and housekeeping

g. fitness and health

h. domestic and work-related stress

i. workload (both overload and underload)

j. fatigue

k. time pressure and deadlines

l. alcohol, medication, and substance abuse

The participants shall:

1.7.3 Engage in discussions and share experiences of how human factors influence accidents related to the BST Working at Heights Module

1.7.4 Engage in and reflect on received feedback and take responsibility on their own performance and development during the training

LESSON 2 - LEGISLATION

20 min.

The aim of this lesson is to enable the participants to comply with legislation for working at heights on onshore and offshore wind farms.

After having successfully completed this lesson, the participants can:

12) **Show interest** in complying with legislation relevant to working at heights (Ability, basic level)

ELEMENT 2.1 - GLOBAL LEGISLATION

Learning objective:

13) The participants can **describe** global legislation relevant to working at heights (Knowledge, basic level)

The instructor shall:

2.1.1 Present examples of:

a. applicable legislation

b. legal responsibilities

2.1.2 Ask the participants involving questions about the applicable legislation and legal responsibilities

The participants shall:

2.1.3 Engage in answering the questions and share understandings about applicable legislation and legal responsibilities

ELEMENT 2.2 - NATIONAL LEGISLATION

Learning objective:

14) The participants can **describe** national legislation relevant to working at heights (Knowledge, basic level)

The instructor shall:

2.2.1 Present examples of:

a. applicable legislation

b. legislative requirements

c. legal responsibilities

2.2.2 Ask the participants involving questions about the applicable legislation, legislative requirements, and legal responsibilities

The participants shall:

2.2.3 Engage in answering the questions and share understandings about applicable legislation, legislative requirements, and legal responsibilities

LESSON 3 - HARNESS

30 min.

The aim of this lesson is to reduce the risk of injury caused by a damaged harness by enabling the participants to perform a pre-use inspection of a harness, to identify when a harness requires a formal inspection and approval, to explain the basic maintenance of a harness and to correctly fit and adjust a harness.

After having successfully completed this lesson, the participants can:

15) **Take responsibility** for working safely with a harness including pre-use inspection, formal inspection and approval, basic maintenance, and correct use (Ability, intermediate level)

ELEMENT 3.1 - PRE-USE INSPECTION

Learning objective:

16) The participants can **perform** a pre-use inspection of a any full body harness (Skills, intermediate level)

The instructor shall:

3.1.1 Briefly introduce the generic approach to safety equipment as described in the Annex 1

3.1.2 Demonstrate how to select the correct sized harness for the intended work

3.1.3 Demonstrate how to identify the relevant standard markings

3.1.4 Present manufacturer and/or legal inspection periods

3.1.5 Explain the principles and importance of self-inspection of a full body harness for defects and significant wear, including:

a. observe proper size

b. markings and labels

c. operating weight and temperature range

d. equipment is within period of formal inspections

e. fall indicator

f. dorsal attachment point is seated centrally between shoulders

g. stitching

h. metal parts

i. straps

j. back protection

k. attachment points and D-Rings

l. soiling of harness (e.g. oil spills)

m. saltwater exposure

n. locks

o. observe manufacturer's user manual for specific or additional requirements

3.1.6 Demonstrate how to perform a pre-use inspection of a full body harness covering the points in sub-element 3.1.5

3.1.7 Stress the generic approach to pre-use inspections of a full body harness focusing on similarities and differences in design, functionality, and operation between different products

3.1.8 Highlight the potential task placed upon the participants (in their own organisation at course completion) requiring them to familiarise themselves with other safety equipment products

3.1.9 Provide constructive feedback on the participants' performance during the practice

The participants shall:

3.1.10 Practise the ability to perform a pre-use inspection of any full body harness (demonstrated during this module) covering the points in sub-element 3.1.5

3.1.11 Practise how to correctly identify the standards markings and inspection dates on a full body harness

ELEMENT 3.2 - FITTING

Learning objective:

17) The participants can **perform** the correct fit and adjustment of any full body harness (Skills, intermediate level)

The instructor shall:

3.2.1 Explain the importance of correctly adjusting a full body harness

3.2.2 Demonstrate how to correctly fit and adjust a full body harness ensuring a snug fit and the following specifics:

a. shoulder straps shall be loosened

b. leg straps sit well

c. abdominal strap shall sit well

d. chest strap (strapped slightly above or on the chest)

e. pivot link shall be at the hip and shall be flexible. It must not sit so high that it may damage ribs and internal organs during a fall

The participants shall:

3.2.3 Practise the ability to correctly fit and adjust a harness (covering the points in sub-element 3.2.2) to a snug fit

ELEMENT 3.3 - PERIODIC INSPECTIONS

Learning objective:

18) The participants can **explain** approvals according to appropriate equipment guidelines (EU, UK, USA, Canada, Mexico etc.) (Knowledge, intermediate level)

The instructor shall:

3.3.1 Explain how often the harness shall be approved globally (in the EU, UK, USA, Canada, Mexico, etc.)

The participants shall:

3.3.2 Share their understanding of harness approvals according to appropriate equipment guidelines and ask questions when in doubt

ELEMENT 3.4 - DOCUMENTATION

Learning objective:

19) The participants can **explain** the approval documentation, equipment serial number, authorisation date, etc (Knowledge, intermediate level)

The instructor shall:

3.4.1 Explain documentation, instrument number, authorisation date, etc.

3.4.2 Explain how to identify the approval documentation, equipment serial number, authorisation date, etc.

The participants shall:

3.4.3 Share their understanding of documentation and ask questions when in doubt

ELEMENT 3.5 - MAINTENANCE

Learning objective:

20) The participants can **explain** how to maintain a full body harness (Knowledge, intermediate level)

The instructor shall:

3.5.1 Explain how to store and maintain a harness (e.g. storage in dry environment, wash with fresh water, etc.)

The participants shall:

3.5.2 Share their understanding of harness maintenance and ask questions when in doubt

LESSON 4 - FALL PREVENTION

25 min.

The aim of this lesson is to enable the participants to use fall/travel restraint and work positioning lanyards to prevent a fall and reduce the risk of injuries while working at heights.

After having successfully completed this lesson, the participants can:

21) **Take responsibility** for safely using fall/travel restraint and work positioning lanyards to prevent a fall and reduce the risk of injuries while working at height (Ability, intermediate level)

ELEMENT 4.1 - FALL PREVENTION OVER FALL ARREST

Learning objectives:

22) The participants can **perform** the attachments of a fall/travel restraint lanyard and work positioning lanyard correctly to the ladder system (Skills, intermediate level)

23) The participants can **explain** why fall prevention is preferred over fall arrest (Knowledge, intermediate level)

The instructor shall:

4.1.1 Explain why fall prevention is better than fall arrest

4.1.2 Recommend attaching fall arrest as well, when fall/travel restraint or work positioning is attached and/or being used

4.1.3 Explain that in some companies it is required to attach a fall arrest lanyard while using a work restraint or work positioning lanyard

4.1.4 Explain how to change position while attached to a work positioning lanyard

4.1.5 Provide constructive feedback on the participants' performance during the practice

The participants shall:

4.1.6 Practise the ability to attach a fall/travel restraint lanyard and work positioning lanyard correctly to the ladder system

4.1.7 Engage in discussing why fall prevention is preferred over fall arrest

ELEMENT 4.2 - PRE-USE INSPECTION

Learning objective:

24) The participants can **perform** a pre-use inspection of a fall/travel restraint lanyard and a work positioning lanyard (Skills, intermediate level)

The instructor shall:

4.2.1 Demonstrate how to perform pre-use inspection of a fall/travel restraint lanyard and work positioning lanyard products required/chosen to instruct this module, by the following principles and covering:

a. markings and labels

b. operating weight and temperature range

c. equipment is within period of formal inspections

d. integrity, damage, corrosion, saltwater exposure and significant wear of: lanyard rope, webbing, plastic, metal and heat-shrinkable tubing

e. all moving parts work correctly, with no excessive play

f. connectors (carabiners) operate, and lock as intended and cannot disconnect completely

g. length adjustment function (if fitted) operates, and locks as intended

h. observe manufacturer's user manual for specific or additional requirements

4.2.2 Stress the generic approach to pre-use inspection of a fall restraint lanyard and work positioning lanyard focusing on similarities and differences in design, functionality, and operation between different products

4.2.3 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products

The participants shall:

4.2.4 Practise the ability to perform a pre-use inspection of fall/travel restraint lanyards and work positioning lanyards covering the points demonstrated in this element

ELEMENT 4.3 - CORRECT ATTACHMENT TO ANCHOR POINTS

Learning objective:

25) The participants can **perform** the correct use of fall/travel restraint lanyards and work positioning lanyards with focus on their own personal safety (Skills, intermediate level)

The instructor shall:

4.3.1 Explain the importance of personal safety when using work positioning lanyards, participants shall never lose focus on their own safety

4.3.2 Demonstrate how to correctly attach fall/travel restraint lanyards and work positioning lanyards:

a. to the ladder stiles and reinforced ladder rungs

b. to certified and structural anchor points

4.3.3 Facilitate practical exercises for the participants covering the scenarios presented in this element

4.3.4 Provide constructive feedback on the participants' performance during the practice

The participants shall:

4.3.5 Identify and select certified and structural anchor points for the attachment of fall/travel restraint lanyards and work positioning lanyards

4.3.6 Practise the ability to correctly attach fall/travel restraint lanyards and work positioning lanyards while working at height during practical exercises, covering the scenarios presented in this element

ELEMENT 4.4 - CORRECT ATTACHMENT TO THE HARNESS

Learning objective:

26) The participants can **perform** the attachments of fall/travel restraint lanyards and work positioning lanyards correctly to the harness (front and/or dorsal attachment points, and/or side D-rings) (Skills, intermediate level)

The instructor shall:

4.4.1 Demonstrate how to correctly attach fall/travel restraint lanyards to the harness (front or dorsal attachment point) according to manufacturer's user manual and relevant country-specific requirements/restrictions

4.4.2 Demonstrate how to correctly attach work positioning lanyards to the harness (front attachment point, and in both side, D-rings at once)

4.4.3 Provide constructive feedback on the participants' performance during the practice

The participants shall:

4.4.4 Practise the ability to attach fall/travel restraint lanyards and work positioning lanyards correctly to the harness

ELEMENT 4.5 - THE IMPORTANCE OF USING WORK POSITIONING

Learning objective:

27) The participants can **explain** the importance of using work positioning lanyards in order to leave hands free for work (Knowledge, intermediate level)

The instructor shall:

4.5.1 Explain the importance of using work positioning lanyards in order to leave hands free for work

The participants shall:

4.5.2 Share their understanding on using work positioning lanyards and ask questions when in doubt

LESSON 5 - VERTICAL FALL ARREST SYSTEMS

25 min.

The aim of this lesson is to enable the participants to perform a pre-use inspection of various types of vertical fall arrest systems and to use any vertical fall arrest system while working at height.

After having successfully completed this lesson, the participants can:

28) **Show interest** in performing a pre-use inspection of various types of vertical fall arrest systems and using any vertical fall arrest system while working at height (Ability, basic level)

ELEMENT 5.1 - LEGAL REQUIREMENTS

Learning objective:

29) The participants can **explain** the legal requirements and practical skills for using fall arrest systems when working at height (Knowledge, intermediate level)

The instructor shall:

5.1.1 Explain the systems currently in use (rail/wire/inertia reel)

5.1.2 Demonstrate how to correctly identify the relevant standard markings

5.1.3 Explain manufacturer and/or statutory inspection periods

5.1.4 Explain the correct storage and maintenance

The participants shall:

5.1.5 Engage in answering questions and share experiences on the legal requirements and practical skills for using fall arrest systems when working at height

ELEMENT 5.2 - PRE-USE INSPECTION

Learning objective:

30) The participants can **perform** a pre-use inspection of fall arrest system chosen/required for this module, including pre-use inspection of a random fall arrest glider/slider (Skills, intermediate level)

The instructor shall:

5.2.1 Demonstrate how to perform a pre-use inspection of a vertical fall arrest system by the following principles that cover:

a. markings and labels

b. system is within period of formal inspections

c. number of users allowed on the system

d. integrity, damage and corrosion of rail and wire and ladder attachments

e. saltwater exposure

f. observe manufacturer's user manual for specific or additional requirements

5.2.2 Demonstrate how to perform pre-use inspection of the guided type fall arrest products chosen/required to instruct this module, by the following principles that cover:

a. identify which vertical fall arrest system the guided type fall arrester matches with, including matching cable size

b. markings and labels

c. operating weight and temperature range

d. equipment is within period of formal inspections

e. integrity, damage, corrosion, saltwater exposure and significant wear of:

e.i fall arrester

e.ii cam

e.iii energy absorber

e.iv connectors (carabiners)

f. all moving parts work correctly, with no excessive play

g. spring fitted buttons engage promptly when released

h. locking and catch mechanisms lock/release as intended

i. identify symbol/indication for correct orientation in use

j. gravity stop functionality works as intended

k. fall indicator

l. connectors (carabiners) operate (and lock) as intended, cannot disconnect completely and have not been extended/shortened

m. which attachment point on harness to connect to

n. observe manufacturer's user manual for specific or additional requirements.

5.2.3 Stress the generic approach to pre-use inspections of a guided type fall arrester (glider/slider) focusing on similarities and differences in design, functionality and operation between different products

5.2.4 Explain that the participant is always required to familiarise themselves with the specific guided type fall arrester product prior to use e.g. by reading the equipment instruction manuals and to familiarise themselves with the specific guided type fall arrester (glider/slider) prior to use

5.2.5 Facilitate practice for the participants before the practical exercises lesson

5.2.6 Provide constructive feedback on the participants' performance during the practise

The participants shall:

5.2.7 Practise and demonstrate the ability to perform a pre-use inspection of a vertical fall arrest system including matching fall arrest glider/slider (demonstrated during this module)

ELEMENT 5.3 - CORRECT ATTACHMENT AND DETACHMENT

Learning objectives:

31) The participants can **perform** the correct attachment of any vertical fall arrest glider/slider to the matching rail/wire (Skills, intermediate level)

The instructor shall:

5.3.1 Demonstrate how to attach and detach the glider/slider to the rail/wire of various vertical fall arrest systems

5.3.2 Explain that the symbol/indication for correct orientation in use of a given guided type fall arrester may not indicate the climbing direction, and that the equipment should always be used according to equipment manufacture's user manual

The participants shall:

5.3.3 Practise and demonstrate the ability to correctly attach/detach any glider/slider to the rail/wire of a matching vertical fall arrest system (prior to the practical exercises lesson of the working at heights module)

ELEMENT 5.4 - CORRECT USE

Learning objective:

32) The participants can **perform** the safe and correct use of a vertical fall arrest system while working at height (Skills, intermediate level)

The instructor shall:

5.4.1 Demonstrate how to correctly use a vertical fall arrest system, including testing prior commencing climbing if the fall arrester operates and locks correctly according to equipment manufacture's user manual

The participants shall:

5.4.2 Practise and demonstrate the ability to correctly use a vertical fall arrest system, including testing (prior to commencing climbing) if the fall arrester operates and locks correctly according to equipment manufacture's user manual

ELEMENT 5.5 - PERIODIC INSPECTIONS

Learning objective:

33) The participants can **explain** country and region-specific approvals of vertical fall arrest systems (Knowledge, intermediate level)

The instructor shall:

5.5.1 Explain how participants can find the correct country approval for vertical fall arrest systems

5.5.2 Explain that the vertical fall arrest system will require a periodic inspection by a competent person and that this inspection period will vary from country to country

5.5.3 Explain that the participants must seek out which inspection periods apply in the country where they will be working

The participants shall:

5.5.4 Ask questions when in doubt and share relevant experiences

ELEMENT 5.6 - CORRECT DOCUMENTATION

Learning objective:

34) The participants can **explain** the correct documentation for the vertical fall arrest system (Knowledge, intermediate level)

The instructor shall:

5.6.1 Explain how participants can find the correct documentation for the vertical fall arrest system

The participants shall:

5.6.2 Ask questions when in doubt

LESSON 6 - FALL ARREST LANYARDS

55 min.

The aim of this lesson is to enable the participants to safely use fall arrest lanyards while working at height.

After having successfully completed this lesson, the participants can:

35) **Take responsibility** for safely using fall arrest lanyards while working at height (Ability, intermediate level)

ELEMENT 6.1 - LEGAL REQUIREMENTS

Learning objective:

36) The participants can **explain** the legal requirements for using fall arrest systems when working at height (Knowledge, intermediate level)

The instructor shall:

6.1.1 Explain the legal requirements for using fall arrest lanyards when working at height

The participants shall:

6.1.2 Engage in discussions and ask questions when in doubt

ELEMENT 6.2 - PRE-USE INSPECTION

Learning objective:

37) The participants can **perform** a pre-use inspection of a fall arrest lanyard (Skills, intermediate level)

The instructor shall:

6.2.1 Demonstrate how to perform pre-use inspection of the fall arrest lanyard products required/chosen to instruct this module, by the following principles that cover:

a. markings and labels

b. operating weight and temperature range

c. equipment is within period of formal inspections

d. integrity, damage, corrosion, saltwater exposure and significant wear of:

d.i energy absorber

d.ii lanyard rope

d.iii webbing

d.iv plastic

d.v metal

d.vi heat-shrinkable tubing

e. all moving parts work correctly with no excessive play

f. connectors (carabiners) operate (and lock) as intended and cannot disconnect completely

g. length adjustment function (if fitted) operates, and locks as intended

h. fall indicator

i. which attachment point on harness to connect to

j. observe fall arrest type (e.g. Y- or V- or I-type) and required attachment procedures, in particular climbing with a twin fall arrest lanyard

k. observe product fall clearance (max. arrest distance)

l. observe manufacturer's user manual for specific or additional requirements

6.2.2 Stress the generic approach to pre-use inspections of a fall arrest lanyard focusing on similarities and differences in design, functionality, and operation between different products

6.2.3 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products

6.2.4 Provide constructive feedback on the participants' performance during the practice

The participants shall:

6.2.5 Practise the ability to perform a pre-use inspection of any fall arrest lanyard (demonstrated during this element) before working at height during practical exercises

ELEMENT 6.3 - CORRECT ATTACHMENT TO HARNESS

Learning objective:

38) The participants can **perform** a correct attachment of a fall arrest systems to the harness (front and dorsal attachment points) (Skills, intermediate level)

The instructor shall:

6.3.1 Demonstrate how to attach fall arrest lanyards correctly to the harness (dorsal, or possible front, attachment point) according to manufacturer's user manual and relevant country-specific requirements/restrictions

6.3.2 Facilitate practice for the participants before conducting practical working at height exercises

6.3.3 Provide constructive feedback on the participants' performance during the practice

The participants shall:

6.3.4 Practise how to correctly attach fall arrest lanyards to a harness

ELEMENT 6.4 - FALL FACTOR

Learning objectives:

39) The participants can **explain** the 'fall factor' and principle of selecting anchor points which reduce the fall factor to as low as possible (Knowledge, intermediate level)

40) The participants can **act independently** in using the principle of selecting anchor points which reduce the fall factor to as low as possible (Ability, intermediate level)

The instructor shall:

6.4.1 Define the term 'fall factor' as it relates to working at height and fall arrest lanyards

6.4.2 Show diagrams of, and explain, the following:

a. factor 1 fall (FF1)

b. factor 2 fall (FF2)

6.4.3 Explain how the distance of a free fall can affect the severity of a fall

6.4.4 Explain how reducing the fall factor will reduce the potential free fall distance

6.4.5 Explain how attaching a fall arrest lanyard to an anchor point that is above shoulder height will reduce the fall factor

6.4.6 Demonstrate how to select anchor points for the attachment of fall arrest lanyards so that the fall factor is reduced to less than FF1

The participants shall:

6.4.7 During subsequent practical training, value and apply the principle of selecting anchor points which will reduce the fall factor to as low as possible

Note *There should be a selection of anchor points at different heights above the working platform available for the participants to attach their fall arrest lanyards. The lowest anchor points should be a minimum of 6.75m above ground level (see explanations in Section 10.4 and in Annex 1)*

ELEMENT 6.5 - FALL INDICATORS

Learning objective:

41) The participants can **explain** how to detect if PPE has experienced a fall (Fall Indicator) (Knowledge, intermediate level)

The instructor shall:

6.5.1 Show an example of a fall arrest lanyard where the fall indicator shows that it has experienced a fall

6.5.2 Demonstrate how to identify if the fall arrest lanyard has experienced a fall by using the fall arrest lanyards fall indicator

The participants shall:

6.5.3 Ask questions and share experiences on how to detect if PPE has experienced a fall

ELEMENT 6.6 - TWIN AND SINGLE FALL ARREST LANYARDS

Learning objectives:

42) The participants can **explain** the differences between twin fall arrest lanyards and single fall arrest lanyards, as well as the different ways they are used (Knowledge, intermediate level)

43) The participants can **perform** the use of twin tail fall arrest lanyards while double hook climbing (Skills, intermediate level)

The instructor shall:

6.6.1 Show examples of, and explain the differences between, twin and single fall arrest lanyards as well as the different ways of using and observing the manufacturer's user guidelines

6.6.2 Demonstrate the correct way of using twin and single fall arrest lanyards including; double hook climbing on ladder, required and recommended distance between twin fall arrest lanyard anchor point attachment points climbing ladders

6.6.3 Provide constructive feedback on the participants' performance during the practice

The participants shall:

6.6.4 Practise how to correctly use single and/or twin fall arrest lanyards while working at height during practical exercises

6.6.5 Practise how to correctly use twin and/or single fall arrest lanyards (while double hook climbing) maintaining the correct distance between the anchor points

ELEMENT 6.7 - APPROVED ANCHOR POINTS FOR ATTACHMENT

Learning objective:

44) The participants can **explain** approved anchor points (Knowledge, intermediate level)

The instructor shall:

6.7.1 Explain approved anchor points for fall arrest attachment by considering certified anchor points and structural anchor points which are unquestionably sound (e.g. ladder stiles, reinforced ladder rungs, gearbox lifting eyes)

The participants shall:

6.7.2 Ask questions and engage in conversations on approved anchor points

Note *Approved anchor points shall be pointed out to the participants during practical exercises to the extent needed*

ELEMENT 6.8 - THE IMPORTANCE OF ALWAYS USING FALL ARREST SYSTEMS

Learning objective:

45) The participants can **explain** the importance of always using a fall arrest system (Knowledge, intermediate level)

The instructor shall:

6.8.1 Explain the importance of always using fall arrest systems

The participants shall:

6.8.2 Ask questions and share experiences on the importance of always using fall arrest systems

LESSON 7 - DROPPED OBJECTS

15 min.

The aim of this lesson is to enable the participants to work safely and reduce the risk of injury arising from dropped objects in and around wind turbines.

After having successfully completed this lesson, the participants can:

46) **Show interest** in working safely to reduce the risk of injury arising from dropped objects in and around wind turbines (Ability, basic level)

ELEMENT 7.1 - RISKS

Learning objective:

47) The participants can **explain** the risks posed by dropped objects (Knowledge, intermediate level)

The instructor shall:

7.1.1 Explain the risks posed by dropped objects

7.1.2 Explain which items constitute a dropped object hazard

7.1.3 Describe typical injuries that can occur as a result of a dropped object

The participants shall:

7.1.4 Ask questions and share experiences on risks posed by dropped objects

ELEMENT 7.2 - RISK REDUCTION

Learning objective:

48) The participants can **explain** how to reduce the risk of dropping objects (Knowledge, intermediate level)

The instructor shall:

7.2.1 Explain that it is never acceptable to work directly above another person

7.2.2 Explain and demonstrate methods for mitigating the risk of dropped objects like:

a. closing hatches

b. covering openings

7.2.3 Explain and demonstrate how to reduce the risk of dropped objects using:

a. object attachment and tethering

b. closed top tool bags

7.2.4 Define the term ‘drop zone’

7.2.5 Explain how, by staying out of the drop zone of workers at height, injuries arising from dropped objects may be prevented

The participants shall:

7.2.6 Share their understanding on how to reduce the risk of dropped objects and keep this awareness during the rest of the training exercises

7.2.7 Take responsibility for staying out of the drop zone of workers at height during the training’s practical exercises

LESSON 8 - SELF-RETRACTING LIFELINES

10 min.

The aim of this lesson is to enable the participants to use self-retracting lifelines as fall protection system during actual work in a wind turbine.

After having successfully completed this lesson, the participants can:

49) **Take responsibility** for correctly and safely using self-retracting lifelines as a fall protection system in a wind turbine (Ability, intermediate level)

ELEMENT 8.1 - FALL PROTECTION SYSTEMS DURING ACTUAL WORK IN A WIND TURBINE

Learning objective:

50) The participants can **explain** the use of an SRL as a fall protection system during actual work in a wind turbine (Knowledge, intermediate level)

The instructor shall:

8.1.1 Provide examples of when an SRL may be used as fall protection system during actual work at height in a wind turbine

8.1.2 Explain that additional fall protection systems are commonly required as a measure to prevent injury during training activities and that an additional fall protection system is commonly not required in actual wind turbines, particularly not for emergency situations such as evacuation and rescue

8.1.3 Explain the different types of SRL fall protection systems typically used for training activities and used in wind turbines for actual work. Explain why and how they are used, their limitations and fall clearance, the length of the lifeline

The participants shall:

8.1.4 Ask questions and engage in discussion about the importance of using fall protection systems in training and actual wind turbines

8.1.5 Explain the difference between fall protection systems used in training versus in actual wind turbines

ELEMENT 8.2 - DIFFERENT ALLOWED MAXIMUM ANGLES

Learning objective:

51) The participants can **explain** the different maximum angles that are allowed when using an SRL according to manufacture specifications (Knowledge, intermediate level)

The instructor shall:

8.2.1 Describe the different maximum angles that are allowed according to equipment manufacture's user manual

8.2.2 Explain how the maximum angle is calculated based on the angle of the lifeline in use compared to; either the SRL housing or the SRL attachment point (anchor point) – according to equipment manufacture's user manual

The participants shall:

8.2.3 Provide an explanation for the different maximum angles allowed when using an SRL and how this is calculated

ELEMENT 8.3 - HOW TO ATTACH CORRECTLY TO THE HARNESS

Learning objective:

52) The participants can correctly **perform** the attachment of a self-retracting lifeline to a harness attachment point (Skills, intermediate level)

The instructor shall:

8.3.1 Explain and demonstrate how to correctly attach an SRL to the harness (front and dorsal attachment points)

8.3.2 Facilitate practical exercises for participants to practise and demonstrate how to correctly attach an SLR to their harness

The participants shall:

8.3.3 Practise and demonstrate how to correctly attach an SRL to their harness

8.3.4 Ask questions when in doubt

ELEMENT 8.4 - APPROVED ANCHOR POINTS FOR SRL FALL PROTECTION SYSTEMS

Learning objective:

53) The participants can **explain** the different types of approved anchor points that an SRL is allowed to be secured to (Knowledge, intermediate level)

The instructor shall:

8.4.1 describe how to identify and use approved anchor points for the attachment of SRLs

The participants shall:

8.4.2 Explain how to identify and use different approved anchor points when attaching an SRL

ELEMENT 8.5 - PRE-USE INSPECTION

Learning objective:

54) The participants can **perform** a pre-use inspection of a self-retractable lifeline (SRL) (Skills, intermediate level)

The instructor shall:

8.5.1 Demonstrate how to perform pre-use inspection of the SRL product required/chosen to instruct this module, by the following principles that cover:

a. markings and labels

b. observe product operating weight and temperature range

c. equipment is within period of formal inspections

d. integrity, damage, corrosion, saltwater exposure, and significant wear of:

d.i block including bolts and locking rivets (entire cable/webbing)

d.ii connectors (carabiners)

e. all moving parts work correctly with no excessive play

f. connectors (carabiners) operate (and lock) as intended and cannot disconnect completely

g. fall indicator

h. brake function (twice)

i. observe correct alignment (max. angle between block and cable/webbing)

j. observe product fall clearance (max. arrest distance)

k. observe manufacturer's user manual for specific or additional requirements

l. differences in pre-use inspections depending on whether the device is pre-installed or not, according to manufacturer specifications

8.5.2 Stress the generic approach to pre-use inspection of a self-retractable lifeline (SRL) focusing on similarities and differences in design, functionality, and operation between different products

8.5.3 Explain that the participant is always required to familiarise themselves with the specific SRL product prior to use e.g., by reading the manufacturer's user manual

8.5.4 Facilitate practical exercises for participants to practise and demonstrate a pre-use inspection of an SRL

8.5.5 Provide constructive feedback on the participants' performance during practical exercises

The participants shall:

8.5.6 Practise and demonstrate how to perform pre-use inspection on the SRL product required/chosen to instruct this module

LESSON 9 - MEASURES TO PREVENT INJURY DURING TRAINING

20 min.

The aim of this lesson is to reduce the risk of injury during training by introducing the participants to the control measures employed in the practical training area and how to warm up prior to performing rescue exercises.

After having successfully completed this lesson, the participants can:

55) **Take responsibility** for control measures employed in the practical training area and for warming up prior to performing rescue exercises (Ability, intermediate level)

ELEMENT 9.1 - CONTROL MEASURES AND WARM-UP

Learning objective:

56) The participants can **explain** the control measures employed in the practical training area and how to warm up prior to performing rescue exercises (Knowledge, intermediate level)

The instructor shall:

9.1.1 Explain further control measures for the specific training facilities and training to avoid injury during the training

9.1.2 Verify that the participants can explain the principles of operation of the PPE and equipment to be used during practical training sessions

9.1.3 Ensure that any hazardous energy sources which may affect the participants during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the participants

9.1.4 Lead a warm-up session of the major muscle groups of the body, ankles, wrists and back

9.1.5 It is the instructor's responsibility to always attach additional fall protection to each participant who is working at height (including both casualty and rescuer). GWO recommends that a SRL is used as additional fall protection.

The participants shall:

9.1.6 Take part in the warm-up session of the major muscle groups, ankles, wrists and back

9.1.7 Perform a pre-use inspection of their personal fall protection equipment

9.1.8 Perform a 'buddy check' of another participant's personal fall protection equipment

LESSON 10 - PRACTICAL EXERCISES

60 min.

The aim of this lesson is to enable the participants to perform safe and controlled work at height, according to the control measures.

After having successfully completed this lesson, the participants can:

57) **Take responsibility** for a safe and controlled working at heights (Ability, intermediate level)

ELEMENT 10.1 - VERTICAL FALL ARREST SYSTEMS

Learning objective:

58) The participants can **act independently** while safely and correctly using the vertical fall arrest systems in the training facility (Skills, advanced level)

The instructor shall:

10.1.1 Create practical exercises that enable the participants to practise using the vertical fall arrest systems safely and correctly

10.1.2 Provide constructive feedback on the participants' performance during the practice

The participants shall:

10.1.3 Practise how to use vertical fall arrest systems safely and correctly

ELEMENT 10.2 - FALL PREVENTION

Learning objective:

59) The participants can **take responsibility** for the safe and correct use of fall restraint lanyards and work positioning lanyards (Skills, advanced level)

60) The participants can **take responsibility** for providing fall prevention (fall restraint) over fall arrest (Ability, intermediate level)

The instructor shall:

10.2.1 Create practical exercises that enable the participants to practise how to use fall restraint lanyards and work positioning lanyards to prevent a fall

10.2.2 Provide constructive feedback on the participants' performance during the practice

The participants shall:

10.2.3 Practise the ability to safely and correctly use fall restraint lanyards and work positioning lanyards to prevent a fall and ask questions when in doubt

ELEMENT 10.3 - FALL ARREST LANYARDS

Learning objective:

61) The participants can **take responsibility** for the safe and correct use of fall arrest lanyards (Skills, advanced level)

The instructor shall:

10.3.1 Provide constructive feedback on the participants' performance during the practice

The participants shall:

10.3.2 Practise and demonstrate the ability to use fall arrest lanyards safely and correctly, double hook climbing included

LESSON 11 - WORKSHOP – RISK/HAZARDS & SUSPENSION TRAUMA

30 min.

The aim of this lesson is to enable the participants to identify risks and hazards in a WTG environment (including suspension trauma) and to take responsibility for preventing them.

After having successfully completed this lesson, the participants can:

62) **Take responsibility** for working safely at heights in a wind turbine environment (Skills, advanced level)

ELEMENT 11.1 - USING THE BST WORKING AT HEIGHTS MODULE

Learning objective:

63) The participants can **explain** multiple perspectives acquired through group discussions (Knowledge, intermediate level)

The participants shall:

11.1.1 Discuss how to best apply the skills learned during the BST Working at Height training in a wind turbine environment

11.1.2 Share relevant experiences and reflections on the multiple perspectives acquired through group discussions

ELEMENT 11.2 - SUSPENSION TRAUMA

Learning objectives:

64) The participants can **explain** the cause of suspension trauma and ways to prevent it (Knowledge, intermediate level)

65) The participants can **act independently** in reducing the risks of a suspension trauma if suspected in a casualty (Ability, intermediate level)

The instructor shall:

11.2.1 Explain how suspension trauma affects the human body

11.2.2 Explain how to mitigate suspension trauma using trauma straps (if fitted to the harness) or using a work positioning lanyard

11.2.3 Demonstrate how to position and treat a conscious and unconscious casualty who is suspected to be suffering from suspension trauma

The participants shall:

11.2.4 Ask relevant questions when in doubt

Note *For a class of 12, divide participants into three groups of four. The participants should use 10 minutes to discuss and generate ideas about rescue and emergency situations in the wind turbine environment. Each group should write the ideas on a flipchart that the instructor can display to enhance a large group discussion with the entire class during the remaining 10 minutes of the workshop. Adjust number of groups of four to match total number of participants.*

LESSON 12 - EMERGENCY PROCEDURES

80 min.

The aim of this lesson is to enable the participants to safely evacuate from a wind turbine using an evacuation or rescue kit.

After having successfully completed this lesson, the participants can:

66) **Act independently** in safely evacuating from a wind turbine using an evacuation or rescue kit (Ability, intermediate level)

Note *If there is more than one participant on the top of the training tower at the same time, all need to be secured, either by the evacuation device or by their fall arrest systems*

ELEMENT 12.1 - CONTENTS OF AN EVACUATION KIT

Learning objective:

67) The participants can **describe** the contents of an evacuation kit (Knowledge, basic level)

The instructor shall:

12.1.1 Show the contents of an evacuation kit and present how the equipment is used in practice applying a generic approach to the use of evacuation equipment focusing on similarities and differences in design, functionality, and operation between different products

12.1.2 Ask the participants involving questions throughout about the contents of an evacuation kit and how the equipment is used in practice

The participants shall:

12.1.3 Ask and answer questions on the evacuation kit

ELEMENT 12.2 - PREPARING EQUIPMENT FOR USE

Learning objective:

68) The participants can **explain** how the evacuation equipment is used (Knowledge, intermediate level)

69) The participants can **perform** the preparation of rescue and or evacuation equipment for use, including applying personal fall protection prior to commencing evacuation (Skills, advanced level

The instructor shall:

12.2.1 Explain that pre-use inspection of the evacuation device may be omitted only if it is permitted by the manufacturer's user manual and the manufacturer criteria

12.2.2 Demonstrate how to perform a pre-use inspection of the rescue/evacuation device products required/chosen to instruct this module, by following principles that cover:

a. markings and labels

b. equipment is within the period of formal inspections

c. the rope has no damage and end terminations are in good condition

d. the rope runs freely through the device in both directions

e. checking integrity and the absence of, damage, corrosion, saltwater/chemical/lubricant/dirt exposure or contamination

f. checking for the absence of significant wear of the device

g. rope securing mechanism works correctly

h. the product operating temperature range

12.2.3 Demonstrate how to prepare the equipment for use, including correct use of anchor points

12.2.4 Stress the generic approach in performing a pre-use inspection and using a rescue/evacuation device focusing on the similarities and differences in design, functionality, and operation between different products

12.2.5 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other rescue/evacuation products

The participants shall:

12.2.6 Engage in discussion on how the evacuation equipment is used

12.2.7 Practise a pre-use inspection of the rescue/evacuation device and products chosen to instruct this module

ELEMENT 12.3 - SAFE AND CORRECT EVACUATION

Learning objectives:

70) The participants can **perform** a safe and correct single evacuation with the evacuation, or rescue, device set up in a passive mode (Skills, intermediate level)

71) The participants can **perform** a safe and correct double evacuation with the evacuation or rescue device set up in an active mode: including a connecting element between the device and the harness (Skills, intermediate level)

The instructor shall:

12.3.1 Demonstrate how to perform a safe and correct evacuation, which shall include:

a. attaching the evacuation device to an anchor point (passive mode setup)

b. attaching the evacuation device to the harness, (active mode setup, applying a deflection/friction connector (carabiner) on the rescue device) and, during a double evacuation, using a fall restraint lanyard (kept as short as possible) as a connecting element between the rescue/evacuation device and the harness

c. when using a friction device; ensure that the rope runs through the device as intended according to the manufacturer's instructions

d. detach the fall restraint/fall arrest system, if attached to an anchor point

e. provide fall prevention by keeping the evacuation device rope's end taut

f. safe and correct access to egress location (e.g. opening escape hatch door, rolled roof edge, etc)

g. deploying the rope bag and inspecting for knots/length (passive mode setup)

h. secure the rope bag to the harness (active mode setup)

i. holding onto the rescue device rope while getting into position for descent (e.g. getting out of the hatch)

j. transferring full body weight to the rescue device rope before descent (e.g. while sitting in the open hatch and putting tension on the rope)

k. evacuating to ground level

l. disconnecting the evacuation device

12.3.2 Facilitate practical exercises for the participants

12.3.3 Provide constructive feedback on the participants' performance during the practice:

The participants shall:

12.3.4 Practise how to perform a safe and correct evacuation

ELEMENT 12.4 - SAFE BEHAVIOUR

Learning objective:

72) The participants can **take responsibility** for safe behaviour in connection with evacuation, including applying personal fall protection prior to commencing evacuation (Ability, intermediate level)

The instructor shall:

12.4.1 Explain safe behaviour in connection with evacuation

12.4.2 Provide constructive feedback on the participants' performance during the practice

The participants shall:

12.4.3 Practise the ability to perform a passive mode and active mode setup evacuation from height using full PPE and a random evacuation device (demonstrated during this module)

12.4.4 Practise the ability to disconnect the device after reaching the ground level

12.4.5 Practise the ability to use techniques like attaching equipment to their harness to reduce the risk of dropped objects

Note *During the evacuation scenarios participants who are not performing the exercise shall be in a safe area (at ground level) where they can familiarise themselves with setting up evacuation equipment and rigging the equipment for an evacuation*

An instructor shall be at the height chosen to descend from

Instructor(s) and participants shall be secured to an anchor point while waiting to descend. This can be achieved by correct use of the fall arrest lanyard

When participants are demonstrating the evacuation, a safety line that is connected to the participants' harness shall be used. This will be set up and controlled by the instructor and be secured to a separate anchor point other than that of the evacuation device

Although not a requirement of this standard, participants may repeat the evacuation exercises should sufficient time be available

LESSON 13 - PPE REVIEW

10 min.

The aim of this lesson is to introduce the participants to the individual parts of the PPE equipment and enable them to use the PPE safely.

This lesson is intended to be a recap suitable for the beginning of day two of a training.

After having successfully completed this lesson, the participants can:

73) **Discuss** the individual parts of the PPE equipment, the correct pre-use inspection and use of the PPE (Knowledge, intermediate level)

ELEMENT 13.1 - THE INDIVIDUAL PARTS OF THE PPE EQUIPMENT

The participants shall:

13.1.1 Discuss the individual parts of the PPE equipment and instruction in pre-use inspection and use

LESSON 14 - RESCUE DEVICES AND RIGGING SETUP

20 min.

The aim of this lesson is to enable the participants to utilise a rescue device in a wind turbine environment.

After having successfully completed this lesson, the participants can:

74) **Show interest** in the individual parts of the rescue equipment (Ability, basic level)

75) **Solve** the challenge of how to correctly use rescue devices, anchor points and various rigging configurations on a ladder system (Ability, basic level)

ELEMENT 14.1 - THE INDIVIDUAL PARTS OF DIFFERENT RESCUE DEVICES

Learning objectives:

76) The participants can **describe** the individual parts of different rescue devices including accessories (Knowledge, basic level)

77) The participants can **recognise** the generic approach in the parts of a rescue device focusing on similarities and differences in design, functionality, and operation between different products (Knowledge, basic level)

78) The participants can **recognise** their potential task in familiarising themselves with other safety equipment products in their own organisation on course completion (Knowledge, basic level)

The instructor shall:

14.1.1 Explain and demonstrate the individual parts of different rescue devices, including accessories, covering:

a. how to attach the device to an anchor point

b. how to utilise an integrated friction device (e.g. pig tail/bull horn) to divert the rope

c. how to rig the device with deflection applying a friction connector (carabiner) for an active mode setup

d. how to secure the rope

e. the use of a rope clamp for rescue (enabling lifting/safe disconnection of a loaded rope type fall protection lanyard)

14.1.2 Stress the generic approach in the parts of a rescue device focusing on similarities and differences in design, functionality, and operation between different products

14.1.3 Highlight the potential task placed upon the participant in (their own organisation at course completion) requiring them to familiarise themselves with other safety equipment products

14.1.4 Ask the participants involving questions about the individual parts of the different rescue devices, including accessories

The participants shall:

14.1.5 Engage in answering the questions and share understandings about the individual parts of the different rescue devices, including accessories

ELEMENT 14.2 - CORRECT USE OF RESCUE DEVICES & SLINGS

Learning objectives:

79) The participants can **recognise** that pre-use inspection of the evacuation/rescue device may be omitted only if it is permitted by the manufacturer's user manual and the manufacturer criteria (Knowledge, basic level)

80) The participants can **describe** how to perform pre-use inspection of the rescue device products required/chosen to instruct this module (Knowledge, basic level)

81) The participants can **describe** how to rig the device onto a ladder stile and reinforced rung utilising slings (on one side and in a centre position of the ladder system) aiming to enable moving parts of the device to run freely (Knowledge, basic level)

82) The participants can **describe** the principles of lifting angle, angle factor and edge protection (Knowledge, basic level)

83) The participants can **describe** how to rig the device in passive mode setup, and active (inverted) mode setup with deflection/deviation applying a friction connector (carabiner) (Knowledge, basic level)

84) The participants can **recognise** the generic approach in pre-use inspecting and using a rescue device focusing on similarities and differences in design, functionality, and operation between different products (Knowledge, basic level)

85) The participants can **recognise** their potential task in familiarising themselves with other safety equipment products in their own organisation on course completion (Knowledge, basic level)

The instructor shall:

14.2.1 Present that pre-use inspection of the evacuation/rescue device may be omitted only if it is permitted by the manufacturer's user manual and the manufacturer criteria

14.2.2 Demonstrate how to perform pre-use inspection of the rescue device products required/chosen to instruct this module, by following principles that cover:

a. markings and labels

b. equipment is within period of formal inspections

c. the rope has no damage and the end terminations are in good condition

d. the rope runs freely through the device in both directions

e. checking for integrity and the absence of damage, corrosion, saltwater/chemical/lubricant/dirt exposure or contamination

f. checking for the absence of significant wear of the device

g. connectors (carabiners) operate, and lock as intended and cannot disconnect completely

h. rope securing mechanism works properly

i. observe product operating temperature range

14.2.3 Demonstrate how to rig the device onto a ladder stile and reinforced rung utilising slings (on one side and in a centre position of the ladder system) aiming to enable moving parts of the device to run freely

14.2.4 Explain and demonstrate the principles of lifting angle, angle factor and edge protection

14.2.5 Demonstrate how to rig the device in passive mode setup, and active (inverted) mode setup with deflection/deviation applying a friction connector (carabiner)

14.2.6 Stress the generic approach in pre-use inspecting and using a rescue device focusing on similarities and differences in design, functionality, and operation between different products

14.2.7 Highlight the potential task placed upon the participant (in their own organisation at course completion) requiring them to familiarise themselves with other safety equipment products

14.2.8 Create a learning activity such as simple quiz, questionnaire or ask the participants involving questions throughout about:

a. how to perform pre-use inspection of the rescue device products required/chosen to instruct this module

b. how to rig the device onto a ladder stile and reinforced rung utilising slings (on one side and in a centre position of the ladder system) aiming to enable moving parts of the device to run freely

c. the principles of lifting angle, angle factor and edge protection

d. how to rig the device in passive mode setup, and active (inverted) mode setup with deflection/deviation applying a friction connector (carabiner)

The participants shall:

14.2.9 Engage in answering the activity and share understandings about:

a. how to perform pre-use inspection of the rescue device products required/chosen to instruct this module

b. how to rig the device onto a ladder stile and reinforced rung utilising slings (on one side and in a centre position of the ladder system) aiming to enable moving parts of the device to run freely

c. the principles of lifting angle, angle factor and edge protection how to rig the device in passive mode setup, and active (inverted) mode setup with deflection/deviation applying a friction connector (carabiner)

LESSON 15 - MEASURES TO PREVENT INJURY DURING TRAINING

20 min.

The aim of this lesson is to reduce the risk of injury during training by ensuring that the participants are briefed in the control measures employed in the practical training area and to warm up prior to performing rescue exercises.

After having successfully completed this lesson, the participants can:

86) **Take responsibility** for control measures employed in the practical training area and for warming up prior to performing rescue exercises (Ability, intermediate level)

Note *This lesson is repeated from Lesson 9 with the intention of teaching the participants good habits of warming up prior to working*

ELEMENT 15.1 - CONTROL MEASURES AND WARM-UP

The instructor shall:

15.1.1 Explain further control measures for the specific training facilities and training to avoid injury during the training

15.1.2 Verify that the participants can explain the principles of operation of the PPE and equipment to be used during practical training sessions

15.1.3 Ensure that any hazardous energy sources which may affect the participants during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the participants

15.1.4 Lead a warm-up session of the major muscle groups of the body, ankles, wrists and back

15.1.5 Attach additional fall protection to each participant. It is the instructor's responsibility to always attach additional fall protection to each participant who is working at height (including both casualty and rescuer). GWO recommends that a SRL is used as additional fall protection.

The participants shall:

15.1.6 Take part in the warm-up session of the major muscle groups, ankles, wrists and back

15.1.7 Perform a pre-use inspection of their personal fall protection equipment

15.1.8 Perform a 'buddy check' of another participant's personal fall protection equipment

LESSON 16 - RESCUE EXERCISES

355 min.

The aim of this lesson is to enable the participants to do a safe and correct rescue in wind turbines while using correct rescue devices, anchor points and safe behaviour on ladders with PPE.

Furthermore, this lesson will give the participants the opportunity to practice working at height techniques while performing rescue exercises.

After having successfully completed this lesson, the participants can:

87) **Act independently** in safely approaching working at heights rescues in wind turbines (Ability, intermediate level)

88) **Take responsibility** for safely and correctly using rescue devices (Ability, intermediate level)

ELEMENT 16.1 - RESCUE SITUATIONS IN WIND TURBINES

Learning objective:

89) The participants can **describe** how to safely approach rescue situations in wind turbines (Knowledge, basic level)

The instructor shall:

16.1.1 Explain and demonstrate how to safely approach rescue situations in wind turbines

16.1.2 Ask the participants involving questions about the instructor´s demonstration of how to safely approach rescue situations in wind turbines:

a. how did the instructor approach the rescue situation?

b. in those actions, which were the most important?

c. why were these key actions performed?

The participants shall:

16.1.3 Engage in answering the questions and share understandings about how to safely approach rescue situations in wind turbines

ELEMENT 16.2 - SAFE AND CORRECT RESCUE

Learning objectives:

90) The participants can **describe** how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue (Knowledge, basic level)

91) The participants can safely and correctly **perform** a rescue in a wind turbine environment (Skills, intermediate level)

The instructor shall:

16.2.1 Explain and demonstrate how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue. The demonstration shall include:

a. handling a conscious/unconscious casualty

b. suspension trauma prevention

c. connecting the connector (carabiner) to the casualty's harness

d. applying tension to the rope to enable safe disconnection of the casualty's fall arrest and /or work positioning lanyard

e. safe descent of casualty

f. suspension trauma treatment

16.2.2 Ask the participants involving questions about the instructor´s demonstration of how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue

The participants shall:

16.2.3 Practise and share understandings about how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue

ELEMENT 16.3 - CORRECT BEHAVIOUR ON THE LADDER WITH PPE

Learning objectives:

92) The participants can **take responsibility** for the safe and correct behaviour on ladders with PPE (Ability, intermediate level)

93) The participants can **act independently** in safely and correctly using anchorage points (Ability, intermediate level)

The instructor shall:

16.3.1 Explain and demonstrate the correct behaviour on ladder with PPE

16.3.2 Ask the participants involving questions about the instructor´s demonstration of the correct behaviour on ladder with PPE

16.3.3 Facilitate practical exercises that enable the participants to practice the safe and correct use of:

a. the evacuation/rescue devices, including:

b. pre-use inspection

c. correct and efficient use of anchor points

d. correct behaviour on ladder with PPE

e. a rescue device in the following scenarios:

f. rescue of a conscious casualty hanging by a guided type vertical fall arrester, secured by their work positioning lanyard (inside of the ladder) with the rescue equipment in a passive setup, preferably utilising a rope clamp for rescue

g. rescue of an unconscious casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup

h. rescue of a conscious casualty secured by their work positioning lanyard attached to the front attachment point of their harness (from the outside of the ladder)

16.3.4 Give constructive feedback to the participants throughout the exercises

The participants shall:

16.3.5 Engage and practise the correct and safe use of the evacuation/rescue devices, including:

a. pre-use inspection

b. correct and efficient use of anchor points

c. correct behaviour on ladder with PPE

16.3.6 Engage and practise how to safely and correctly use a rescue device in the following scenarios:

a. rescue of a conscious casualty hanging by a guided type vertical fall arrester, secured by their work positioning lanyard (inside of the ladder) with the rescue equipment in a passive setup, preferably utilising a rope clamp for rescue

b. rescue of an unconscious casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup

c. rescue of a conscious casualty secured by their work positioning lanyard attached to the front attachment point of their harness (from the outside of the ladder)

Note *The participants shall at all times during the exercises practice how to reduce the risk of dropped objects*

During exercise 16.3.6.a. The participant performing the rescue should use a rope clamp for rescue (to train in the use of this equipment) and use the hip overhang technique to move the casualty away from the ladder

Note *During the rescue scenarios the participants who are not performing the exercise shall be in a safe area (at ground level) where they can familiarise themselves with setting up rescue equipment, rigging and operating the equipment for a rescue*

It is recommended to have the participants familiarise themselves with the rescue equipment while one rescue exercise is conducted and observe one rescue exercise

During the rescue scenarios the participants acting as rescuer must correctly use their work positioning lanyard to secure themselves leaving their hands free to work with the equipment and casualty

During the rescue scenarios, a rescue dummy can be used to simulate a casualty

The instructor will notify the participants whether the casualty is conscious or unconscious. Participants may demonstrate the recovery position/seated position once the dummy has been lowered to a safe area

All appropriate PPE shall be worn during these exercises

Methods of preventing suspension trauma should be demonstrated during the practical exercises, as they will have already been discussed in theory. This will facilitate good, small group discussions on the various methods of preventing suspension trauma

LESSON 17 - TRAINING REVIEW

15 min.

The aim of this lesson is to enable the participants to reflect on and process their learning outcome and key take aways from the module, aiming to achieve a high learning transfer from the module to their way of working.

ELEMENT 17.1 - TRAINING REVIEW

The instructor shall:

17.1.1 Re-present the overall aims and learning objectives of the module for the participants' comparison of their learning outcomes and the achievement of their previously stated expectations for the module

The participants shall:

17.1.2 Reflect on their learning outcome and key take aways from BST Working at Heights Module, aiming to achieve a high learning transfer from the module to their way of working by means of e.g.

a. group discussions or walk & talk

b. questions & answers in class or where suitable

Note *The instructor may additionally conduct a local evaluation of the training*

ELEMENT 17.2 - FEEDBACK SESSION

The instructor shall:

17.2.1 Give an overall feedback and feed forward on the participants' learning outcome inspired by the training as well as from the training review session

17.2.2 Encourage the participants to examine and grow awareness of which specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualise and enhance learning transfer). In addition to discuss with colleagues how the BST Working at Heights Module content, methods and techniques are similar or different to the local specific conditions identified after the module completion

10.7 Participant Performance Assessment

Assessment of learning outcomes.

Participants will be assessed according to the learning outcomes stated in this module by means of direct observation and supplementary oral questions, where appropriate.

The assessment shall be conducted by practical scenarios based on the WTG environment. Each participant shall participate and demonstrate:

Correct use of the evacuation/rescue device, including:

a. user inspection and test

b. use of correct anchor points

c. correct behaviour on ladder with PPE

Correct rescue methods, including:

a. rescue of a conscious casualty hanging by a guided type vertical fall arrester, secured by their work positioning lanyard (inside of the ladder) with the rescue equipment in a passive setup, preferably utilising a rope clamp for rescue

b. rescue of an unconscious casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup

c. rescue of a conscious casualty secured by their work positioning lanyard (from the outside of the ladder, with hip diversion, i.e. rescue line is diverted using the side D-ring located at the hip of the rescuer's harness. This creates greater space between the casualty and the ladder

The formal evaluation of knowledge of above scenarios shall be in accordance with the participant performance assessment form (example provided in GWO's Requirements for Training). The instructor keeps the participant performance assessment form until the completion/evaluation of the BST Module

Training providers shall have a documented procedure in place for dealing with participants not meeting the stated learning outcomes. If a participant fails to meet the demands, they shall attend a new BST Working at Heights Module.

GLOBAL WIND ORGANISATION

Working at Heights & Manual Handling

(WAH/MH) Combined

11. BST WORKING AT HEIGHTS & MANUAL HANDLING MODULE

11.1 Aims and Objectives of the BST Working at Heights & Manual Handling Module

The aim of this module is to enable the participants, through theoretical and practical training, to use basic personal protective equipment, work safely at heights and perform comprehensive basic rescue from heights in a wind turbine environment. Furthermore, this module also aims to encourage positive manual handling and ergonomic behaviour and enable participants to perform manual handling tasks in a safe manner.

Overall learning objective for the module:

1) After having successfully completed this BST Working at Heights and Manual Handling Module, the participants have the ability to **act** safely and responsibly and apply good manual handling techniques when working at heights and performing comprehensive basic rescue from heights. (Ability, intermediate level)

Note *This course is not intended to test the participants' capability and aptitude for working at height, i.e. it is not a test for fear of heights or designed to overcome fear of heights*

11.2 Duration of the BST Working at Heights & Manual Handling Module

The total contact time for completing the BST Manual Handling and Working at Heights Module is 14 hours and 40 minutes.

The training provider must not exceed the times per day given in Table 11.2.1 (below).

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 hours

Table 11.2.1 – Maximum durations for training day

Note *Contact time includes delivery of course lesson content, practical exercises and activities directly related to these*

The total training day includes contact time, meals and breaks and travel between training sites (where applicable)

11.3 Working at Heights & Manual Handling Module Participant Ratio

The ratio shown for theory sessions indicates the maximum number of participants per instructor attending the course.

Other ratios indicate the maximum number of participants to be supervised by an instructor during each activity.

Module	Session	Instructor to Participant Ratio
BST Working at Heights with Manual Handling	Theory	1:12
	Practical	1:6
	Session (Onsite)	Instructor to Participant Ratio
	Theory	1:12
	Practical	1:4

Table 11.3.1 – GWO WAH and MH Module instructor to participant ratio

11.4 Equipment for Working at Heights & Manual Handling Module

The equipment required for training as listed in Annex 1 must be available and must fulfil national legal requirements as listed in Bable A4-1 in Annex 1 where applicable.

A generic approach to teaching safety equipment is applied to this module aiming to avoid potential product specific additional training on completion of this module, which may be required by the participant's organisation e.g. prior to site or work.

The generic approach is achieved by teaching a variety of safety equipment products within each safety equipment category (e.g., guided type fall arresters). This enables the participants to conduct pre-use inspection and to use other safety equipment products compared to those taught during this module (based on the manufacturer's user manual). However, a location specific risk assessment might identify the need for additional instructions.

Additional fall protection must always be used during training activities at height.

The training provider shall introduce control measures that lower the risks and hazards associated with a fall from height to an acceptable level, following the Hierarchy of Controls in their risk assessment.

GWO recommends a maximum fall factor of 0.5. To calculate this the following formula has been used (shown below) using the maximum allowed lanyard of length 2.00m and a fall of 1.00m

$$Fall\ Factor\ (FF) = \frac{Distance\ Fallen}{Length\ of\ lanyard}$$

Using the maximum allowed lanyard of length 2.00 m and a fall 0f 1.00 m,

$$Fall\ Factor\ (FF) = \frac{1.00\ m}{2.00\ m}$$

$$Fall\ Factor\ (FF) = 0.5$$

During the evacuation exercises in this module the anchor points used for the attachment of fall arrest lanyards including energy absorbers must be high enough above the ground (or structure below them) that, in the event of a fall, the energy absorber in their fall arrest lanyard can fully deploy and prevent the participants from contacting the ground (or structure directly below the anchor point).

During the evacuation exercise participants must be able to experience a minimum amount of descent (using an evacuation or rescue device) to ensure that they gain the experience of the speed of descent using these devices. This can be achieved by having the participants descend from a minimum height using a rescue or evacuation device.

To ensure enough clearance below the anchor point (for all fall protection equipment that may be used), and to ensure that the participants can experience a descent of sufficient duration for meaningful learning transfer, GWO recommends the anchor point is a minimum of 6.75m above the ground (or structure directly below the anchor point). The recommended 6.75m clearance under the anchor point is explained in detail in Annex 1.

If a training provider deviates from the recommended anchor point height of 6.75m to a lower height, then the following additional control measures must be in place.

The training provider shall document a risk assessment for the lower height. This shall include calculations for the equipment to be used during the evacuation exercises. The calculations shall:

a. use the value for shock absorber elongation that is provided by the equipment manufacturer and,

b. demonstrate that the equipment will prevent the person from coming into contact with the ground or structure directly below the anchor point and,

c. use a formula provided by the equipment manufacturer or national legislation that is for the purpose of calculating anchor point clearance height or, where no such formula exists, use the formula in Annex 1. The potential fall factor shall not exceed 0.5 and participants must experience a descent from a platform that is a minimum of 4.5m above the ground

11.5 BST Working at Heights & Manual Handling Module Timetable

The order in which elements of this BST Module training are delivered may vary according to the didactical choices of the delivering training provider.

The delivery of this module must comply with the requirements described in the GWO Requirements for Training.

Lesson	Element		Duration
1. Introduction to the training	1.1	Safety instructions and emergency procedures	
	1.2	Facilities	
	1.3	Introduction	
	1.4	Scope and main learning objective	
	1.5	Ongoing assessment (participant performance assessment form)	

		1.6	Motivation	
		1.7	Human factors	
			TOTAL	15 min.
2.	Legislation and behavioural safety	2.1	Global legislation	
		2.2	National legislation	
		2.3	Behavioural safety	
			TOTAL	25 min.
3.	Harness	3.1	Pre-use inspection	
		3.2	Fitting	
		3.3	Periodic inspections	
		3.4	Documentation	
		3.5	Maintenance	
			TOTAL	30 min.
4.	Fall prevention	4.1	Fall prevention over fall arrest	
		4.2	Pre-use inspection	
		4.3	Correct attachment to anchor points	
		4.4	Correct attachment to the harness	
		4.5	The importance of using work positioning	
			TOTAL	30 min.
5.	Vertical fall arrest systems	5.1	Legal requirements	
		5.2	Pre-use inspection	
		5.3	Correct attachment and detachment	
		5.4	Correct use	
		5.5	Periodic inspections	
		5.6	Correct documentation	
			TOTAL	25 min.
6.	Fall arrest lanyards	6.1	Legal requirements	
		6.2	Pre-use inspection	
		6.3	Correct attachment to the harness	
		6.4	Fall factor	
		6.5	Fall indicators	
		6.6	Twin and single fall arrest lanyards	
		6.7	Approved anchor points for attachment	
		6.8	The importance of always using fall arrest systems	

			TOTAL	55 min.
7.	Dropped objects	7.1	Risks	
		7.2	Risk reduction	
			TOTAL	15 min.
8.	Self-retracting lifelines	8.1	Fall protection systems during actual work in wind turbines	
		8.2	Different allowed maximum angles	
		8.3	How to attach correctly to the harness	
		8.4	Approved anchor points for SRL fall protection systems	
		8.5	Pre-use inspection	
			TOTAL	10 min.
9.	Measures to prevent injury during training	9.1	Control measures and warm-up	
			TOTAL	20 min.
10.	Practical exercises	10.1	Vertical fall arrest systems	
		10.2	Fall prevention	
		10.3	Fall arrest lanyards	
			TOTAL	60 min.
11.	Injuries, symptoms, and essential manual handling principles	11.1	How to avoid common musculoskeletal injuries in the wind industry	
		11.2	Typical symptoms of injuries	
		11.3	Essential manual handling principles	
		11.4	Basic dynamic risk assessment and introduction to TILE principle	
			TOTAL	25 min.
12.	Manual handling: risk controls and proper manual handling techniques	12.1	Working over shoulder height	
		12.2	Working while kneeling	
		12.3	Push and pull	
		12.4	Carrying	
		12.5	Lifting	
		12.6	Work with handheld tools	
		12.7	Awkward postures	
			TOTAL	60 min.
13.	Emergency procedure	13.1	Contents of an evacuation kit	

		13.2	Preparing equipment for use	
		13.3	Safe and correct evacuation	
		13.4	Safe behaviour	
			TOTAL	80 min.
14.	Workshop – risks/ hazards & suspension trauma	14.1	Using the BST Working at Height with Manual Handling Course	
		14.2	Suspension trauma	
			TOTAL	30 min.
15.	PPE review	15.1	The individual parts of the PPE equipment	
			TOTAL	10 min.
16.	Rescue devices and rigging setup	16.1	The individual parts of different rescue devices	
		16.2	Correct use of rescue devices and slings	
			TOTAL	20 min.
17.	Rescue exercises	17.1	Rescue situations in wind turbines	
		17.2	Safe and correct rescue	
		17.3	Correct behaviour on the ladder with PPE	
			TOTAL	355 min.
18.	Training Review	18.1	Training review	
		18.2	Feedback session	
			TOTAL	15 min.
			GRAND TOTAL	880 min.

Table 11.5.1 – GWO BST WAH/MH Module timetable

11.6 Detailed Description of BST Working at Heights & Manual Handling Module

LESSON 1 - INTRODUCTION TO THE TRAINING

15 min.

The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.

After having successfully completed Lesson 1 of BST Working at Heights & Manual Handling Module, the participants can:

2) **Recognise** what is expected of them throughout the module (Knowledge, basic level)

3) **Name** and point out local emergency procedures and facilities (Knowledge, basic level)

4) **Discuss** the relevant human factors and explain their implications (Knowledge, intermediate level)

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

5) The participants **show interest** or curiosity in the safety and emergency procedures at the training facility (Ability, basic level)

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. safety instructions according to internal procedures

b. emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures

ELEMENT 1.2 - FACILITIES

Learning objective:

6) The participants can **recognise** the location of facilities at the training location (Knowledge, basic level)

The instructor shall:

1.2.1 Present a general description of the facilities at the training location (administration, dining area, restrooms, toilets, etc.)

1.2.2 Alternative activity: lead a tour and point out facilities

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt

ELEMENT 1.3 - INTRODUCTION

Learning objective:

7) The participants **show interest** in fellow participants and the course content and design (Ability, basic level)

The instructor shall:

1.3.1 Explain and ask involving questions aiming at the programme of the BST Working at Heights & Manual Handling Module program, including breaks and mealtimes

1.3.2 Give a short introduction to themselves, including their backgrounds as instructors

1.3.3 Ask for participants' expectations of the training and their learning or development

The participants shall:

1.3.4 Give a short introduction to themselves, including job function and expected primary geographic work location and share expectations on the training

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVE

Learning objective:

8) The participants can **recognise** the scope and main objectives of the BST Working at Heights & Manual Handling Module (Knowledge, basic level)

The instructor shall:

1.4.1 Present the scope and main learning objectives of the BST Working at Heights & Manual Handling Module training

1.4.2 Involve participants with questions on understanding and individual experiences on BST Working at Heights & Manual Handling Module training

The participants shall:

1.4.3 Engage in answering questions and share experiences on BST Working at Heights & Manual Handling Module training

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT PERFORMANCE ASSESSMENT FORM)

Learning objective:

9) The participants **recognise** the assessment procedure and the aim of the ongoing assessment (Knowledge, basic level)

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment

1.5.2 Explain the layout of the GWO participant performance assessment form and how it is used

The participants shall:

1.5.3 Engage themselves in discussions and ask questions when in doubt in relation to the assessment procedure

ELEMENT 1.6 - MOTIVATION

Learning objective:

10) The participants **show interest** and willingness to engage in the learning activities (Ability, basic level)

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. the importance of personal involvement in the course

b. the definition of and the need for BST Working at Heights & Manual Handling module understandings and abilities

Note *Positive motivation is the driving force for commitment, and the instructor should make a focused effort to support growth of the necessary attitude and motivation in the participant*

The participants shall:

1.6.2 Engage themselves in discussions and share experiences on BST Working at Heights & Manual Handling

Note *When the participants succeed by trying out on their own, bring their relevant experience into play and apply learning points from the instructor's feedback the participant develops a positive attitude and responsibility towards the subject and the performance in the work situation*

ELEMENT 1.7 - HUMAN FACTORS

The aim of the element is to draw the participants' attention to how human behaviour and taking responsibility influences a safe work environment. In addition, the aim is to prepare for a continued focus on human factors during practical training and exercises.

Learning objectives:

11) The participants can **describe** the relevant human factors, and their implications. (Knowledge, basic level)

12) The participants **show interest** and willingness to focus on human factors during the following practical exercises (Ability, basic level)

The instructor shall:

1.7.1 Present how human factors influence accidents in the wind industry (relevant statistics may be applied)

1.7.2 Lead a discussion about the role of the individual in improving human behaviour and how this can improve the safety of offshore operations

Facts and Human Factors Criteria:

The consequences of human factors in accidents in the wind industry are influenced by the following terms and conditions:

a. attention and perception

b. group behaviour and peer pressure

c. weather conditions

d. weather delays

e. noise levels

f. site layout and housekeeping

g. fitness and health

h. domestic and work-related stress

i. workload (both overload and underload)

j. fatigue

k. time pressure and deadlines

l. alcohol, medication, and substance abuse

m. warming up prior to working at height, including awkward postures

The participants shall:

1.7.3 Engage in discussions and share experiences on how human factors influence accidents related to the BST Working at Heights & Manual Handling

1.7.4 Engage in and reflect on received feedback and take responsibility on their own performance and development during the training

LESSON 2 - LEGISLATION AND BEHAVIOURAL SAFETY

25 min.

The aim of this lesson is to introduce the participants to the site organisation and relevant legislation in order to ensure the participants are aware of the roles, responsibilities and rules that apply to onshore and offshore wind farms. Additionally, this lesson will enable the participants to work safely in the wind industry and remain injury-free.

After having successfully completed this lesson, the participants can:

13) **Recognise** hazards and risks associated with working at heights and manual handling specific to a wind turbine generator (WTG) (Knowledge, basic level)

14) **Show interest** in complying with applicable legislation relevant to working at heights and manual handing specific to a WTG (Ability, basic level)

15) **Act independently** in searching for help or seeking guidance regarding legislation about working at heights and manual handling (Ability, intermediate level)

ELEMENT 2.1 - GLOBAL LEGISLATION

Learning objectives:

16) The participants can **describe** internationally recognised standards/legislation relevant to working at height (Knowledge, basic level)

17) The participants can **describe** internationally recognised standards/legislation relevant to manual handling (Knowledge, basic level

The instructor shall:

2.1.1 Describe applicable standards/legislation

2.1.2 Describe legal responsibilities

The participants shall:

2.1.3 Share their experiences on when it can be necessary to find and apply legislation and where their local and national legislation can be obtained

ELEMENT 2.2 - NATIONAL LEGISLATION

Learning objectives:

18) The participants can **describe** national standards/legislation relevant to working at heights (Knowledge, basic level)

19) The participants can **describe** national standards/legislation relevant to manual handling (Knowledge, basic level)

The instructor shall:

2.2.1 Describe applicable legislation

2.2.2 Describe legislative requirements

2.2.3 Describe legal responsibilities

The participants shall:

2.2.4 Share their experiences on when it can be necessary to find and apply legislation and where their local and national legislation can be obtained

ELEMENT 2.3 - BEHAVIOURAL SAFETY

Learning objectives:

20) The participants can **explain** the consequences of injuries (Knowledge, intermediate level)

21) The participants can **explain** the possible causes of injuries (Knowledge, intermediate level)

The instructor shall:

2.3.1 Lead a discussion about the causes of injuries, i.e. time vs. effort/conditions/risk, putting job before self, negative habits, previous injuries, etc.

2.3.2 Highlight the importance of staying injury-free

2.3.3 Explain the consequences of incorrect manual handling

2.3.4 Lead a discussion about the importance of warming up before working at heights in awkward physical postures

The participants shall:

2.3.5 Discuss how a work-related injury can affect them

2.3.6 Discuss how incorrect manual handling can affect them

2.3.7 Discuss the importance of warming up prior to working at heights and manual handling in general

LESSON 3 - HARNESS

30 min.

The aim of this lesson is to reduce the risk of injury caused by a damaged harness by enabling the participants to perform a pre-use inspection of a harness, to identify when a harness requires a formal inspection and approval, to explain the basic maintenance of a harness and to correctly fit and adjust a harness.

After having successfully completed this lesson, the participants can:

22) **Take responsibility** for working safely with a harness including pre-use inspection, formal inspection and approval, basic maintenance, and correct use (Ability, intermediate level)

ELEMENT 3.1 - PRE-USE INSPECTION

Learning objective:

23) The participants can **perform** a pre-use inspection of a random full body harness (Skills, intermediate level)

The instructor shall:

3.1.1 Briefly introduce the generic approach to safety equipment as described in the Annex 1

3.1.2 Demonstrate how to select the correct sized harness for the intended work

3.1.3 Demonstrate how to identify the relevant standard markings

3.1.4 Present manufacturer and/or legal inspection periods

3.1.5 Explain the principles and importance of self-inspection of a full body harness for defects and significant wear, including:

a. observe proper size

b. markings and labels

c. operating weight and temperature range

d. equipment is within period of formal inspections

e. fall indicator

f. dorsal attachment point is seated centrally between shoulders

g. stitching

h. metal parts

i. straps

j. back protection

k. attachment points and D-Rings

l. soiling of harness (e.g. oil spills)

m. saltwater exposure

n. locks

o. observe manufacturer's user manual for specific or additional requirements

3.1.6 Demonstrate how to perform a pre-use inspection of a random full body harness covering the points in sub-element 3.1.5

3.1.7 Stress the generic approach to pre-use inspections of a full body harness focusing on similarities and differences in design, functionality, and operation between different products

3.1.8 Highlight the potential task placed upon the participants (in their own organisation at course completion) requiring them to familiarise themselves with other safety equipment products

3.1.9 Provide constructive feedback on the participants' performance during the practice

The participants shall:

3.1.10 Practise the ability to perform a pre-use inspection of a random full body harness (demonstrated during this module) covering the points in sub-element 3.1.5

3.1.11 Practise how to correctly identify the standards markings and inspection dates on a full body harness

ELEMENT 3.2 - FITTING

Learning objective:

24) The participants can **perform** the correct fit and adjustment of a random full body harness (Skills, intermediate level)

The instructor shall:

3.2.1 Explain the importance of correctly adjusting a full body harness

3.2.2 Demonstrate how to correctly fit and adjust a full body harness ensuring a snug fit and the following specifics:

a. shoulder straps shall be loosened

b. leg straps sit well

c. abdominal strap shall sit well

d. chest strap (strapped slightly above or on the chest)

e. pivot link shall be at the hip and shall be flexible. It must not sit so high that it may damage ribs and internal organs during a fall

The participants shall:

3.2.3 Practise the ability to correctly fit and adjust a harness covering the points in sub-element 3.2.2 to a snug fit

ELEMENT 3.3 - PERIODIC INSPECTIONS

Learning objective:

25) The participants can **explain** approvals according to appropriate equipment guidelines (EU, UK, USA, Canada, Mexico etc.) (Knowledge, intermediate level)

The instructor shall:

3.3.1 Explain how often the harness shall be approved globally (in the EU, UK, USA, Canada, Mexico, etc.)

The participants shall:

3.3.2 Share their understanding of harness approvals according to appropriate equipment guidelines and ask questions when in doubt

ELEMENT 3.4 - DOCUMENTATION

Learning objective:

26) The participants can **explain** the approval documentation, equipment serial number, authorisation date, etc (Knowledge, intermediate level)

The instructor shall:

3.4.1 Explain documentation, instrument number, authorisation date, etc.

3.4.2 Explain how to identify the approval documentation, equipment serial number, authorisation date, etc.

The participants shall:

3.4.3 Share their understanding of documentation and ask questions when in doubt

ELEMENT 3.5 - MAINTENANCE

Learning objective:

27) The participants can **explain** how to maintain a full body harness (Knowledge, intermediate level)

The instructor shall:

3.5.1 Explain how to store and maintain a harness (e.g. storage in dry environment, wash with fresh water, etc.)

The participants shall:

3.5.2 Share their understanding of harness maintenance and ask questions when in doubt

LESSON 4 - FALL PREVENTION

30 min.

The aim of this lesson is to enable the participants to use fall/travel restraint and work positioning lanyards to prevent a fall and reduce the risk of injuries while working at heights.

After having successfully completed this lesson, the participants can:

28) **Take responsibility** for safely using fall/travel restraint and work positioning lanyards to prevent a fall and reduce the risk of injuries while working at height (Ability, intermediate level)

ELEMENT 4.1 - FALL PREVENTION OVER FALL ARREST

Learning objectives:

29) The participants can **perform** the attachments of a fall/travel restraint lanyard and work positioning lanyard correctly to the ladder system (Skills, intermediate level)

30) The participants can **explain** why fall prevention is preferred over fall arrest (Knowledge, intermediate level)

The instructor shall:

4.1.1 Explain why fall prevention is better than fall arrest

4.1.2 Recommend attaching fall arrest as well, when fall/travel restraint or work positioning is attached and/or being used

4.1.3 Explain that in some companies it is required to attach a fall arrest lanyard while using a work restraint or work positioning lanyard

4.1.4 Explain how to change position while attached to a work positioning lanyard

4.1.5 Conduct warm-up on relevant muscles and loins

4.1.6 Facilitate the practical training on using fall prevention equipment

4.1.7 Provide constructive feedback on the participants' performance during the practice

The participants shall:

4.1.8 Practise the ability to attach a fall/travel restraint lanyard and work positioning lanyard correctly to the ladder system

4.1.9 Engage in discussing why fall prevention is preferred over fall arrest

Note *Warm-up is introduced in Lesson 2 and will be unfolded in Lesson 9. To be loyal to the principles of safe behaviour, it is necessary to perform warm-up, when relevant*

ELEMENT 4.2 - PRE-USE INSPECTION

Learning objective:

31) The participants can **perform** a pre-use inspection of a fall/travel restraint lanyard and a work positioning lanyard (Skills, intermediate level)

The instructor shall:

4.2.1 Demonstrate how to perform pre-use inspection of a fall/travel restraint lanyard and work positioning lanyard products required/chosen to instruct this module, by the following principles and covering:

a. markings and labels

b. operating weight and temperature range

c. equipment is within period of formal inspections

d. integrity, damage, corrosion, saltwater exposure and significant wear of:- lanyard rope, webbing, plastic, metal and heat-shrinkable tubing

e. all moving parts work correctly, with no excessive play

f. connectors (carabiners), and lock as intended and cannot disconnect completely

g. length adjustment function (if fitted) operates, and locks as intended

h. observe manufacturer's user manual for specific or additional requirements

4.2.2 Stress the generic approach to pre-use inspection of a fall restraint lanyard and work positioning lanyard focusing on similarities and differences in design, functionality, and operation between different products

4.2.3 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products

The participants shall:

4.2.4 Practise the ability to perform a pre-use inspection of a random fall/travel restraint lanyard and work positioning lanyard covering the points demonstrated in this element, before working at height during practical exercises

ELEMENT 4.3 - CORRECT ATTACHMENT TO ANCHOR POINTS

Learning objective:

32) The participants can **perform** the correct use of fall/travel restraint lanyards and work positioning lanyards with focus on their own personal safety (Skills, intermediate level)

The instructor shall:

4.3.1 Explain the importance of personal safety when using work positioning lanyards, participants shall never lose focus on their own safety

4.3.2 Demonstrate how to correctly attach fall/travel restraint lanyards and work positioning lanyards:

a. to the ladder stiles and reinforced ladder rungs

b. to certified and structural anchor points

4.3.3 Facilitate practical exercises for the participants covering the scenarios presented in this element

4.3.4 Provide constructive feedback on the participants' performance during the practice

The participants shall:

4.3.5 Identify and select certified and structural anchor points for the attachment of fall/travel restraint lanyards and work positioning lanyards

4.3.6 Practise the ability to correctly attach fall/travel restraint lanyards and work positioning lanyards while working at height during practical exercises, covering the scenarios presented in this element

ELEMENT 4.4 - CORRECT ATTACHMENT TO THE HARNESS

Learning objective:

33) The participants can **perform** the attachments of fall/travel restraint lanyards and work positioning lanyards correctly to the harness (front and/or rear attachment points, and/or side D-rings) (Skills, intermediate level)

The instructor shall:

4.4.1 Demonstrate how to correctly attach fall/travel restraint lanyards to the harness (front or back attachment point) according to manufacturer's user manual and relevant country-specific requirements/restrictions

4.4.2 Demonstrate how to correctly attach work positioning lanyards to the harness (front attachment point, and in both side, D-rings at once)

4.4.3 Provide constructive feedback on the participants' performance during the practice

The participants shall:

4.4.4 Practise the ability to attach fall/travel restraint lanyards and work positioning lanyards correctly to the harness

ELEMENT 4.5 - THE IMPORTANCE OF USING WORK POSITIONING

Learning objective:

34) The participants can **explain** the importance of using work positioning lanyards in order to leave hands free for work (Knowledge, intermediate level)

The instructor shall:

4.5.1 Explain the importance of using work positioning lanyards in order to leave hands free for work

The participants shall:

4.5.2 Share their understanding on using work positioning lanyards and ask questions when in doubt

LESSON 5 - VERTICAL FALL ARREST SYSTEMS

25 min.

The aim of this lesson is to enable the participants to perform a pre-use inspection of various types of vertical fall arrest systems and to use any vertical fall arrest system while working at height.

After having successfully completed this lesson, the participants can:

35) **Show interest** in performing a pre-use inspection of various types of vertical fall arrest systems and using any vertical fall arrest system while working at height (Ability, basic level)

ELEMENT 5.1 - LEGAL REQUIREMENTS

Learning objective:

36) The participants can **explain** the legal requirements and practical skills for using fall arrest systems when working at height (Knowledge, intermediate level)

The instructor shall:

5.1.1 Explain the systems currently in use (rail/wire/inertia reel)

5.1.2 Demonstrate how to correctly identify the relevant standard markings

5.1.3 Explain manufacturer and/or statutory inspection periods

5.1.4 Explain the correct storage and maintenance

The participants shall:

5.1.5 Ask questions when in doubt and share relevant experiences

ELEMENT 5.2 - PRE-USE INSPECTION

Learning objective:

37) The participants can **perform** a pre-use inspection of fall arrest system chosen/required for this module, including pre-use inspection of a random fall arrest glider/slider (Skills, intermediate level)

The instructor shall:

5.2.1 Demonstrate how to perform a pre-use inspection of a vertical fall arrest system by the following principles that covers:

a. markings and labels

b. system is within period of formal inspections

c. number of users allowed on the system

d. integrity, damage and corrosion of rail and wire and ladder attachments

e. saltwater exposure

f. observe manufacturer's user manual for specific or additional requirements

5.2.2 Demonstrate how to perform pre-use inspection of the guided type fall arrest products chosen/required to instruct this module, by the following principles that cover:

a. identify which vertical fall arrest system the guided type fall arrester matches with, including matching cable size

b. markings and labels

c. operating weight and temperature range

d. equipment is within period of formal inspections

e. integrity, damage, corrosion, saltwater exposure and significant wear of: fall arrester, cam, energy absorber and connectors (carabiners)

f. all moving parts work correctly, with no excessive play

g. spring fitted buttons engage promptly when released

h. locking and catch mechanisms lock/release as intended

i. identify symbol/indication for correct orientation in use

j. gravity stop functionality works as intended

k. fall indicator

l. connector (carabiner) elements operate (and lock) as intended, cannot disconnect completely and have not been extended/shortened

m. which attachment point on harness to connect to

n. observe manufacturer's user manual for specific or additional requirements.

5.2.3 Stress the generic approach to pre-use inspections of a guided type fall arrester (glider/slider) focusing on similarities and differences in design, functionality and operation between different products

5.2.4 Explain that the participant is always required to familiarise themselves with the specific guided type fall arrester product prior to use e.g. by reading the equipment instruction manuals and to familiarise themselves with the specific guided type fall arrester (glider/slider) prior to use

5.2.5 Facilitate practise for the participants before the practical exercises lesson

5.2.6 Provide constructive feedback on the participants' performance during the practise

The participants shall:

5.2.7 Practise and demonstrate the ability to perform a pre-use inspection of a vertical fall arrest system including matching fall arrest glider/slider (demonstrated during this module)

ELEMENT 5.3 - CORRECT ATTACHMENT AND DETACHMENT

Learning objectives:

38) The participants can **perform** the correct attachment of any vertical fall arrest glider/slider to the matching rail/wire (Skills, intermediate level)

The instructor shall:

5.3.1 Demonstrate how to attach and detach the glider/slider to the rail/wire of various vertical fall arrest systems

5.3.2 Explain that the symbol/indication for correct orientation in use of a given guided type fall arrester may not indicate the climbing direction, and that the equipment should always be used according to equipment manufacture's user manual

The participants shall:

5.3.3 Practise and demonstrate the ability to correctly attach/detach a random glider/slider to the rail/wire of a matching vertical fall arrest system (prior to the practical exercises lesson of the working at heights module)

ELEMENT 5.4 - CORRECT USE

Learning objective:

39) The participants can **perform** safely and correctly use a vertical fall arrest system while working at height (Skills, intermediate level)

The instructor shall:

5.4.1 Demonstrate how to correctly use a vertical fall arrest system, including testing (prior to commencing climbing) if the fall arrester operates and locks correctly according to equipment manufacture's user manual

The participants shall:

5.4.2 Practise and demonstrate the ability to correctly use a vertical fall arrest system, including testing (prior to commencing climbing) if the fall arrester operates and locks correctly according to equipment manufacture's user manual

ELEMENT 5.5 - PERIODIC INSPECTIONS

Learning objective:

40) The participants can **explain** country and region-specific approvals of vertical fall arrest systems (Knowledge, intermediate level)

The instructor shall:

5.5.1 Explain how participants can find the correct country approval for vertical fall arrest systems

5.5.2 Explain that the harness will require a periodic inspection by a competent person and that this inspection period will vary from country to country

5.5.3 Explain that the participants must seek out which inspection periods apply in the country where they will be working

The participants shall:

5.5.4 Ask questions when in doubt and share relevant experiences

ELEMENT 5.6 - CORRECT DOCUMENTATION

Learning objective:

41) The participants can **explain** the correct documentation for the vertical fall arrest system (Knowledge, intermediate level)

The instructor shall:

5.6.1 Explain how participants can find the correct documentation

The participants shall:

5.6.2 Ask questions when in doubt and share relevant experiences

LESSON 6 - FALL ARREST LANYARDS

55 min.

The aim of this lesson is to enable the participants to safely use fall arrest lanyards while working at height.

After having successfully completed this lesson, the participants can:

42) **Take responsibility** for safely using fall arrest lanyards while working at height (Ability, intermediate level)

ELEMENT 6.1 - LEGAL REQUIREMENTS

Learning objective:

43) The participants can **explain** the legal requirements for using fall arrest systems when working at height (Knowledge, intermediate level)

The instructor shall:

6.1.1 Explain the legal requirements for using fall arrest lanyards when working at height

The participants shall:

6.1.2 Engage in discussions and ask questions when in doubt

ELEMENT 6.2 - PRE-USE INSPECTION

Learning objective:

44) The participants can **perform** a pre-use inspection of a fall arrest lanyard (Skills, intermediate level)

The instructor shall:

6.2.1 Demonstrate how to perform pre-use inspection of the fall arrest lanyard products required/chosen to instruct this module, by the following principles that cover:

a. markings and labels

b. operating weight and temperature range

c. equipment is within period of formal inspections

d. integrity, damage, corrosion, saltwater exposure and significant wear of:

d.i energy absorber

d.ii lanyard rope

d.iii webbing

d.iv plastic

d.v metal

d.vi heat-shrinkable tubing

e. all moving parts work correctly, with no excessive play

f. connectors (carabiners) operate (and lock) as intended and cannot disconnect completely

g. length adjustment function (if fitted) operates, and locks as intended

h. fall indicator

i. which attachment point on harness to connect to

j. observe fall arrest type (e.g. Y- or V- or I-type) and required attachment procedures, in particular climbing with a twin fall arrest lanyard

k. observe product fall clearance (max. arrest distance)

l. observe manufacturer's user manual for specific or additional requirements

6.2.2 Stress the generic approach to pre-use inspections of a fall arrest lanyard focusing on similarities and differences in design, functionality, and operation between different products

6.2.3 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products

6.2.4 Provide constructive feedback on the participants' performance during the practice

The participants shall:

6.2.5 Practise the ability to perform a pre-use inspection of any fall arrest lanyard (demonstrated during this element) before working at height during practical exercises

ELEMENT 6.3 - CORRECT ATTACHMENT TO HARNESS

Learning objective:

45) The participants can **perform** a correct attachment of a fall arrest systems to the harness (front and dorsal attachment points) (Skills, intermediate level)

The instructor shall:

6.3.1 Demonstrate how to attach fall arrest lanyards correctly to the harness (dorsal, or possible front, attachment point) according to manufacturer's user manual and relevant country-specific requirements/restrictions

6.3.2 Facilitate practice for the participants before working at height during practical exercises

6.3.3 Provide constructive feedback on the participants' performance during the practice

The participants shall:

6.3.4 Practise how to correctly attach fall arrest lanyards to a harness

ELEMENT 6.4 - FALL FACTOR

Learning objectives:

46) The participants can **explain** the 'fall factor' and principle of selecting anchor points which reduce the fall factor to as low as possible (Knowledge, intermediate level)

47) The participants can **act independently** in using the principle of selecting anchor points which reduce the fall factor to as low as possible (Ability, intermediate level)

The instructor shall:

6.4.1 Define the term 'fall factor' as it relates to working at height and fall arrest lanyards

6.4.2 Show diagrams of and explain the following:

a. factor 1 fall (FF1)

b. factor 2 fall (FF2)

6.4.3 Explain how the distance of a free fall can affect the severity of a fall

6.4.4 Explain how reducing the fall factor will reduce the potential free fall distance

6.4.5 Explain how attaching a fall arrest lanyard to an anchor point that is above shoulder height will reduce the fall factor

6.4.6 Demonstrate how to select anchor points for the attachment of fall arrest lanyards so that the fall factor is reduced to less than FF1

The participants shall:

6.4.7 During subsequent practical training, value and apply the principle of selecting anchor points which will reduce the fall factor to as low as possible

Note *There should be a selection of anchor points at different heights above the working platform available for the participants to attach their fall arrest lanyards.*

ELEMENT 6.5 - FALL INDICATORS

Learning objective:

48) The participants can **explain** how to detect if PPE has experienced a fall (Fall Indicator) (Knowledge, intermediate level)

The instructor shall:

6.5.1 Show an example of a fall arrest lanyard where the fall indicator shows that it has experienced a fall

6.5.2 Demonstrate how to identify if the fall arrest lanyard has experienced a fall by using the fall arrest lanyards fall indicator

The participants shall:

6.5.3 Ask questions and share experiences on how to detect if PPE has experienced a fall

ELEMENT 6.6 - TWIN AND SINGLE FALL ARREST LANYARDS

Learning objectives:

49) The participants can **explain** the differences between twin fall arrest lanyards and single fall arrest lanyards, as well as the different ways they are used (Knowledge, intermediate level)

50) The participants can **perform** the use of twin tail fall arrest lanyards while double hook climbing (Skills, intermediate level)

The instructor shall:

6.6.1 Show examples of, and explain the differences between, twin and single fall arrest lanyards as well as the different ways of using and observing the manufacturer's user guidelines

6.6.2 Demonstrate the correct way of using twin and single fall arrest lanyards including; double hook climbing on ladder, required and recommended distance between twin fall arrest lanyard anchor point attachment points climbing ladders

6.6.3 Provide constructive feedback on the participants' performance during the practice

The participants shall:

6.6.4 Practise how to correctly use single and/or twin fall arrest lanyards while working at height during practical exercises

6.6.5 Practise how to correctly use twin and/or single fall arrest lanyards while double hook climbing on a ladder maintaining the correct distance between the anchor points

ELEMENT 6.7 - APPROVED ANCHOR POINTS FOR ATTACHMENT

Learning objective:

51) The participants can **explain** approved anchor points (Knowledge, intermediate level)

The instructor shall:

6.7.1 Explain approved anchor points for fall arrest attachment by considering certified anchor points and structural anchor points which are unquestionably sound (e.g. ladder stiles, reinforced ladder rungs, gearbox lifting eyes)

The participants shall:

6.7.2 Ask questions and engage in conversations on approved anchor points

Note *Approved anchor points shall be pointed out to the participants during practical exercises to the extent needed*

ELEMENT 6.8 - THE IMPORTANCE OF ALWAYS USING FALL ARREST SYSTEMS

Learning objective:

52) The participants can **explain** the importance of always using a fall arrest system (Knowledge, intermediate level)

The instructor shall:

6.8.1 Explain the importance of always using fall arrest systems

The participants shall:

6.8.2 Ask questions and share experiences on the importance of always using fall arrest systems

LESSON 7 - DROPPED OBJECTS

15 min.

The aim of this lesson is to enable the participants to work safely and reduce the risk of injury arising from dropped objects in and around wind turbines.

After having successfully completed this lesson, the participants can:

53) **Show interest** in working safely to reduce the risk of injury arising from dropped objects in and around wind turbines (Ability, basic level)

ELEMENT 7.1 - RISKS

Learning objective:

54) The participants can **explain** the risks posed by dropped objects (Knowledge, intermediate level)

The instructor shall:

7.1.1 Explain the risks posed by dropped objects

7.1.2 Explain which items constitute a dropped object hazard

7.1.3 Describe typical injuries that can occur as a result of a dropped object

The participants shall:

7.1.4 Ask questions and share experiences on risks posed by dropped objects

ELEMENT 7.2 - RISK REDUCTION

Learning objective:

55) The participants can **explain** techniques of how to reduce the risk of dropping objects (Knowledge, intermediate level)

The instructor shall:

7.2.1 Explain that it is never acceptable to work directly above another person

7.2.2 Explain and demonstrate methods for mitigating the risk of dropped objects like:

a. closing hatches

b. covering openings

7.2.3 Explain and demonstrate how to reduce the risk of dropped objects using:

a. object attachment and tethering

b. closed top tool bags

7.2.4 Define the term ‘drop zone’

7.2.5 Explain how to prevent injuries arising from dropped objects by staying out of the drop zone of workers at height

The participants shall:

7.2.6 Share their understanding on how to reduce the risk of dropped objects during the rest of the exercises during this course

7.2.7 Take responsibility for staying out of the drop zone of workers at height during the practical exercises in this course

LESSON 8 - SELF-RETRACTING LIFELINES

10 min.

The aim of this lesson is to enable the participants to use self-retracting lifelines as fall protection system during actual work in a wind turbine.

After having successfully completed this lesson, the participants can:

56) Take responsibility for correctly and safely using self-retracting lifelines as fall protection system in a wind turbine (Ability, intermediate level)

ELEMENT 8.1 - FALL PROTECTION SYSTEMS DURING ACTUAL WORK IN A WIND TURBINE

Learning objective:

57) The participants can **explain** the use of an SRL as a fall protection system during actual work in a wind turbine (Knowledge, intermediate level)

The instructor shall:

8.1.1 Provide examples of when an SRL may be used as fall protection system during actual work at height in a wind turbine

8.1.2 Explain that additional fall protection systems are commonly required as a measure to prevent injury during training activities and that an additional fall protection system is commonly not required in actual wind turbines, particularly not for emergency situations such as evacuation and rescue

8.1.3 Explain the different types of SRL fall protection systems typically used for training activities and used in wind turbines for actual work; why and how they are used, their limitations and fall clearance, the length of the lifeline

The participants shall:

8.1.4 Ask questions and engage in discussion about the importance of using fall protection systems in training and actual wind turbines

8.1.5 Explain the difference between fall protection systems used in training versus in actual wind turbines

ELEMENT 8.2 - DIFFERENT ALLOWED MAXIMUM ANGLES

Learning objective:

58) The participants can **explain** the different maximum angles that are allowed when using an SRL according to manufacture specifications (Knowledge, intermediate level)

The instructor shall:

8.2.1 Describe the different maximum angles that are allowed according to equipment manufacture's user manual

8.2.2 Explain how the maximum angle is calculated based on the angle of the lifeline in use compared to; either the SRL housing or the SRL attachment point (anchor point) – according to equipment manufacture's user manual

The participants shall:

8.2.3 Provide an explanation for the different maximum angles allowed when using an SRL and how this is calculated

ELEMENT 8.3 - HOW TO ATTACH CORRECTLY TO THE HARNESS

Learning objective:

59) The participants can correctly **perform** the attachment of a self-retracting lifeline to a harness attachment point (Skills, intermediate level)

The instructor shall:

8.3.1 Explain and demonstrate how to correctly attach an SRL to the harness (front and dorsal attachment points)

8.3.2 Facilitate practical exercises for participants to practise and demonstrate how to correctly attach an SLR to their harness

The participants shall:

8.3.3 Practise and demonstrate how to correctly attach an SRL to their harness

8.3.4 Ask questions when in doubt

ELEMENT 8.4 - APPROVED ANCHOR POINTS FOR SRL FALL PROTECTION SYSTEMS

Learning objective:

60) The participants can **explain** the different types of approved anchor points that an SRL is allowed to be secured to (Knowledge, intermediate level)

The instructor shall:

8.4.1 describe how to identify and use approved anchor points for the attachment of SRLs

The participants shall:

8.4.2 Explain how to identify and use different approved anchor points when attaching an SRL

ELEMENT 8.5 - PRE-USE INSPECTION

Learning objective:

61) The participants can perform a pre-use inspection of a self-retractable lifeline (SRL) (Skills, intermediate level)

The instructor shall:

8.5.1 Demonstrate how to perform pre-use inspection of the SRL product required/chosen to instruct this module, by the following principles that cover:

a. markings and labels

b. observe product operating weight and temperature range

c. equipment is within period of formal inspections

d. integrity, damage, corrosion, saltwater exposure, and significant wear of:

d.i block including bolts and locking rivets (entire cable/webbing)

d.ii connectors (carabiners)

e. all moving parts work correctly with no excessive play

f. connectors (carabiners) operate (and lock) as intended and cannot disconnect completely

g. fall indicator

h. brake function (twice)

i. observe correct alignment (max. angle between block and cable/webbing)

j. observe product fall clearance (max. arrest distance)

k. observe manufacturer's user manual for specific or additional requirements

l. differences in pre-use inspections depending on whether the device is pre-installed or not, according to manufacturer specifications

8.5.2 Stress the generic approach to pre-use inspection of a self-retractable lifeline (SRL) focusing on similarities and differences in design, functionality, and operation between different products

8.5.3 Explain that the participant is always required to familiarise themselves with the specific SRL product prior to use e.g. by reading the equipment instruction manual

8.5.4 Facilitate practical exercises for participants to practise and demonstrate a pre-use inspection of an SRL

8.5.5 Provide constructive feedback on the participants' performance during practical exercises

The participants shall:

8.5.6 Practise and demonstrate how to perform pre-use inspection on the SRL product required/chosen to instruct this module

LESSON 9 - MEASURES TO PREVENT INJURY DURING TRAINING

20 min.

The aim of this lesson is to reduce the risk of injury during training by introducing the participants to the control measures employed in the practical training area and how to warm up prior to performing rescue exercises.

After having successfully completed this lesson, the participants can:

62) **Take responsibility** for control measures employed in the practical training area and for warming up prior to performing rescue exercises (Ability, intermediate level)

ELEMENT 9.1 - CONTROL MEASURES AND WARM-UP

Learning objective:

63) The participants can **explain** the control measures employed in the practical training area and how to warm up prior to performing rescue exercises (Knowledge, intermediate level)

The instructor shall:

9.1.1 Explain further control measures for the specific training facilities and training to avoid injury during the training

9.1.2 Verify that the participants can explain the principles of operation of the PPE and equipment to be used during practical training sessions

9.1.3 Ensure that any hazardous energy sources which may affect the participants during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the participants

9.1.4 Lead a warm-up session of the major muscle groups of the body, ankles, wrists and back

9.1.5 Attach additional fall protection to each participant. It is the instructor's responsibility to always attach additional fall protection to each participant who is working at height (including both casualty and rescuer). GWO recommends that a SRL is used as additional fall protection

The participants shall:

9.1.6 Take part in the warm-up session of the major muscle groups, ankles, wrists and back

9.1.7 Perform a pre-use inspection of their personal fall protection equipment

9.1.8 Perform a 'buddy check' of another participant's personal fall protection equipment

LESSON 10 - PRACTICAL EXERCISES

60 min.

The aim of this lesson is to enable the participants to perform safe and controlled work at height, according to the control measures.

After having successfully completed this lesson, the participants can:

64) **Take responsibility** for a safe and controlled working at hights (Ability, intermediate level)

ELEMENT 10.1 - VERTICAL FALL ARREST SYSTEMS

Learning objective:

65) The participants can **act independently** while safely and correctly using the vertical fall arrest systems in the training facility (Skills, advanced level)

The participants shall:

10.1.1 Practise how to use vertical fall arrest systems safely and correctly

The instructor shall:

10.1.2 Create practical exercises that enable the participants to practise using the vertical fall arrest systems safely and correctly

10.1.3 Provide constructive feedback on the participants' performance during the practice

ELEMENT 10.2 - FALL PREVENTION

Learning objective:

66) The participants can **take responsibility** for the safe and correct use of fall restraint lanyards and work positioning lanyards (Skills, advanced level)

67) The participants can **take responsibility** for providing fall prevention (fall restraint) over fall arrest (Ability, intermediate level)

The participants shall:

10.2.1 Practise how to safely and correctly use fall restraint lanyards and work positioning lanyards to prevent a fall

The instructor shall:

10.2.2 Create practical exercises that enable the participants to practise how to use fall restraint lanyards and work positioning lanyards to prevent a fall

10.2.3 Provide constructive feedback on the participants' performance during the practice

ELEMENT 10.3 - FALL ARREST LANYARDS

Learning objective:

68) The participants can **take responsibility** for the safe and correct use of fall arrest lanyards (Skills, advanced level)

The participants shall:

10.3.1 Practise and demonstrate the ability to use fall arrest lanyards safely and correctly, double hook climbing included

The instructor shall:

10.3.2 Provide constructive feedback on the participants' performance during the practice

LESSON 11 - INJURIES, SYMPOTMS AND ESSENTIAL MANUAL HANDLING PRINCIPLES

25 min.

The aim of this lesson is to create awareness of the risk of musculoskeletal injuries within the wind industry.

After successfully having completed this lesson, participants can:

69) **Solve** how to identify typical symptoms of musculoskeletal injuries (Ability, basic level)

70) **Show interest** in the essential manual handling principles and how these can be used to reduce the risk of injury in their work (Ability, basic level)

Note *Parts of the total learning outcome of Lesson 11 must be covered within the practical exercises in Lesson 12 in exercise introductions and feedback sessions where feasible.*

ELEMENT 11.1 - HOW TO AVOID COMMON MUSCULOSKELETAL INJURIES IN THE WIND INDUSTRY

Learning objectives:

71) The participants can **describe** common muscular and skeletal injuries related to manual handling in the wind industry (Knowledge, basic level)

72) The participants can **describe** examples of risks and hazards of manual handling relevant to the job functions within the wind industry (Knowledge, basic level)

The instructor shall:

11.1.1 Present examples of common muscular and skeletal injuries related to manual handling in the wind industry including:

a. back injuries e.g. slipped disc

b. muscle strains

11.1.2 Lead a brainstorm or discussion with the participants about examples of risks and hazards of manual handling relevant to the job functions within the wind industry and the principles of how to improve safety while executing such tasks, such as:

a. working over shoulder height

b. working while kneeling

c. lifting, push and pull

d. carrying

e. working with handheld tools

f. awkward positions

g. forceful exertions

h. repetitive motions

i. twisting

j. contact stress

k. exposure of local body parts and entire body to mechanical vibrations

l. duration of exposure

m. frequency of exposure

n. intensity of exposure

11.1.3 Lead discussions with the participants about:

a. the risks and hazards while executing manual handling related tasks

b. principles of how to improve safety while executing manual handling related tasks

The participants shall:

11.1.4 Engage in the brainstorms / discussions: share experiences and understandings about:

a. common muscular and skeletal injuries related to manual handling in the wind industry

b. risks and hazards of manual handling relevant to the job functions within the wind industry

c. how to avoid injuries, the risks and hazards and improve safety while executing manual handling related tasks

Note *Element 2.1 may be carried out during the practical training in Lesson 12 and in the training review in Lesson 18*

ELEMENT 11.2 - TYPICAL SYMPTOMS OF INJURIES

Learning objectives:

73) The participants can **recognise** typical early symptoms of musculoskeletal injuries (Knowledge, basic level)

74) The participants can **take responsibility** for reacting to early symptoms of musculoskeletal injuries and take initiative for corrective action and seeking medical advice (Ability, intermediate level)

75) The participants can **describe** potential long-term consequences of musculoskeletal injuries (Knowledge, basic level)

The instructor shall:

11.2.1 Facilitate participants' guided practice in identifying key examples of typical symptoms of musculoskeletal injuries

11.2.2 Lead participants in discussions about:

a. experiences with musculoskeletal injuries

b. what to do when typical symptoms of musculoskeletal injuries have been identified

c. the importance of early detection and treatment

11.2.3 Provide constructive feedback to the participants performance in the activities

The participants shall:

11.2.4 Practise how to identify key examples of typical symptoms of musculoskeletal injuries

11.2.5 Reflect on the received feedback, engage in the discussions, and share understandings and experiences about:

a. what to do when typical symptoms of musculoskeletal injuries have been identified

b. the importance of early detection and treatment

ELEMENT 11.3 - ESSENTIAL MANUAL HANDLING PRINCIPLES

Learning objectives:

76) The participants can **describe** essential manual handling principles (Knowledge, basic level)

77) The participants can **describe** the further control measures and how these can be used to reduce risk of injury in the participants' own work (Knowledge, basic level)

The instructor shall:

11.3.1 Explain and demonstrate how to use essential manual handling principles to safely perform frequent manual handling tasks in the wind industry

11.3.2 Ask the participants involving questions during the practical exercises about how to use essential manual handling principles, for example:

a. how are the essential manual handling principles followed?

b. what are the differences and similarities between the principles?

c. how will the participants be able to follow the principles in their own work?

d. in what situations is the principle of 'good housekeeping' relevant for safe manual handling operations?

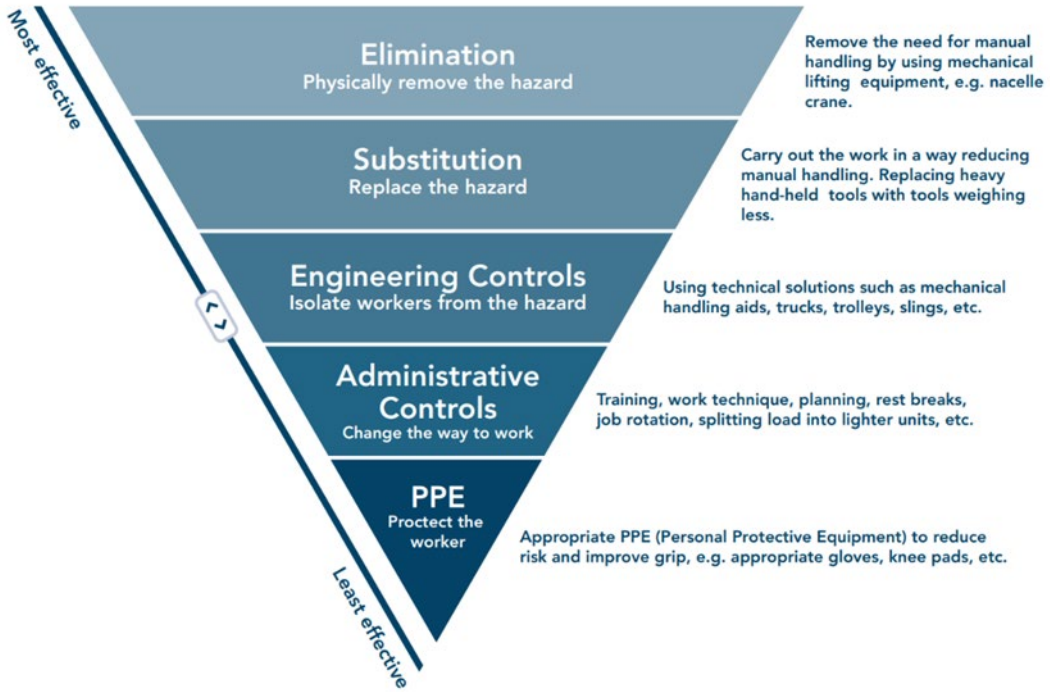


Figure 11.6.1 – Hierarchy of Controls

11.3.3 Present and lead a discussion about further control measures and how to use these to reduce risk of musculoskeletal injury and protect pre-existing injuries. The hierarchy of control measures is illustrated by Figure 11.6.1 Hierarchy of Controls. Also see Annex 3 for further discussion

11.3.4 Ask the participants involving questions about the further control measures and how these can be used to reduce risk of injury in the participants own work

The participants shall:

11.3.5 Engage in answering the questions and share understandings about:

a. the essential manual handling principles

b. the further control measures and how these can be used to reduce risk of musculoskeletal injury in the participants' own work

Note *Loads used for training should be of a realistic and safe weight and must be in line with the guidance in the 'lifting and lowering filter' presented in Annex 3. Also see Figure 11.6.2 (below)*

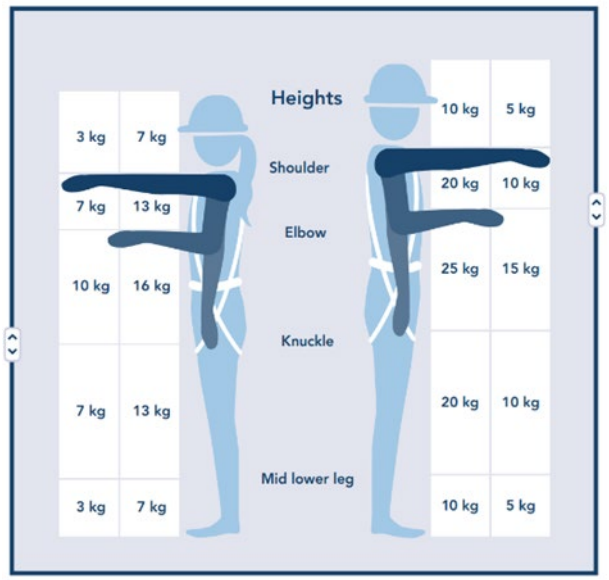


Figure 11.6.2 – Lifting and lowering filters

Note *The use of mechanical and manual aids is recommended wherever possible to reduce risk of musculoskeletal injuries*

ELEMENT 11.4 - BASIC DYNAMIC RISK ASSESSMENT AND INTRODUCTION TO TILE PRINCIPLE

Note *See Annex 3 for TILE principle*

Learning objective:

78) The participants can **describe** the TILE principle and how to apply it in manual handling situations (Knowledge, basic level)

The instructor shall:

11.4.1 Present the TILE principle and its use in relation to basic dynamic risk assessment when planning manual handling operations

11.4.2 Ask involving questions about TILE principle in relation to planning manual handling operations

The participants shall:

11.4.3 Engage in answering questions and share experiences about using TILE principle when planning manual handling operations

Additional optional learning activity. The participants complete a questionnaire covering the main theory topics from Lesson 2. This may be done during rotation exercises in Lesson 4

Note *TILE principle must be addressed at all times (when relevant) during the practical training in Lesson 4*

LESSON 12 - MANUAL HANDLING: RISK CONTROLS & PROPER MANUAL HANDLING TECHNIQUES

60 min.

The aim of this lesson is to enable the participants to use essential manual handling principles in a variety of relevant scenarios in wind turbine work environments.

Note *Guidelines on filters for lifting, carrying, and lowering loads, on how to identify low risk tasks, and on good handling techniques are presented in Annex 3*

After successfully having completed this lesson, the participants can:

79) **Take initiative** and act independently in using essential manual handling principles to reduce the risk of musculoskeletal injury when working in the wind industry (Ability, intermediate level)

80) **Take responsibility** for mitigating musculoskeletal injuries (when lifting; pushing and pulling loads; and when working in awkward postures) by using suitable manual handling principles and aids where possible (Ability, intermediate level)

Note *The scenario-based training exercises should reflect the environment and the work tasks that wind technicians face on the job enabling the participants to practise how to mitigate the musculoskeletal injuries risks related to manual handling*

Note *Scenario-based exercises must follow the TILE principle for planning, and must include loads of different shapes, sizes, and weights. The use of manual handling aids must be considered, when planning the manual handling operation and must be included where relevant*

Note *Scenario-based exercises described in the respective elements of this lesson must be bundled and conducted as coherent exercises, where several elements in this lesson are included*

ELEMENT 12.1 - WORKING OVER SHOULDER HEIGHT

Learning objectives:

81) The participants can **recognise** the risks from working over shoulder heights (Knowledge, basic level)

82) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and using relevant aids when working over shoulder heights (Ability, intermediate level)

Note *Whenever possible, a work task should be planned to reduce activities above shoulder height*

The instructor shall:

12.1.1 Present and explain how to mitigate working over shoulder height and how to mitigate musculoskeletal injuries when working over shoulder height

12.1.2 Facilitate a scenario-based exercise covering working over shoulder height: e.g. placing spare parts and loads; bolt tensioning; reaching and rescue scenarios on ladders

12.1.3 Observe the participant's performance and give constructive feedback throughout on the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids, where possible

c. the use of the manual handling principles

The participants shall:

12.1.4 Take active part in exercises covering working over shoulder height and ask questions when unsure of safe manual handling techniques and principles

12.1.5 Apply TILE principle when planning the manual handling operation

12.1.6 Reflect on the received feedback in order to perform manual handling the best possible way

ELEMENT 12.2 - WORKING WHILE KNEELING

Learning objectives:

83) The participants can **recognise** the risks of musculoskeletal injuries from working while kneeling (Knowledge, basic level)

84) The participants can **take the initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when working while kneeling (Ability, intermediate level)

The instructor shall:

12.2.1 Explain and present how to mitigate musculoskeletal injuries from working while kneeling. For example: alternating between sitting and standing, organising work task between colleagues and how to mitigate musculoskeletal injuries when working while kneeling (e.g. by using knee pads and mats)

12.2.2 Facilitate a scenario-based exercise covering working while kneeling (e.g. cleaning, preparing rescuing stretchers and tightening bolts)

12.2.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing working while kneeling by using suitable handling aids where possible

c. the use of the manual handling principles

d. using e.g. knee pads and mats to mitigate musculoskeletal injuries

The participants shall:

12.2.4 Take active part in exercises covering working while kneeling and ask questions when unsure of safe manual handling techniques and principles

12.2.5 Apply TILE principle when planning the manual handling operation

12.2.6 Reflect on the received feedback in order to perform manual handling in the best possible way

ELEMENT 12.3 - PUSH AND PULL

Learning objectives:

85) The participants can **recognise** the risks from pushing and pulling loads (Knowledge, basic level)

86) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when pushing and pulling loads (Ability, intermediate level)

The instructor shall:

12.3.1 Explain and present how to mitigate musculoskeletal injuries from pushing and pulling loads manually

12.3.2 Facilitate a scenario-based exercise covering moving loads, e.g. when transferring between SOV (walk-to-work) and WTG, and when working in restricted spaces

12.3.3 Observe the participant's performance and give constructive feedback throughout the exercise with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids where possible

c. the use of manual handling principles

The participants shall:

12.3.4 Take active part in exercises covering pushing and pulling loads and ask questions when unsure of safe manual handling techniques and principles

12.3.5 Apply TILE principle when planning the manual handling operation

12.3.6 Reflect on the received feedback concerning pushing and pulling loads in the best possible way in relation to avoid musculoskeletal injuries

ELEMENT 12.4 - CARRYING

Learning objectives:

87) The participants can **recognise** the risks from carrying loads (Knowledge, basic level)

88) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when carrying loads (Ability, intermediate level)

The instructor shall:

12.4.1 Explain and present how to mitigate musculoskeletal injuries from carrying loads by following the TILE principle

12.4.2 Facilitate a scenario-based exercise covering different loads, e.g. shapes, size, weights, in different route scenarios, such as: stairs, hatches, thresholds and ramps

12.4.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids where possible

c. the use of manual handling principles

The participants shall:

12.4.4 Take active part in lifting loads exercises and ask questions when unsure of safe manual handling techniques and principles

12.4.5 Apply TILE principle when planning the manual handling operation

12.4.6 Reflect on the received feedback to perform manual handling in the best possible way

Note *Use relevant lifting equipment when possible and avoid carrying loads on stairs*

ELEMENT 12.5 - LIFTING

Learning objectives:

89) The participants can **recognise** the risks from lifting loads (Knowledge, basic level)

90) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when lifting loads (Ability, intermediate level)

The instructor shall:

12.5.1 Present and explain risks from lifting loads and how to mitigate musculoskeletal injuries from lifting, e.g. weight, grip, posture, and position of the load relative to the body

12.5.2 Facilitate a scenario-based exercise covering lifting different kinds of loads, e.g. liquids in containers, bulky loads, shapes, and unbalanced loads. The exercise must include considerations covering the task, individual capabilities, the load, and the work environment (TILE)

12.5.3 Observe the participants performance and give constructive feedback throughout the participants practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing manual handling using suitable handling aids where possible

c. the use of manual handling principles

The participants shall:

12.5.4 Take an active part in lifting loads exercises and ask questions when unsure of safe manual handling techniques and principles

12.5.5 Apply TILE principle when planning the manual handling operation

12.5.6 Reflect on the received feedback to perform manual handling the best possible way

Note *The participants must also practise in teams of two or more persons (or otherwise according to local policy) to perform a safe lift of a load that weighs no more than 30kg and is unwieldy; difficult to grasp; difficult to grip; with contents likely to move or shift (e.g. a rescue dummy and liquids)*

ELEMENT 12.6 - WORK WITH HANDHELD TOOLS

Learning objectives:

91) The participants can **recognise** the risks from repetitive work and from working with handheld tools (Knowledge, basic level)

92) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when working with handheld tools (Ability, intermediate level)

The instructor shall:

12.6.1 Present and explain risks by working with handheld tools; e.g. repetitive work and heavy tools

12.6.2 Facilitate a scenario-based exercise and a discussion covering how to mitigate musculoskeletal injuries from repetitive work and working with handheld tools

12.6.3 Observe the participants' performance and give constructive feedback throughout the participants' practice with a focus on:

a. the participants using safe techniques and appropriate planning

b. reducing musculoskeletal injuries from repetitive work and work with handheld tools

c. the use of manual handling principles

The participants shall:

12.6.4 Take an active part in exercises focusing on how to mitigate injuries from working with handheld tools; ask questions when unsure of safe manual handling techniques and principles and engage in discussions

12.6.5 Apply TILE principle when planning the manual handling operation

12.6.6 Reflect on the received feedback to perform manual handling the best possible way

Note *The instructor should present examples of early symptoms of injuries from vibrating handheld tools, e.g. numbness and reduced blood circulation in fingers (vibration white finger)*

ELEMENT 12.7 - AWKWARD POSTURES

Learning objectives:

93) The participants can **recognise** the risks from working in awkward postures (Knowledge, basic level)

94) The participants can **take initiative** to mitigate the risk of musculoskeletal injuries by applying TILE principle, safe work procedures and aids when working in awkward postures (Ability, intermediate level)

The instructor shall:

12.7.1 Present and explain risks from working in awkward postures (such as: when the torso is twisted or bent; in combination with loads and distance away from the body) and how to mitigate musculoskeletal injuries from working in awkward postures

12.7.2 Facilitate an exercise covering working in awkward postures and how to mitigate musculoskeletal injuries, e.g. when working in restricted spaces, working from a ladder and during rescue scenarios

12.7.3 Observe the participant's performance and give constructive feedback throughout the participant's practice with a focus on:

a. using safe techniques and appropriate planning

b. reducing manual handling by using suitable handling aids and work positions where possible

c. the use of manual handling principles

The participants shall:

12.7.4 Take active part in exercises focusing on how to mitigate musculoskeletal injuries from working in awkward postures and ask questions when in doubt of safe manual handling techniques and principles

12.7.5 Apply TILE principle when planning the manual handling operation

12.7.6 Reflect on the received feedback from performing manual handling when working in awkward postures in the best possible way

Note *Each participant would benefit most if they participate in a practice scenario based on a wind turbine work environment*

Lifting various objects in the correct and proper manner. These can be of different shapes and sizes but shall not weigh more than 15kg

In teams (two or more persons if required according to local policy), perform a correct lift of a load that weighs no more than 30 kg and is unwieldy, difficult to grasp, difficult to grip, with contents likely to move or shift (e.g. a rescue dummy)

The lesson elements concerned with manual handling should be practiced during subsequent exercises where the participants are performing exercises for rescue and evacuation from height and at any other time where they are handling equipment or props for exercises

The instructor should observe and provide immediate constructive feedback to the participants focusing on the following areas:

- reducing manual handling using suitable handling aids where possible
- planning of manual handling tasks using the TILE principle considering the load weight, maximum reaching distance and aggravating factors
- correct manual handling techniques

LESSON 13 - EMERGENCY PROCEDURES

80 min.

The aim of this lesson is to enable the participants to safely evacuate from a wind turbine using an evacuation or rescue kit.

After having successfully completed this lesson, the participants can:

95) **Act independently** in safely evacuating from a wind turbine using an evacuation or rescue kit (Ability, intermediate level)

Note *If there is more than one participant on the top of the training tower at the same time, all need to be secured, either by the evacuation device or by their fall arrest systems*

ELEMENT 13.1 - CONTENTS OF AN EVACUATION KIT

Learning objective:

96) The participants can **describe** the contents of an evacuation kit (Knowledge, basic level)

The instructor shall:

13.1.1 Show the contents of an evacuation kit and present how the equipment is used in practice applying a generic approach to the use of evacuation equipment focusing on similarities and differences in design, functionality, and operation between different products

The participants shall:

13.1.2 Ask and answer questions on the evacuation kit

ELEMENT 13.2 - PREPARING EQUIPMENT FOR USE

Learning objective:

97) The participants can **explain** how the evacuation equipment is used (Knowledge, intermediate level)

98) The participants can **perform** the preparation of rescue and or evacuation equipment for use, including applying personal fall protection prior to commencing evacuation (Skills, advanced level

The instructor shall:

13.2.1 Explain that pre-use inspection of the evacuation device may be omitted only if it is permitted by the manufacturer's user manual and the manufacturer criteria

13.2.2 Demonstrate how to perform a pre-use inspection of the rescue/evacuation device products required/chosen to instruct this module, by following principles that cover:

a. markings and labels

b. equipment is within the period of formal inspections

c. the rope has no damage and end terminations are in good condition

d. the rope runs freely through the device in both directions

e. checking integrity and the absence of, damage, corrosion, saltwater/chemical/lubricant/dirt exposure or contamination

f. checking for the absence of significant wear of the device

g. rope securing mechanism works correctly

h. the product operating temperature range

13.2.3 Demonstrate how to prepare the equipment for use, including correct use of anchor points

13.2.4 Stress the generic approach in performing a pre-use inspection and using a rescue/evacuation device focusing on the similarities and differences in design, functionality, and operation between different products

13.2.5 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other rescue/evacuation products

The participants shall:

13.2.6 Engage in discussion on how the evacuation equipment is used

13.2.7 Practise a pre-use inspection of the rescue/evacuation device products chosen to instruct this module

ELEMENT 13.3 - SAFE AND CORRECT EVACUATION

Learning objectives:

99) The participants can **perform** a safe and correct single evacuation with the evacuation, or rescue, device set up in a passive mode (Skills, intermediate level)

100) The participants can **perform** a safe and correct double evacuation with the evacuation or rescue device set up in an active mode: including a connecting element between the device and the harness (Skills, intermediate level)

The instructor shall:

13.3.1 Demonstrate how to perform a safe and correct evacuation, which shall include:

a. attaching the evacuation device to an anchor point (passive mode setup)

b. attaching the evacuation device to the harness, (active mode setup, applying a deflection/friction connector (carabiner) on the rescue device) and, during a double evacuation, using a fall restraint lanyard (kept as short as possible) as a connecting element between the rescue/evacuation device and the harness

c. when using a friction device; ensure that the rope runs through the device as intended according to the manufacturer's instructions

d. detach the fall restraint/fall arrest system, if attached to an anchor point

e. provide fall prevention by keeping the evacuation device rope's end taut

f. safe and correct access to egress location (e.g. opening escape hatch door, rolled roof edge, etc)

g. deploying the rope bag and inspecting for knots/length (passive mode setup)

h. secure the rope bag to the harness (active mode setup)

i. holding onto the rescue device rope while getting into position for descent (e.g. getting out of the hatch)

j. transferring full body weight to the rescue device rope before descent (e.g. while sitting in the open hatch and putting tension on the rope)

k. evacuating to ground level

l. disconnecting the evacuation device

13.3.2 Facilitate practical exercises for the participants

13.3.3 Provide constructive feedback on the participants' performance during the practice:

The participants shall:

13.3.4 Practise how to perform a safe and correct evacuation

ELEMENT 13.4 - SAFE BEHAVIOUR

Learning objective:

101) The participants can **take responsibility** for safe behaviour in connection with evacuation, including applying personal fall protection prior to commencing evacuation (Ability, intermediate level)

The instructor shall:

13.4.1 Explain safe behaviour in connection with evacuation

The participants shall:

13.4.2 Practise the ability to perform a passive mode and active mode setup evacuation from height using full PPE and a random evacuation device (demonstrated during this module)

13.4.3 Practise the ability to disconnect the device after reaching the ground level

13.4.4 Practise the ability to use techniques like attaching equipment to their harness to reduce the risk of dropped objects

Note *During the evacuation scenarios participants who are not performing the exercise shall be in a safe area (at ground level) where they can familiarise themselves with setting up evacuation equipment and rigging the equipment for an evacuation*

An instructor shall be at the height chosen to descend from

Instructor(s) and participants shall be secured to an anchor point while waiting to descend (this can be achieved by correct use of the fall arrest lanyard)

When participants are demonstrating the evacuation, a safety line that is connected to the participants' harness shall be used. This will be set up and controlled by the instructor and be secured to a separate anchor point other than that of the evacuation device

Although not a requirement of this standard, participants may repeat the evacuation exercises should sufficient time be available

LESSON 14 - WORKSHOP – RISK/HAZARDS & SUSPENSION TRAUMA

30 min.

The aim of this lesson is to enable the participants to identify risks and hazards in a WTG environment (including suspension trauma) and to take responsibility for preventing them.

After having successfully completed this lesson, the participants can:

102) **Take responsibility** for working safely at heights in a wind turbine environment (Skills, advanced level)

ELEMENT 14.1 - USING THE BST WORKING AT HEIGHTS WITH MANUAL HANDLING COURSE

Learning objective:

103) The participants can **explain** multiple perspectives acquired through group discussions (Knowledge, intermediate level)

The participants shall:

14.1.1 Discuss how to best apply the skills learned during the BST Working at Heights training in a wind turbine environment

14.1.2 Share relevant experiences and reflections on the multiple perspectives acquired through group discussions

ELEMENT 14.2 - SUSPENSION TRAUMA

Learning objectives:

104) The participants can **explain** the cause of suspension trauma and ways to prevent it (Knowledge, intermediate level)

105) The participants can **act independently** in reducing the risks of a suspension trauma if suspected in a casualty (Ability, intermediate level)

The instructor shall:

14.2.1 Explain how suspension trauma affects the human body

14.2.2 Explain how to mitigate suspension trauma using trauma straps (if fitted to the harness) or using a work positioning lanyard

14.2.3 Demonstrate how to position and treat a conscious and unconscious casualty who is suspected to be suffering from suspension trauma

The participants shall:

14.2.4 Ask relevant questions when in doubt

Note *The class will be divided into three groups of four participants, maximum. The participants should use 10 minutes to discuss and generate ideas about rescue and emergency situations in the wind turbine environment. Each group should write the ideas on a flipchart that the instructor can display to enhance a large group discussion with the entire class during the remaining 10 minutes of the workshop. Adjust number of groups (of four) to match total number of participants*

LESSON 15 - PPE REVIEW

10 min.

The aim of this lesson is to enable the participants to don and use the PPE correct and safely.

This lesson is intended to be a recap at the beginning of day two.

After having successfully completed this lesson, the participants can:

106) **Explain** the individual parts of the PPE equipment, the correct pre-use inspection and use of the PPE (Knowledge, intermediate level)

107) **Act independently** to inspect and don relevant PPE (Ability, intermediate level)

ELEMENT 15.1 - THE INDIVIDUAL PARTS OF THE PPE EQUIPMENT

The participants shall:

15.1.1 Discuss the individual parts of the PPE equipment, instruction in pre-use inspection and PPE use

LESSON 16 - RESCUE DEVICES AND RIGGING SETUP

20 min.

The aim of this lesson is to enable the participants to utilise a rescue device in a wind turbine environment.

After having successfully completed this lesson, the participants can:

108) **Show interest** in the individual parts of the rescue equipment (Ability, basic level)

109) **Solve** the challenge of how to correctly use rescue devices, anchor points and various rigging configurations on a ladder system (Ability, basic level)

ELEMENT 16.1 - THE INDIVIDUAL PARTS OF DIFFERENT RESCUE DEVICES

Learning objective

110) The participants can **explain** the individual parts of the rescue equipment (Knowledge, intermediate level)

The instructor shall:

16.1.1 Explain and demonstrate the individual parts of different rescue devices, including accessories, covering:

a. how to attach the device to an anchor point

b. how to utilise an integrated friction device (e.g. pig tail/bull horn) to divert the rope

c. how to rig the device with deflection applying a friction connector (carabiner) for an active mode setup

d. how to secure the rope

e. the use of a rope clamp for rescue (enabling lifting/safe disconnection of a loaded rope type fall protection lanyard)

16.1.2 Stress the generic approach in the parts of a rescue device focusing on similarities and differences in design, functionality, and operation between different products

16.1.3 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products

16.1.4 Ask the participants involving questions about the individual parts of the different rescue devices, including accessories

The participants shall:

16.1.5 Engage in answering the questions and share understandings about the individual parts of the different rescue devices, including accessories

ELEMENT 16.2 - CORRECT USE OF RESCUE DEVICES & SLINGS

Learning objective:

111) The participants can **explain** correct usage of rescue devices, anchor points and slings, including various rigging configurations on a ladder system (Knowledge, intermediate level)

The instructor shall:

16.2.1 Present that pre-use inspection of the evacuation device may be omitted only if it is permitted by the manufacturer's user manual and the manufacturer criteria

16.2.2 Demonstrate how to perform pre-use inspection of the rescue device products required/chosen to instruct this module, by following principles that cover:

a. markings and labels

b. equipment is within period of formal inspections

c. the rope has no damage, and the end terminations are in good condition

d. the rope runs freely through the device in both directions

e. checking for integrity and the absence of damage, corrosion, saltwater/chemical/lubricant/dirt exposure or contamination

f. checking for the absence of significant wear of the device

g. connectors (carabiners) operate, and lock as intended and cannot disconnect completely

h. rope securing mechanism works properly

i. observe product operating temperature range

16.2.3 Demonstrate how to rig the device onto a ladder stile and reinforced rung utilising slings (on one side and in a centre position of the ladder system) aiming to enable moving parts of the device to run freely

16.2.4 Explain and demonstrate the principles of lifting angle, angle factor and edge protection

16.2.5 Demonstrate how to rig the device in passive mode setup, and active (inverted) mode setup with deflection/deviation applying a friction connector (carabiner)

16.2.6 Stress the generic approach in pre-use inspecting and using a rescue device focusing on similarities and differences in design, functionality, and operation between different products

16.2.7 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products

16.2.8 Create a learning activity such as simple quiz, questionnaire or ask the participants involving questions about the correct usage of rescue devices

The participants shall:

16.2.9 Engage in answering the activity and share understandings about correct usage of rescue devices

LESSON 17 - RESCUE EXERCISES

355 min.

The aim of this lesson is to enable the participants to do a safe and correct rescue in wind turbines while using correct rescue devices, anchor points and safe behaviour on ladders with PPE.

Furthermore, this lesson will give the participants the opportunity to practice working at height techniques while performing rescue exercises.

After having successfully completed this lesson, the participants can:

112) **Act independently** in safely approaching working at heights rescues in wind turbines (Ability, intermediate level)

113) **Take responsibility** for safely and correctly using rescue devices (Ability, intermediate level)

ELEMENT 17.1 - RESCUE SITUATIONS IN WIND TURBINE ENVIRONMENT

Learning objective:

114) The participants can **describe** how to safely approach rescue situations in wind turbines (Knowledge, basic level)

The instructor shall:

17.1.1 Explain and demonstrate how to safely approach rescue situations in wind turbines

17.1.2 Ask the participants involving questions about the instructor´s demonstration of how to safely approach rescue situations in wind turbines

The participants shall:

17.1.3 Engage in answering the questions and share understandings about how to safely approach rescue situations in wind turbines

ELEMENT 17.2 - SAFE AND CORRECT RESCUE

Learning objectives:

115) The participants can **describe** how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue (Knowledge, basic level)

116) The participants can safely and correctly **perform** a rescue in a wind turbine environment (Skills, intermediate level)

The instructor shall:

17.2.1 Explain and demonstrate how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue. The demonstration shall include:

a. handling a conscious/unconscious casualty

b. suspension trauma prevention

c. connecting the connector (carabiner) to the casualty's harness

d. applying tension to the rope to enable safe disconnection of the casualty's fall arrest and /or work positioning lanyard

e. safe descent of casualty

f. suspension trauma treatment

17.2.2 Ask the participants involving questions about the instructor´s demonstration of how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue

The participants shall:

17.2.3 Practise and engage in answering the questions and share understandings about how to conduct a safe and correct rescue in a wind turbine environment and administer first aid relating to this rescue

ELEMENT 17.3 - CORRECT BEHAVIOUR ON THE LADDER WITH PPE

Learning objectives:

117) The participants can **take responsibility** for the safe and correct behaviour on ladders with PPE (Ability, intermediate level)

118) The participants can **act independently** in safely and correctly using anchorage points (Ability, intermediate level)

The instructor shall:

17.3.1 Explain and demonstrate the correct behaviour on ladder with PPE

17.3.2 Provide constructive feedback on participants' performance

The participants shall:

17.3.3 Practise the ability to safely and correctly use the evacuation/rescue devices, including:

a. pre-use inspection

b. correct and efficient use of anchor points

c. correct behaviour on ladder with PPE

17.3.4 Practise the ability to safely and correctly use a rescue device in the following scenarios:

a. rescue of a conscious casualty hanging by a guided type vertical fall arrester, secured by their work positioning lanyard (inside of the ladder) with the rescue equipment in a passive setup, preferably utilising a rope clamp for rescue

b. rescue of an unconscious casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup

c. rescue of a conscious casualty secured by their work positioning lanyard attached to the front attachment point of their harness (from the outside of the ladder)

Note *The participants shall at all times during the exercises demonstrate the ability to reduce the risk of dropped objects*

During exercise 17.3.3 (reference to c.) the participant performing the rescue should use a rope clamp for rescue (to train the use of this equipment) and use the hip overhang technique to move the casualty away from the ladder

Formal assessment of knowledge (see Section 11.7)

Note *During the rescue scenarios the participants who are not performing the exercise shall be in a safe area (at ground level) where they can familiarise themselves with setting up rescue equipment, rigging and operating the equipment for a rescue*

It is recommended to have the participants familiarise themselves with the rescue equipment while one rescue exercise is conducted and observe one rescue exercise

During the rescue scenarios the participants acting as rescuer must correctly use their work positioning lanyard to secure themselves leaving their hands free to work with the equipment and casualty

During the rescue scenarios, a rescue dummy can be used to simulate a casualty

The instructor will notify the participants whether the casualty is conscious or unconscious. Participants may demonstrate the recovery position/seated position once the dummy has been lowered to a safe area

All appropriate PPE shall be worn during these exercises

Methods of preventing suspension trauma should be demonstrated during the practical exercises, as they will have already been discussed in theory. This will facilitate good small group discussions on the various methods of preventing suspension trauma

LESSON 18 - TRAINING REVIEW

15 min.

The aim of this lesson is to enable the participants to reflect on and process their learning outcome and key takeaways from the module, aiming to achieve a high learning transfer from the module to their way of working.

ELEMENT 18.1 - TRAINING REVIEW

The instructor shall:

18.1.1 Re-present the overall aims and learning objectives of the module for the participants' comparison of their learning outcomes and the achievement of their previously stated expectations for the module

The participants shall:

18.1.2 Reflect on their learning outcome and key takeaways from BST Working at Heights & Manual Handling, aiming to achieve a high learning transfer from the module to their way of working by means of e.g.:

a. group discussions or walk & talk

b. questions & answers in class or where suitable

Note *The instructor may additionally conduct a local evaluation of the training*

ELEMENT 18.2 - FEEDBACK SESSION

The instructor shall:

18.2.1 Give overall feedback and feed forward on the participants' learning outcomes inspired by the training as well as from the training review

18.2.2 Encourage the participants to examine and grow awareness of which specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualise and enhance learning transfer). In addition, and after the module completion, to discuss with colleagues about how the BST Working at Heights & Manual Handling content, methods and techniques are similar or different to specific, local conditions

11.7 Participant performance assessment

Assessment of learning outcomes:

Participants will be assessed according to the learning outcomes stated in this module by means of direct observation and supplementary oral questions, where appropriate

The assessment shall be conducted by practical scenarios based on the WTG environment

Each participant shall participate and demonstrate:

Correct manual handling throughout, including:

a. reducing manual handling using suitable handling aids where possible

b. planning of manual handling tasks using the TILE principle and a tool considering the load weight, maximum reaching distance and aggravating factors

Correct manual handling techniques:

a. practical exercise simulating the loading and unloading of a service truck. Use equipment common to a technician’s daily duties. Loading truck exercise should include a dummy to simulate loading a casualty

Correct use of the evacuation/rescue device, including:

a. user inspection and test

b. use of correct anchor points

c. correct behaviour on ladder with PPE

Correct rescue methods, including:

a. rescue of a conscious casualty hanging by a guided type vertical fall arrester, secured by their work positioning lanyard (inside of the ladder) with the rescue equipment in a passive setup, preferably utilising a rope clamp for rescue

b. rescue of an unconscious casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup

c. rescue of a conscious casualty secured by their work positioning lanyard (from the outside of the ladder, with hip diversion, i.e. rescue line is diverted using the side D-ring located at the hip of the rescuer's harness. This creates greater space between the casualty and the ladder)

d. the formal evaluation of knowledge of above scenarios shall be in accordance with the participant performance assessment form (example provided in the Requirements for Training). The instructor keeps the participant performance assessment forms until the completion/evaluation of the BST Module

Training providers shall have a documented procedure in place for dealing with participants not meeting the stated learning outcomes. If a participant fails to meet the demands, they shall attend a new BST Working at Height & Manual Handing Module.

GLOBAL WIND ORGANISATION

Sea Survival Module

SS

12. BST SEA SURVIVAL MODULE

12.1 Aims and Objectives of the BST Sea Survival Module

The aims of this BST Sea Survival course are to give, by theoretical and practical training, participants the ability to act safely and responsibly and to take the correct preventive actions in all aspects of offshore operations from shore to installation vessel (or WTG) and vice versa. This is both during normal operations and in an offshore wind energy environment emergency.

The overall learning objective:

1) After successfully having completed this BST Sea Survival Module, the participants have the ability to **act** safely and responsibly in an offshore work environment and to take responsibility for their own and fellow employees' safety in work situations as well as in emergency situations (Ability, intermediate level)

Note *In addition to adhering to legal regulations and standards, the training provider must continuously ensure that the training material is updated and in alignment with industry guidelines from G+ specifically: Working at Height in the Offshore Wind Industry and Safe Management of Small Service Vessels Used in the Offshore Wind Industry*

12.2 Instructor Qualification Prerequisites

The instructor shall possess appropriate qualifications and experience to ensure that all training and supportive activities are carried out in accordance with current legislation and/or local guidelines and current version of GWO's Requirements for Training offering GWO training.

In addition, instructors for the GWO BST Sea Survival Module must hold a valid GWO Working at Heights Module training certificate

12.3 Duration of the Sea Survival Module

The total contact time for completing the BST Sea Survival Module is 6 hours and 30 minutes.

The training provider must not exceed the times per day given in Table 12.4.1 (below).

	Maximum Duration Per Day
Contact time	8 hours
Total training day	10 hours

Table 12.4.1 – Maximum durations for training days

Note *Contact time includes delivery of course lesson content, practical exercises and activities directly related to these*

The total training day includes contact time, meals and breaks and travel between training sites (where applicable)

12.4 Instructor to Participant Ratio

The ratio shown in Table 12.5.1 indicates the maximum number of participants that shall attend the course per instructor.

Module	Session	Instructor to Participant Ratio
Sea Survival	Theory	1:12
	Practical	1:6

Table 12.5.1 – GWO Sea Survival Module instructor to participant ratio

Note *There must always be at least two instructors or rescue person present during practical training*

Note *The local training site emergency response plan may call for a further number of qualified safety and rescue personnel*

12.5 Equipment for Sea Survival Module

The equipment required for training as listed in Annex 1-5 must be available and must fulfil national legal requirements as listed in Table A1-5 (see Annex 1) where applicable.

12.6 BST Sea Survival Module Timetable

The order in which elements of this BST Module training are delivered may vary according to the didactical choices of the delivering training provider.

The delivery of this module must comply with the requirements described in the GWO Requirements for Training.

Lesson	Element		Duration
1. Introduction to the training	1.1	Safety instructions and emergency procedures	
	1.2	Facilities	
	1.3	Introduction	
	1.4	Scope and main learning objective	
	1.5	Ongoing assessment (participant performance assessment form)	

		1.6	Motivation	
		1.7	Human factors	
			TOTAL	20 min.
2.	Safety culture and legacy			
			TOTAL	5 min.
3.	Cold water immersion	3.1	Exposure	
		3.2	Cold shock	
		3.3	Hypothermia	
		3.4	Drowning	
		3.5	Sea sickness	
		3.6	Contaminated water	
			TOTAL	15 min.
4.	Lifesaving appliances (LSA) and PPE	4.1	Personal LSA and PPE	
		4.2	Collective LSA	
			TOTAL	10 min.
5.	SAR AND GMDSS	5.1	SAR	
		5.2	GMDSS and transponders	
		5.3	Physical actions to enhance detection	
			TOTAL	10 min.
6.	Practical Sea Survival	6.1	Correct donning and use of LSA and PPE	
		6.2	Risks related to evacuation into water	
		6.3	Warm-up	
		6.4	Controlled entry into the water from TP ladder	
		6.5	Individual and collective swimming techniques	
		6.6	Correct usage of life raft	
		6.7	Emergency descent by constant rate descender	
		6.8	Summary by exercise	
			TOTAL	140 min.
7.	Safe travel and transfer (theory)	7.1	Safety introduction on board transfer vessel	
		7.2	Hazards related to different types of transfers	
		7.3	Transfer vessels	
		7.4	Safe transfer from vessel	

		7.5	Safe transfer from vessel to vessel and dock to vessel (theory)	
		7.6	Safe handling of equipment and storage	
			TOTAL	20 min.
8.	Installations, vessels and WTGS	8.1	Safety on board	
		8.2	Man overboard procedures (MOB)	
			TOTAL	5 min.
9.	Transfer practical	9.1	Procedure for transfer between crew transfer vessel and wind turbine generator transition piece	
		9.2	Safe transfer between crew transfer vessel and wind turbine generator transition piece	
			TOTAL	130 min.
10.	Training review	10.1	Training review	
		10.2	Feedback session	
			TOTAL	35 min.
			GRAND TOTAL	390 min.

Table 12.7.1 – GWO Sea Survival Module timetable

12.7 Detailed Description of the BST Sea Survival Module

LESSON 1 - INTRODUCTION TO THE TRAINING

20 min.

The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.

After having successfully completed this lesson, the participants can:

2) **Recognise** what is expected of them throughout the module (Knowledge, basic level)

3) **Name** and point out local emergency procedures and facilities (Knowledge, basic level)

4) **Discuss** the relevant human factors and explain the implications of these (Knowledge, intermediate level)

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

5) The participants **show interest** in the safety and emergency procedures at the training facility (Ability, basic level)

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. safety instructions according to internal procedures

b. emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures

ELEMENT 1.2 - FACILITIES

Learning objective:

6) The participants can **recognise** the location of facilities at the training location (Knowledge, basic level)

The instructor shall:

1.2.1 Present a general description of the facilities at the training location (administration, dining area, restrooms, toilets, etc.)

1.2.2 Alternatively, lead a tour pointing out facilities

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt

ELEMENT 1.3 - INTRODUCTION

Learning objective:

7) The participants **show interest** in fellow participants and the course content and design (Ability, basic level)

The instructor shall:

1.3.1 Explain and ask involving questions aiming at the program of the BST Sea Survival Module training, including breaks and mealtimes

1.3.2 Give a short introduction to themselves, including their backgrounds as instructors

1.3.3 Ask for participants' expectations of the training and their learning or development

The participants shall:

1.3.4 Give a short introduction to themselves, including job function and expected primary geographic work location and share expectations of the training

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVES

Learning objective:

8) The participants can **recognise** the scope and main objectives of the BST Sea Survival Module training (Knowledge, basic level)

The instructor shall:

1.4.1 Present the scope and main learning objective of the BST Sea Survival Module training

1.4.2 Involve participants with questions on understanding and individual experiences on BST Sea Survival Module

The participants shall:

1.4.3 Engage in answering questions and share experiences relevant for the BST Sea Survival Module

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT PERFORMANCE ASSESSMENT FORM)

Learning objective:

9) The participants **recognise** the assessment procedure and the aim of the ongoing assessment (Knowledge, basic level)

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment

1.5.2 Explain the layout of the GWO participant performance assessment form and how it will be used

The participants shall:

1.5.3 Engage themselves in discussion and ask questions when in doubt in relation to the assessment procedure

ELEMENT 1.6 - MOTIVATION

Learning objective:

10) The participant **shows interest** and willingness to engage in the learning activities (Ability, basic level)

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. The importance of personal involvement in the course

b. The definition of and the need for BST Sea Survival Module understandings and abilities

Note *Positive motivation is the driving force for commitment, and the instructor should make a focused effort to support growth of the necessary attitude and motivation in the participant*

The participants shall:

1.6.2 Engage in discussions and share experiences on BST Sea Survival Module

Note *When the participants succeed by trying out on their own, bring their relevant experience into play and apply learning points from the instructor's feedback, the participant develops a positive attitude and responsibility towards the subject and the performance in the work situation*

ELEMENT 1.7 - HUMAN FACTORS

The aim of the element is to draw the participants' attention to how human behaviours and taking responsibility influences a safe work environment, and to prepare for the continued focus on human factors during practical training and exercises.

Learning objectives:

11) The participant can **describe** human factors relevant to the wind industry and their implications (Knowledge, basic level)

12) The participant **shows interest** and willingness to focus on human factors during the following practical exercises (Ability, basic level)

The instructor shall:

1.7.1 Present how human factors influence accidents in the wind industry (relevant statistics may be used)

1.7.2 Lead a discussion about the role of the individual in improving human performance and how this can improve the safety of offshore operations

1.7.3 Ensure that constructive feedback on the participant's performance involve human factor criteria when these are defined in the learning objective such as the ability to take responsibility or to act independently

Facts and Human Factors Criteria:

How accidents in the wind industry are influenced by the consequences of human factors and may include the following terms and conditions:

a. attention and perception

b. group behaviour and peer pressure

c. weather conditions

d. weather delays

e. noise levels

f. site layout and housekeeping

g. fitness and health

h. domestic and work-related stress

i. workload (both overload and underload)

j. fatigue

k. time pressure and deadlines

l. alcohol, medication, and substance abuse

The participants shall:

1.7.4 Engage in discussions and share experiences on how human factors influence accidents during offshore operations

1.7.5 Reflect on the feedback received and take responsibility of their own performance and development during the training

LESSON 2 - SAFETY CULTURE AND LEGACY

5 min.

The aim of this lesson is to give the participants the needed awareness of site organisation and relevant legislation in relation to safety culture and organisation to ensure that the participants are aware of the roles, personal responsibilities and rules that apply to offshore wind farms.

After having successfully completed this lesson of BST Sea Survival Module, the participants can:

13) **Show interest** in rescue recovery organisation and safety culture on site and will on their own seek guidance when needed (Ability, basic level)

The instructor shall:

2.1.1 Present and explain site organisation for rescue and recovery and types of units on a site

2.1.2 Explain legal responsibilities in terms of a short discussion on the participants' experiences with rescue and recovery organisations

The participants shall:

2.1.3 Engage in discussion and share experiences on rescue and recovery on offshore wind farms

LESSON 3 - COLD WATER IMMERSION

15 min.

The aim of this lesson is to provide participants with the needed knowledge to minimise the risk of hypothermia, drowning, contamination due to polluted water and sea sickness.

After having successfully completed this lesson of the BST Sea Survival Module, the participants can:

14) **Take initiative** to intervene and supervise in order to mitigate detected risks in relation to cold water immersion (Ability, intermediate level)

ELEMENT 3.1 - EXPOSURE

Learning objective:

15) The participants can **explain** the human body's reaction to exposure in different offshore environments and what precaution to take (Knowledge, intermediate level)

The instructor shall:

3.1.1 Facilitate a group discussion or Q/A activity on different types of exposures in different offshore environments and relevant precautions

The participants shall:

3.1.2 Engage in discussion and share experiences on the human body's reaction to exposure in different offshore environments and what precautions to take

ELEMENT 3.2 - COLD SHOCK

Learning objective:

16) The participants can **describe** bodily consequences of cold shock and how to prevent it (Knowledge, basic level)

The instructor shall:

3.2.1 Facilitate a group discussion or Q/A activity on:

a. the bodily reaction related to cold shock and how to behave in relation to cold shock

The participants shall:

3.2.2 Engage in discussion and share experiences on bodily reaction related to cold shock

ELEMENT 3.3 - HYPOTHERMIA

Learning objective:

17) The participants can **recognise** signs of hypothermia and how to use a Thermal Protective Aid (TPA) (Knowledge, basic level)

The instructor shall:

3.3.1 Facilitate a group discussion or Q/A activity on:

a. the various stages and signs of hypothermia, and how to detect these

b. how to apply a TPA

3.3.2 Present examples of individual and collective actions to minimise the risk of hypothermia while in the water ("HELP" – Heat Escape Lessening Positions)

The participants shall:

3.3.3 Engage in discussions and share experiences on hypothermia

Note *This element may be conducted during the practical exercise*

ELEMENT 3.4 - DROWNING

Learning objective:

18) The participants can **recognise** signs of drowning (Knowledge, basic level)

The instructor shall:

3.4.1 Facilitate a group discussion or Q/A activity on signs of drowning and correct first aid treatment on drowning

The participants shall:

3.4.2 Engage in discussions and share experiences on drowning

Note *This element may be conducted during the practical exercise*

ELEMENT 3.5 - SEA SICKNESS

Learning objective:

19) The participants can **describe** the consequences from sea sickness (Knowledge, basic level)

The instructor shall:

3.5.1 Facilitate a group discussion or Q/A activity on the consequences of sea sickness and mitigating actions

The participants shall:

3.5.2 Engage in discussions and share experiences on sea sickness and mitigating actions

Note *This element may be conducted during the practical exercise lesson*

ELEMENT 3.6 - CONTAMINATED WATER

Learning objective:

20) The participants can **describe** the main risks from staying in contaminated water (Knowledge, basic level)

The instructor shall:

3.6.1 Facilitate a group discussion or Q/A activity on the main biological hazards from staying in contaminated water and in what environments or situations this may occur

The participants shall:

3.6.2 Engage in discussions and share experiences of staying in contaminated water

Note *This element may be conducted during the practical exercises*

LESSON 4 - LIFE SAVING APPLIANCE (LSA) AND PPE

10 min.

The aim of this lesson is to enable the participants to recognise the advantages and limitations of personal LSA and PPE and their usage in a correct and safe manner.

After successfully having completed this lesson of the BST Sea Survival Module, the participants can:

21) **Take responsibility** for the use of LSA and PPE in the offshore wind industry (Ability, intermediate level)

Note *Correct donning and use of LSA and PPE is covered in the practical exercise (Lesson 6 of this Sea Survival Module)*

ELEMENT 4.1 - PERSONAL LSA AND PPE

Learning objectives:

22) The participants can **describe** advantages and limitations of personal LSA and PPE related to the industry (Knowledge, basic level)

23) The participants can **recognise** different types of suits: anti-exposure (transfer suit) and immersion suits (vessel evacuation suit) (Knowledge, basic level)

The instructor shall:

4.1.1 Present and explain:

a. advantages and limitations of the different personal LSA and PPE related to the industry including different types of PLB, life jackets, suits: anti-exposure (transfer suit), and immersion suit (vessel evacuation suit)

b. the correct use of the different personal LSA and PPE and importance of familiarisation with the equipment

c. correct pre-use check, maintenance, and storage of personal LSA and PPE

d. facilitate a group discussion on the participants' understanding of LSA and PPE

The participants shall:

4.1.2 Engage in discussions and share experiences with LSA and PPE

ELEMENT 4.2 - COLLECTIVE LSA

Learning objective:

24) The participants can **explain** advantages and limitations of LSA related to the industry (Knowledge, intermediate level)

The instructor shall:

4.2.1 Facilitate a group discussion or Q/A activity on advantages and limitations of the different collective LSA, related to the industry, for example life rafts, lifeboats, and marine evacuation systems (MES)

The participants shall:

4.2.2 Engage in discussion and share experiences on the use of LSA

Note *The participants shall practise pre-use check and the application of LSA and PPE during Lessons 6 and 9 of this module*

LESSON 5 - SEARCH AND RESCUE AND GLOBAL MARITIME DISTRESS & SAFETY SYSTEMS

10 min.

The aim of this lesson is to introduce GMDSS (Global Maritime Distress and Safety Systems) and Search and Rescue (SAR) to the participants to enable the participants to act accordingly to enhance their efficiency and response time of the SAR operation and thereby their own evacuation and rescue.

After successfully having completed this lesson of the BST Sea Survival Module, the participants can:

25) **Recognise** common components of search and rescue operations (Knowledge, basic level)

Note *A dummy PLB should be used for the training*

ELEMENT 5.1 - SAR

Learning objective:

26) The participants can **describe** basic principles of SAR operations (Knowledge, basic level)

The instructor shall:

5.1.1 Present and explain the basic principles of SAR operations

The participants shall:

5.1.2 Engage in answering questions and share experiences on SAR operations

ELEMENT 5.2 - GMDSS AND TRANSPONDERS

Learning objective:

27) The participants can **describe** overall principles of the GMDSS and transponders system and how to activate a personal locator beacon (Knowledge, basic level)

The instructor shall:

5.2.1 Present and explain basic principles of GMDSS including transponders and locators:

a. emergency positioning indicating radio beacon (EPIRB)

b. search and rescue transponder (SART/AIS-SART)

c. personal locating beacon (PLB)

The participants shall:

5.2.2 Engage in Q/A activities and share their knowledge about the different transponder's types and usage

ELEMENT 5.3 - PHYSICAL ACTIONS TO ENHANCE DETECTION

Learning objective:

28) The participants can **recognise** and name relevant distress signals and actions to enhance detection (Knowledge, basic level)

The instructor shall:

5.3.1 Explain and illustrate examples of relevant distress signals and actions to enhance detection

The participants shall:

5.3.2 Engage in Q/A activities and share experiences on relevant distress signals and physical actions to enhance detection at sea

Note *Participants practise physical actions during practical exercise*

LESSON 6 - PRACTICAL SEA SURVIVAL

140 min.

The aim of this lesson is to enable the participants to enhance the chance of individual and collective survival in an emergency at sea.

After successfully having completed this lesson of the BST Sea Survival Module, the participants can:

29) **Take responsibility** and take initiative to act correctly and independently or in cooperation with others in actual emergency situations at sea (Ability, intermediate level)

30) **Take responsibility** of performing safe evacuation from a WTG transition piece (Ability, intermediate level)

Note *The instructor shall during the practical exercise ensure that the participants meet the stated learning objectives in all elements*

ELEMENT 6.1 - CORRECT DONNING AND USE OF LSA AND PPE

Learning objectives:

31) The participants can **take responsibility** on their own for donning and using LSA and PPE correctly (Ability, intermediate level)

32) The participants can **take responsibility** to perform an effective buddy check on colleague's LSA and PPE (Ability, intermediate level)

The instructor shall:

6.1.1 Explain and demonstrate:

a. characteristics, features, and function of LSA and PPE

b. correct donning of LSA and PPE, including immersion and transfer suits while focusing of the implications of failing to do so correctly

c. the purpose and procedure for buddy check

d. the potential exposures when using LSA and PPE in a WTG environment

6.1.2 Observe participants practicing the donning of LSA and PPE as well as performing buddy check, and provide constructive feedback on the participants' efforts on donning and buddy checking

The participants shall:

6.1.3 Practise correct donning and use of personal LSA and PPE, including suit, life jackets and harness

6.1.4 Practise buddy check

6.1.5 Decide how to apply the instructor's feedback to the following exercises

ELEMENT 6.2 - RISKS RELATED TO EVACUATION INTO WATER

Learning objective:

33) The participants **understand** and can discuss sea survival techniques in relation to evacuation into water (Knowledge, intermediate level)

The instructor shall:

6.2.1 Explain and demonstrate:

a. risks related to the evacuation and release in water currents, waves, and swell. How to apply sea survival techniques including different types of evacuation, by use of equipment or manual evacuation (jump, ladder etc.)

b. controlled entry into the water from a height (less than 1 m)

c. evacuation by helicopter sling hoist

d. collective techniques to minimise the risk of hypothermia, including heat escape lessening posture ('HELP')

e. individual swimming techniques

f. collective swimming techniques

g. bodily reaction related to cold shock and the related symptoms

6.2.2 Facilitate discussions on risks related to evacuation into water and prepare participants for the practical exercise

The participants shall:

6.2.3 Discuss risks and options concerning:

a. the ability to enter the water from a height in a controlled manner

b. risks related to the evacuation and release in water currents, waves, swell and how to apply sea survival techniques in such conditions

c. collective techniques to minimise the risk of hypothermia including heat escape lessening posture ('HELP') individual swimming techniques

d. collective swimming techniques

ELEMENT 6.3 - WARM UP

Prior to the practical exercises, instructors and participants should conduct a covering warm-up program (see Annex 2, Guideline for warm-up exercises)

Aim of this element is to mitigate risks of musculoskeletal injuries from the practical elements of the training and to support manual handling culture of always to warm up prior to physical activities

ELEMENT 6.4 - CONTROLLED ENTRY INTO THE WATER FROM TRANSITION PIECE (TP) LADDER

Learning objective:

34) The participants can **act independently** and take responsibility to enter the water from a WTG transition piece in a controlled manner (Ability, intermediate level)

The instructor shall:

6.4.1 Explain and demonstrate how to enter the water by the TP ladder by:

a. applying twin fall arrest lanyards during the descent

b. detach and secure lanyards when above the surface and free of waves

c. check surface below for any obstacles

d. climb down and enter to mid waist

e. manually inflate the life vest

f. make sure no entanglements from PPE, climb down and push backwards in the water

g. make safe distance to the TP

h. observe participants doing exercise and prepare feedback

The participants shall:

6.4.2 enter the water by the TP ladder by:

a. applying twin fall arrest lanyards during the descent

b. detach and secure lanyards when above the surface and free of waves

c. check surface below for any obstacles

d. climb down and enter to mid waist

e. manually inflate the life vest

f. make sure no entanglements from PPE, climb down and push backwards in the water

g. make safe distance to the TP

ELEMENT 6.5 - INDIVIDUAL AND COLLECTIVE SWIMMING TECHNIQUES

Learning objectives:

35) The participants can **perform** individual swimming techniques with LSA and PPE donned (Skills, intermediate level)

36) The participants can **take responsibility** for supporting other participants while applying collective swimming techniques (Ability, intermediate level)

37) The participants can **solve** how to minimise the risk of hypothermia while in the water (Ability, basic level)

The instructor shall:

6.5.1 Guide the participants in the water in relation to individual and collective swimming and the responsibility of supporting the person next to you in the water

6.5.2 Guide the participants in the water in practising individual and collective positions to minimize the risk of hypothermia (heat escape lessening posture (‘HELP’)

The participants shall:

6.5.3 Follow the instructors' guidance and practise individual and collective swimming techniques and positions to reduce hypothermia

ELEMENT 6.6 - CORRECT USAGE OF LIFE RAFT

Learning objectives:

38) The participants can **take responsibility** for ensuring the correct use of a life raft in an emergency at sea (Ability, intermediate level)

39) The participants can **explain** how to recover a nearby casualty in the water (Knowledge, intermediate level)

40) The participants can **describe** how to right a capsized life raft (Knowledge, basic level)

41) The participants can **describe** equipment in a life raft (Knowledge, basic level)

42) The participants can **describe** actions to enhance detection at sea (Knowledge, basic level)

Note *Treatment of hypothermia is covered in the GWO BST First Aid Training Module*

The instructor shall:

6.6.1 Explain and demonstrate:

a. inflation of life raft (may be presented on video)

b. righting a capsized life raft

c. methods of entering a life raft

d. immediate and further actions in a life raft

e. the equipment in life rafts

f. recovery of a nearby casualty in the water

g. actions to enhance detection at sea, including relevant distress signals

6.6.2 Provide constructive feedback on the participants ability to take responsibility for ensuring the correct use of a life raft

The participants shall:

6.6.3 Apply and practise:

a. the ability to enter a life raft

b. knowledge of immediate and further actions in a life raft the ability to find and handle the equipment in a life raft

c. knowledge of how to enhance detection, including relevant distress signals (fx group splashing their feet while floating in a circle)

ELEMENT 6.7 - EMERGENCY DESCENT BY CONSTANT RATE DESCENDER

Learning objectives

43) The participants can, under supervision of the instructor, **perform** (two by two) safe double descent into the water and detach from the evacuation system while in the water (Skills, intermediate level)

The instructor shall:

6.7.1 Explain and demonstrate single and double evacuation from WTG by descent into the water including:

a. single and double evacuation from WTG by descent into the water including:

b. pre-use inspection of descending device

c. correct fitting of harness

d. attachment to descending device

e. descent into water

f. manual inflation of lifejackets

g. detachment in the water (single and double evacuation)

6.7.2 Provide constructive feedback on the participants' efforts during the practical exercises .The feedback should focus on the development of abilities

Note *Various types of accessories for each detachment may be applied or demonstrated, e.g., quick release, connector (carabiner), restraint lanyards, types of detachment etc. To cover risks of panic, bodily malfunction, accessibility due to body positioning and equipment restraints*

The participants shall:

6.7.3 Practise double evacuation from WTG by descent into the water including:

a. pre-use inspection of PPE and descending device

b. correct fitting of harness

c. attachment to descending device

d. descent into water (double evacuation)

e. manual inflation of lifejacket

f. detachment in the water

Note *A passive set-up with connector (carabiner) connection is recommended to ensure fidelity*

ELEMENT 6.8 - SUMMARY BY EXERCISE

If time and training facility risk assessment allows, an exercise to summarise the sea survival practical elements (elements 64, 6.5 and 6.6) may be conducted. This exercise and its related feedback will enhance the participants' learning outcome in relationship to elements 6.4, 6.5, & 6.6

The instructor shall:

6.8.1 Brief the following exercise and explain safety procedures of the exercise to ensure that the participants understand that they are to apply their abilities gained in Lesson 6 practical sea survival – including their knowledge, skills, accountability, responsibility and initiative

6.8.2 Provide constructive feedback on the participants ability to take responsibility and act correctly in a simulated emergency situation at sea

The participants shall:

6.8.3 Apply their abilities to act correctly and independently or in cooperation with others in a simulated emergency situation at sea

6.8.4 The following activities can be included in one coherent scenario:

a. controlled entry into the water from a WTG TP ladder

b. individual swimming techniques

c. correct use of collective techniques to prevent hypothermia

d. collective swimming techniques

e. entry into a life raft

f. immediate actions in a life raft

g. recovery of a nearby casualty in the water

h. (non-mandatory) helicopter hoist of one participant from life raft – terminating the exercise

i. formal assessment of knowledge (see Lesson 10, Test and Training Review)

LESSON 7 - SAFE TRAVEL AND TRANSFER (THEORY)

20 min.

The aim of this lesson is to give the participants the necessary basic knowledge on hazards and risks of travel and transfer to subsequently apply it when practicing correct preventive measures and use of the available LSA and PPE in a correct and safe manner.

After successfully having completed this lesson of the BST Sea Survival Module, the participants can:

44) **Recognise** the hazards and risks of travel and transfer and can describe correct preventive measures and procedures and how to use available LSA and PPE in a correct and safe manner (Knowledge, basic level)

ELEMENT 7.1 - SAFETY INTRODUCTION ON BOARD TRANSFER VESSEL

Learning objective:

45) The participants can **explain** the importance of the safety introduction on board transfer vessels (Knowledge, intermediate level)

The instructor shall:

7.1.1 Facilitate a group discussion on the aim, content, and importance of the safety briefing

The participants shall:

7.1.2 Engage in discussion and share experiences on:

a. the aim and importance of the safety briefing and its content

b. how correct conduct on board can reduce hazards and risks

ELEMENT 7.2 - HAZARDS RELATED TO DIFFERENT TYPES OF TRANSFERS

Learning objective:

46) The participants can **name** different types of transfers and describe how to mitigate the different hazards (Knowledge, basic level)

The instructor shall:

7.2.1 Explain principles and the hazards related to the different types of transfers and lead a discussion on how to mitigate these hazards in each situation (dynamic/floating > static/fixed; static/fixed > dynamic/floating; dynamic/floating > dynamic/floating)

The participants shall:

7.2.2 Engage in the discussion on mitigating hazards in different types of transfers and share their experiences

ELEMENT 7.3 - TRANSFER VESSELS

Learning objective:

47) The participants can **recognise** different types of transfer vessels commonly used by the WTG industry (Knowledge, basic level)

The instructor shall:

7.3.1 Describe:

a. the different types of transfer vessels commonly used by the WTG industry

b. various types of vessels the participants may encounter in a sea survival situation

The participants shall:

7.3.2 Share their experiences on different types of transfer vehicles commonly used by the WTG industry

ELEMENT 7.4 - SAFE TRANSFER FROM VESSEL TO WTG (THEORY)

Learning objective:

48) The participants can **explain** the use of self-retractable lifeline and twin fall arrest lanyards (Knowledge, intermediate level)

The instructor shall:

7.4.1 Present and explain safe transfer from vessel to WTG and back including:

a. use of self-retractable lifeline (SRL)

b. use of twin fall arrest lanyards

c. the final decision whether to transfer, or not, lies with the transferee

Note *7.4.1 is based on the G+ Offshore Wind Health and Safety Association, Good Practice Guideline, 'Working at Height in the Offshore Wind Industry', section 4.4 'Transfer by Stepping Over Between Vessels And Offshore Structures' and in particular these sections:*

- *Protection against falling: SRL on boat landing ladder*
- *Roles of supervisors, vessel captain, deckhand, and passengers*

7.4.2 Lead a short discussion on safe transfer

The participants shall:

7.4.3 Engage in a discussion on the differences in handling the self-retractable lifeline (SRL) and the twin fall arrest lanyards

ELEMENT 7.5 - SAFE TRANSFER FROM VESSEL TO VESSEL AND DOCK TO VESSEL (THEORY)

Learning objective:

49) The participants can **describe** how to safely transfer from dock to vessel and vessel to vessel (Knowledge, basic level)

The instructor shall:

7.5.1 Explain safe transfer from dock to vessel and from vessel to vessel

7.5.2 Present examples on risks from sudden waves and wind gusts

The participants shall:

7.5.3 Engage in discussion on how to safely transfer from dock to vessel and vessel to vessel

ELEMENT 7.6 - SAFE HANDLING OF EQUIPMENT AND STORAGE

Learning objective:

50) The participants can **recognise** how to safely handle and store equipment (Knowledge, basic level)

The instructor shall:

7.6.1 Describe principles for safe handling of equipment and storage

7.6.2 Facilitate a discussion on:

a. the implications of failing to handle equipment safely

b. the responsibilities of storing equipment correctly

c. risks from dropped objects

The participants shall:

7.6.3 Engage in discussion on safe handling of equipment and storage and share experiences

LESSON 8 - INSTALLATIONS, VESSELS AND WTGS

5 min.

The aim of this lesson is to inspire the participants to ensure safe conduct on installations, vessels, and WTG´s during normal operations and in case of emergencies and evacuation. In addition to seek guidance when needed.

After successfully completing this lesson of the BST Sea Survival Module, the participants can:

51) **Show** interest in safe conduct in wind industry environment and seek guidance, when needed (Ability, basic level)

ELEMENT 8.1 - SAFETY ON BOARD

Learning objective:

52) The participants can **recognise** how failing to adhere to general safety on board installations, vessels and WTGs may lead to sea survival situations (Knowledge, basic level)

The instructor shall:

8.1.1 Present principles of general safety on board installations, vessels, and WTGs

8.1.2 Present principles for contingency/plans on installations, vessels, and WTGs

8.1.3 Lead a short discussion or Q&A on possible risks from failure in relation to general safety principles on board installations, vessels, and WTGs

The participants shall:

8.1.4 Engage in discussion or Q&A on general safety principles on board installations, vessels and WTGs and share experiences

ELEMENT 8.2 - MAN OVERBOARD PROCEDURES (MOB)

Learning objective:

53) The participants can **explain** relevant actions when a person falls in the water (Knowledge, intermediate level)

The instructor shall:

8.2.1 Describe MOB procedures on installation, vessel, or WTG. Include what the vessel crew will do, and what is expected from the wind employee if one falls overboard or sees a person falling overboard

8.2.2 Present different types of recovery equipment and methods of use including: unassisted recovery from water, and assisted recovery from water in cooperation between casualty and rescuer, and by means of cradle and rescue net

8.2.3 Lead a discussion on MOB procedures

The participants shall:

8.2.4 Engage in discussions on MOB procedures and share experiences

Note *The theoretical knowledge of general procedures and awareness in case of a man overboard incident, may be presented as part of instructional activities and discussions in Lesson 6, Practical Sea Survival*

LESSON 9 - TRANSFER PRACTICAL

130 min.

Note *The practical transfer training is designed as a two-step sequence of practical learning activities:*

1) training the procedure for transfer from crew transfer vessel (CTV) to transition piece and back to CTV, and 2) practising live transfer from CTV to transition piece and back to CTV

The aim of this lesson is to enable the participants to conduct safe transfer of themselves and equipment between crew transfer vessel and wind turbine generator transition piece and back to vessel.

After successfully having completed this lesson of the BST Sea Survival Module, the participants can:

54) **Take responsibility** for conducting safe transfer for themselves between CTV and WTG TP (Ability, intermediate level)

ELEMENT 9.1 - PROCEDURES FOR TRANSFER BETWEEN CREW TRANSFER VESSEL AND WIND TURBINE GENERATOR TRANISITON PIECE

Learning objective:

55) The participants can **perform** transfer between CTV and WTG TP following the relevant procedures (Ability, intermediate level)

The instructor shall:

9.1.1 Explain and demonstrate the procedure for safe transfer between CTV and WTG TP and for the return transfer to CTV

9.1.2 Supervise participants' pre-use inspection of PPE (quick connector included) prior to commencing transfer process

9.1.3 Conduct practical training of the procedure while focusing on safety and procedural commands

The participants shall:

9.1.4 Conduct pre-use inspection of PPE (quick connector included) prior to commencing transfer process

9.1.5 Practise the procedure for safe transfer between CTV and WTG TP and for the return transfer to CTV:

a. advance from the designated transfer waiting area to the transfer position upon the command "ADVANCE!" from the deckhand

b. to prepare their quick connector

c. to connect their quick connector to the attachment point of the SRL when the deckhand calls out the command "TRANSFER!" and presents the SRL attachment point to them

d. to step across to the ladder and climb immediately after connecting to the SRL, with the SRL loose retrieval line over their shoulder

e. to immediately disconnect from the SRL on the command "ABORT TRANSFER!" from the deckhand

f. to close the platform gate or provide alternative fall protection before disconnecting from the SRL and give the command "CLEAR!" to signal to the deckhand that the SRL is ready to use for the next transferee

g. verify with the deckhand that transfer can commence by giving the command "READY FOR TRANSFER!", before transfer from WTG to vessel (exit) commences

h. inspects the SRL brake function and fall indicator prior to the transfer from WTG to vessel

i. to connect to the SRL and start the transfer from WTG to vessel immediately

j. to identify the deckhand's count down during climbing from the 5th ladder rung above the CTV deck "FIVE, FOUR, THREE, TWO, ONE!"

k. upon the deckhand's command "ONE!"; move one hand to the quick connector's release function while keeping three points of contact with the ladder, and orientate towards the vessel while stepping across

l. immediately release of the quick connector from the SRL as soon as they touch the vessel with their second foot

Note *Deck hand will hold his hand on the retrieval line of the SRL to keep the device under control*

m. immediately climb upwards to a safe position upon the deckhand's command "ABORT!" during their descent and resume their descent upon the deckhand's command "READY!" or "DOWN!"

n. application of the above-mentioned principles during transfer without quick connector and with twin fall arrest lanyards

o. loud and clear communication

Note *Practising the procedures for safe transfer can be conducted from the ground to and from any ladder certified for working at height training*

ELEMENT 9.2 - SAFE TRANSFE BETWEEN CREW TRANSFER VESSEL AND WIND TURBINE GENERATOR TRANSITION PIECE

Learning objective:

56) The participants can **take responsibility** for conducting safe transfer between vessel and WTG applying lanyards and connectors (Ability, intermediate level)

The instructor shall:

9.2.1 Facilitate participants' pre-use inspection of PPE (quick connector included) prior to commencing transfer process

9.2.2 Explain and demonstrate:

a. the importance of identifying hazards (swells, marine growth, waves, equipment failure) relating to the transfer, including the right to say stop/refuse to transfer

b. safe transfer of self between vessel and WTG using:

b.i SRL with quick connector

b.ii SRL without connector

b.iii twin fall arrest lanyards

c. underline the importance of observing and learning from the other participants doing the transfer exercises

9.2.3 Lead the practical training of safe transfer following the procedure

9.2.4 Provide constructive feedback to the participants between the exercises

The participants shall:

9.2.5 Conduct pre-use inspection of PPE (quick connector included) prior to commencing transfer process

9.2.6 Practise two transfers* (one transfer to; and one from the WTG) of self of each type (listed below) per participant:

a. SRL with quick connector

b. twin fall arrest lanyards

Note ** Based on the G+ Offshore Wind Health and Safety Association, Good Practice Guideline: 'Working at Height in the Offshore Wind Industry', section: 4.4.3 'Protection Against Falling: SRL on Boat Landing Ladder'*

9.2.7 Practise, while taking responsibility on their own:

a. keep one hand on handrail when moving about vessel

b. advance from the designated transfer waiting area to the vessels transfer position upon the command "ADVANCE" from the deckhand

c. to hold on to the vessel for safety and prepare their quick connector

d. to connect their quick connector to the attachment, point of the SRL when the deckhand calls out the command "TRANSFER" and presents the SRL attachment point to them

e. to step across to the WTG ladder and climb immediately after connecting to the SRL, with the SRL loose retrieval line over their shoulder

f. to immediately disconnect from the SRL on the command "ABORT TRANSFER" from the deckhand

g. to close the platform gate or provide alternative fall protection before disconnecting from the SRL, and give the command "CLEAR" to signal to the deckhand that the SRL is ready to use for the next transferee

h. verify with the deckhand that transfer can commence by giving the command “READY FOR TRANSFER”, before transfer from WTG to vessel (egress) commences

i. inspects the SRL brake function and fall indicator prior to the transfer from WTG to vessel

j. to connect to the SRL and start your transfer from WTG to vessel immediately

k. to identify the deckhand’s count down during climbing from the 5th ladder rung above the CTV deck “FIVE, FOUR, THREE, TWO, ONE”

l. upon the deckhand’s command “ONE”; move one hand to the quick connector’s release function while keeping three points of contact with the ladder, and orientate towards the vessel while stepping across

m. immediately release of the quick connector from the SRL as soon as they touch the vessel with their second foot

n. immediately climb upwards to a safe position upon the deckhand’s command “ABORT” during their descent, and resume their descent upon the deckhand’s command “READY” or “DOWN”

o. application of the above-mentioned principles during transfer without quick connector and with twin fall arrest lanyards

p. loud and clear communication

q. the ability to react to instructions and hazards during the transfers

9.2.8 Receive the instructor’s feedback and reflect on how to apply the feedback points in future transfer work situations

LESSON 10 - TRAINING REVIEW

35 min.

The aim of this lesson is to enable the participants to reflect on and process their learning outcome and key takeaways from the module, aiming to achieve a high learning transfer from the module to their way of working.

ELEMENT 10.1 - TRAINING REVIEW

The instructor shall:

10.1.1 Re-present the overall aims and learning objectives of the module for the participants’ comparison of their learning outcomes and the achievement of their previously stated expectations for the module

10.1.2 Lead a discussion or Q&A aiming at the participants’ reflections of their learning outcome in relation to their ways of working

The participants shall:

10.1.3 Reflect on their learning outcome and key takeaways from BST Sea Survival Module, aiming to achieve a high learning transfer from the module to their way of working by means of for example:

a. group discussions or walk & talk

b. questions & answers in class, or where suitable

Note *The instructor may additionally conduct a local evaluation of the training*

ELEMENT 10.2 - FEEDBACK SESSION

The instructor shall:

10.2.1 Give an overall feedback and feed forward on the participants' learning outcome inspired by the training as well as from the training review session

10.2.2 Encourage the participants to examine and grow awareness of how their own workplace WTG types/WTG environments differ from the training scenario environment. Promote participants discussion with their colleagues about how sea survival content, methods and techniques are similar or different to the local specific conditions identified after the module completion

GLOBAL WIND ORGANISATION

Annexes

ANNEX 1 - EQUIPMENT LIST

The following pages contain the lists of equipment required for delivering each of the modules contained within this training standard. All equipment shall meet the criteria defined in the GWO Requirements for Training.

1. BST FIRST AID

The following equipment is required during the entire duration of the BST First Aid Module training

1. Anatomical torso or graphical representation or illustration of human anatomy
2. Airway model or graphical representation or illustration of an airway model
3. A minimum of one resuscitation dummies (adult) per four participants
4. First aid equipment which as a minimum must include:
    a. AED
    b. tourniquet
    c. bandages – pressure dressings
    d. eye flush
    e. pocket mask for CPR
    f. protection gloves
5. Make-up kit for first aid scenarios
6. AED training unit and as minimum one AED training unit per resuscitation dummy
7. Blankets / thermal protective aid (TPA)

Any equipment used during this GWO training module shall meet or exceed the minimum requirements of the national standards in the country where the training is taking place. When working in a country where there is no applicable national standard then the equipment shall meet or exceed the minimum requirements of the European standards

2. BST MANUAL HANDLING

The following equipment is required during the entire duration of this BST Manual Handling training to meet the needs of the BST Manual Handling Module

1. A lumbar vertebrae model for educational purposes
2. A model of a shoulder for educational purpose

3. A load that weighs no more than 30kg and is unwieldy i.e.-difficult to grasp, difficult to grip, with contents likely to move or shift (e.g. a rescue dummy)

4. Personal protective equipment

5. Other lifting props for manual handling - weighing a maximum 15kg

Any equipment used during this GWO training module shall meet or exceed the minimum requirements of the national standards in the country where the training is taking place

When working in a country where there is no applicable national standard then the equipment shall meet or exceed the minimum requirements of the European standards

3. BST FIRE AWARENESS

The following equipment is required to meet needs for the Fire Awareness Module

1. Handheld CO2 and water extinguishers

2. Fire blankets

3. Dummies

4. Personal protective equipment (PPE)

5. Personal escape mask (optional)

Any equipment used during this GWO training module shall meet or exceed the minimum requirements of the national standards in the country where the training is taking place

When working in a country where there is no applicable national standard then the equipment shall meet or exceed the minimum requirements of the European standards

4. BST WORKING AT HEIGHTS & MANUAL HANDLING MODULE

The following equipment is required to instruct the BST Working at Height & Manual Handling Module.

Within each equipment category one product or more must be operative for practical training. Required additional different products are accepted in a limited quantity as products for hands on demonstration.

The instructor must select the most relevant products according to their geographic location and target audience

1. Full body harness:

    a. at least two different products

2. Fall restraint lanyards:

    a. at least two different adjustable products

3. Fixed length fall arrest lanyards with an energy absorber:
    a. one flexible Y-type
    b. one fixed adjustable Y – or I-type
    c. recommended but not required: one fixed or flexible V-type
4. Helmets
5. Vertical fall arrest system with the following sliders/gliders:
    a. cable guide, twist type attachment
    b. cable guide, slot type attachment
    c. cable guide clamp type attachment
    d. rail type attachment
6. Self-Retractable Lifeline (SRL)
7. Slings

Note *The European standard for slings specifies safety requirements and test methods for slings used for mountaineering (slings are used as anchor points and since there are no industrial standard for slings, they must also comply with the requirements listed in table A4-1 below)*

8. connectors (carabiners) with mandatory automatic closing and locking system
9. Evacuation/rescue devices:
    a. one emergency descent and one rescue device, or
    b. different rescue devices
10. Rope clamp for rescue (enabling lifting/safe disconnection of a loaded rope type fall protection lanyard)
11. Vertical aluminium ladders
12. Anchor points

Note *The height of the anchor point shall ensure that in the event of a fall there will be enough space below the anchor point to allow the shock absorber in a fixed length fall arrest lanyard to fully deploy while preventing the person who is falling from coming into contact with the ground or structure below the anchor point*

The GWO recommends an anchor point height of 6.75m for the evacuation exercises

The recommended height is based upon the following formula,

$$RD = LL + DD + HH + C,$$

Where:

RD	=	required fall distance clearance (minimum anchor point height)
LL	=	length of lanyard
DD	=	deceleration distance (fall distance)
HH	=	height of suspended worker
C	=	safety factor

The value for HH is the length of the suspended worker after a fall includes factors like the height of the person and harness stretch, to account for these variables this is set to 2.00m.

Using the value for HH (2.00m), the maximum allowed values for LL (2.00m) & DD (1.75m), and the minimum allowed value C (1.00 m), gives ,

$$RD = LL + DD + HH + C$$

And,

$$RD = 2.00\ m + 1.75\ m + 2.00\ m + 1.00\ m,$$

Therefore,

$$RD = 6.75\text{m}$$

Therefore, GWO recommends that the anchor points used during the evacuation exercises are placed a minimum of 6.75m above the ground or any structure which a person may come into contact with, in the event of a fall.

Any equipment used during this GWO training module shall meet or exceed the minimum requirements of the national standards listed in Table A4-1. When working in a country where there is no applicable national standard then the equipment shall meet or exceed the minimum requirements of the European standards.

	Country Specific Equipment Standards			
Equipment	Europe	North America	China	United Kingdom

Full Body Harness	EN 361+358	ANSI/ASSP Z359.11	GB 6095 +GB 6095 W/GB 6095 Q	BS EN 361+358
Fall restraint lanyards	EN 358	ANSI/ASSP Z359.3	GB 24543 W/GB 24543 Q	BS EN 358
Fall arrest lanyard including energy absorber	EN 354 and/or EN 355	ANSI/ASSP Z359.13	GB 24543 Z+GB/T 24538	BS EN 354 and/or BS EN 355
Industrial safety helmet with a chinstrap that is released with a force of no less than 150 N and no more than 250 N	EN 397 +A1	ANSI Z89.1 Type I	GB 2811	BS EN 397 +A1
Vertical fall arrest system on a rigid anchor line	EN 353-1	ANSI/ASSP Z359.15	GB 24542/GB 24537/GB 24543 Z/GB 30862+GB/T 24538/GB 24544	BS EN 353-1
Self Retracting Lifelines (Retractable type fall arresters)	EN 360	ANSI/ASSP Z359.14	GB 24544	BS EN 360
Anchor Points	EN795	ANSI/ASSP Z359.18	GB 30862	BS EN795
Slings	EN 354 + 795	ANSI/ASSP Z359.12	GB 24543 Z+GB 30862	BS EN 354 + 795
Connectors (Carabiners)	EN 362	ANSI/ASSP Z359.12	GB/T 23469	BS EN 362
Static ropes	EN 1891	ANSI/ASSP Z459.1 NFPA 1983	GB/T 23268.2	BS EN 1891
Rescue devices with lifting capacity	EN 1496	ANSI/ASSP Z359.4		BS EN 1496
Devices for emergency descent	EN 341	ANSI/ASSP Z359.4	GB/T 38230 A or GB/T 38230 B or GB/T 38230 C	BS EN 341
Vertical Aluminium Ladders	EN 131-2 and EN 14122-4	-	GB/T 17889.1 GB/T 17889.2	BS EN 131-2 and BS EN 14122-4

Table A4-1-Country specific equipment standards – Working at Heights

5. BST Sea Survival

The following equipment is required to meet the needs for the Sea Survival Module.

1. Inflatable lifejackets
2. Survival suits
3. Helmets
4. Inflatable life raft with equipment
5. Helicopter rescue sling
6. Device for emergency descent
7. Safety harnesses
8. Twin fall arrest lanyards
9. Self retractable lifeline (SRL)
10. PPE
11. Ladder simulating a WTG boat landing suitable for practicing safe transfer between ladder and boat
12. Boat suitable for practicing safe transfer to and from WTG ladder
13. Various types of accessories for each detachment quick release, restraint lanyard etc.

Any equipment used during this GWO training module shall meet or exceed the minimum requirements of the national standards of the country in which the actual training is taking place. When working in a country where there is no applicable national standard then the equipment shall meet or exceed the minimum requirements of the European standards.

	Country Specific Equipment Standards			
Equipment	Europe	North America	China	United Kingdom
Life Jackets	-	-	-	-
Inflatable	-	-	GB/T 32227	-
Survival Suits	-	-	GB/T 9953	-

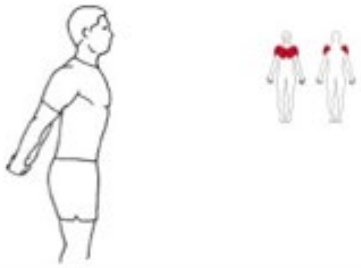
Industrial safety helmet with a chinstrap that is released with a force of no less than 150 N and no more than 250 N	EN 397 +A1	ANSI Z89.1 Type I	GB 2811	BS EN 397 +A1
Devices for emergency descent	EN 341	ANSI/ASSP Z359.4	GB/T 38230 A or GB/T 38230 B or GB/T 38230 C	BS EN 341
Full Body Harness	EN 361+358	ANSI/ASSP Z359.11	GB 6095 +GB 6095 W/GB 6095 Q	BS EN 361+358
Fall arrest lanyard including energy absorber	EN 354 and/or EN 355	ANSI/ASSP Z359.13	GB 24543 Z+GB/T 24538	BS EN 354 and/or BS EN 355
Self Retracting Lifelines (Retractable type fall arresters)	EN 360	ANSI/ASSP Z359.14	GB 24544	BS EN 360

Table A1-5-Country specific equipment standards – Sea Survival

ANNEX 2 - GUIDLINE FOR WARM-UP EXERCISES

Monday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.



1. Chest and shoulder stretch

Fold your hands behind you, push your chest forward and pull your arms back until you feel a good stretch in your chest and shoulders. Hold for 30 seconds.
Duration: 30 sec, Sets: 2

2. Arm Scissors

Stand with your feet together. Raise your arms forwards and upwards to approximately chest height. Breathe out and lift one arm towards the ceiling while lowering the other arm towards the floor with both palms facing forward. Continue moving both arms backwards until you feel a stretch in your pectoral muscles. Avoid arching your back.
Duration: 30 sec, Sets: 2

3. Stretch the back of your thigh and calf

Stand with one knee slightly bent and the other leg straight. Support your hands on the knee and keep your back straight. Slowly lower your upper body forwards until you feel a stretch on the back of your leg. Hold for 30 seconds and switch legs.
Duration: 30 sec, Sets: 2

4. Swing leg back and forth

Find support against a wall or hold onto a partner and swing your leg forwards and backwards. Try to keep your upper body steady in a good posture. Continue for 30 seconds, then switch legs. You can also practise your balance by not holding onto anything.
Duration: 30 sec, Sets: 2

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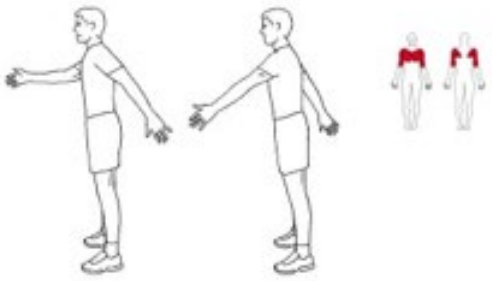
Tuesday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.

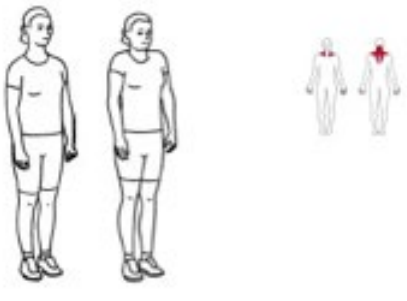
5. Sideward lunge

Stand with your legs together and your hands on your hips. Use your active leg to step to the side and place your weight on your active leg.
The movement stops when your foot hits the floor. In the end position, your active leg is bent and your supporting leg is almost straight. Press up and return to the starting position.
Repeat to the other side.
Sets: 2 , Reps: 10



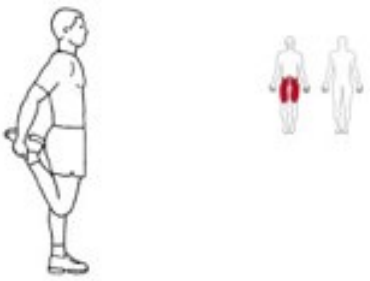
6. Standing back and forth arm swing

Stand with the arms hanging straight down along your side. Relax the shoulders and swing the arms alternately back and forth.
Sets: 2 , Duration: 30 sec



7. Shoulder Shrugs

Lift your shoulders as high as possible while you take a deep breath in, lower your shoulders while you exhale. Push your shoulders down as much as possible.
Sets: 2 , Duration: 30 sec



8. Stretch front side thigh and hip

Stand up straight. Grab one ankle and pull your heel towards your buttocks. Push your hips forwards until you feel the stretch on the front of your thigh. Keep your knees together. Hold for 30 seconds and switch legs.
Duration: 30 sec, Sets: 2

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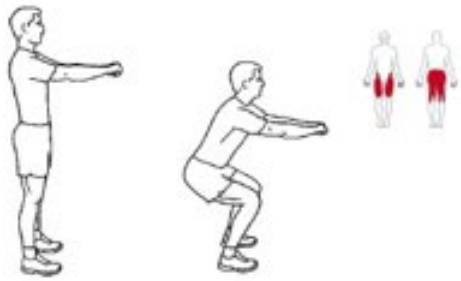
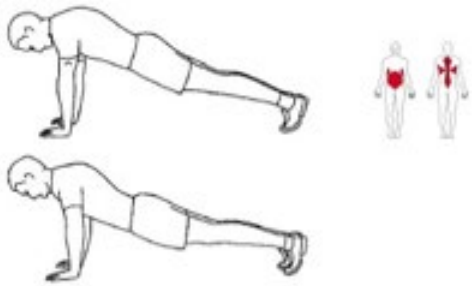
Wednesday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.



9. Static squat hold

Stand with your feet shoulder-width apart and your arms straight out in front of you. Move into a sitting position with your thighs approximately in a horizontal position and hold this position.
Hold the position until you feel a stinging/warm sensation in your thighs (minimum 30 seconds). Push yourself back up again.
Sets: 2 , Duration: 30 sec

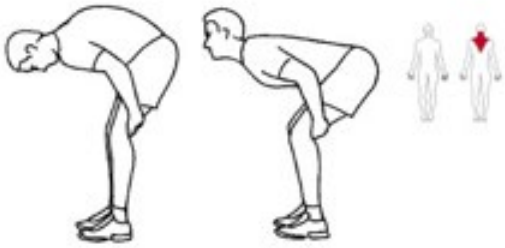


10. Scapular Push-ups

Support yourself on your arms and toes. Keep your body straight throughout the exercise. Try separating your shoulder blades by extending your upper back towards the ceiling.
Slowly lower your upper back, pulling your shoulder blades together.
Sets: 2 , Duration: 30 sec

11. Shoulder rotation w/ 90 degree abduction

Lift your arms with your elbows pointing to the sides. Bend your elbows to an approximately 90-degree angle. Move your arms so that they point upwards and downwards in an alternating motion.
The movement should take place in the shoulder joints.
Sets: 2 , Duration: 30 sec



12. Stretch and bend your back

Stand on a mat with feet hip-width apart. Bend the knees and hips, and clasp your hands behind your knees. Breathe in and round your back, exhale while arching your back.
Sets: 2 , Duration: 30 sec

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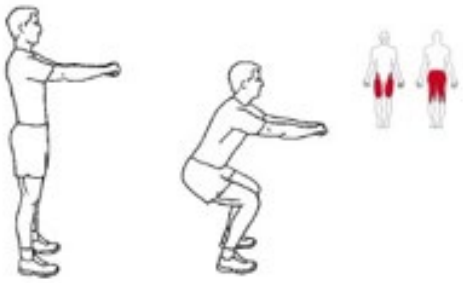
Thursday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.

13. Push-ups

Rest on your hands and feet with your body straight and tense.
Your hands must be placed at a distance that is slightly wider than shoulder-width apart. Lower your upper body towards the floor and push up again without flexing your hips. If you cannot do 10 repetitions, perform the exercise on your knees.
Sets: 2 , Reps: 10



14. Squat

Stand with your feet shoulder-width apart and your arms straight out in front of you. Bend your knees to 90 degrees then press up again. Keep your back straight and your eyes looking straight ahead throughout the motion. Alternatively, hold the deep position for a few seconds before pressing back up.
Sets: 2 , Reps: 10

15. Neck stretch

Hold your hand over your collar bone. Bend your neck towards the opposite side of where your hand is and rotate your head to the same side as you bend your neck. Look down. Feel the stretch on the front of your neck. Hold for about 30 seconds.
Duration: 30 sec, Sets: 2

16. Standing side stretch

Lift one arm above your head and slowly bend your upper body to the opposite side. Feel the stretch on the side of your body. Hold the position for 30 seconds. Change sides and repeat the exercise.
Duration: 30 sec, Sets: 2

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Friday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.

17. Single leg squat

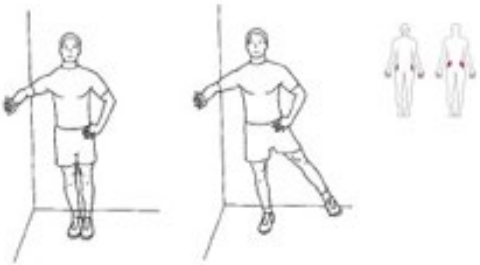
Stand on one leg with your arms straight, in front of you. Your passive leg may be put behind your active leg for support only. Bend your knee 90 degrees and push back up. Keep your back straight and look ahead throughout the movement. Repeat with opposite leg.

Sets: 2 , Reps: 10

18. Neck stretch

Place one hand on your head and gently pull your head down towards your shoulder. Relax the opposite shoulder. When you feel the stretch on the side of your neck, hold for 30 seconds. Switch sides and repeat the exercise.

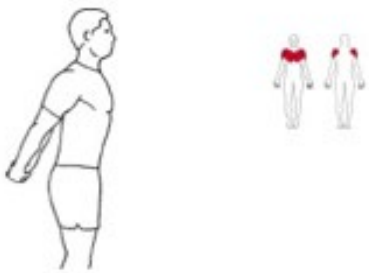
Sets: 2 , Duration: 30 sec



19. Standing outward leg lift

Stand next to a wall, using one hand for support. Extend your leg to the side and slowly return to the starting position. Keep your pelvis stable.
You may also do the exercise without the wall or with the support of a partner.

Gentagelser: 10 , Sets: 2



20. Stretch your chest and shoulders

Fold your hands behind your back, open your chest and push your arms backwards until you feel a stretch in your chest and shoulders. Hold for 30 seconds.

Sets: 2 , Duration: 30 sec

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Saturday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.

21. Backwards leglift

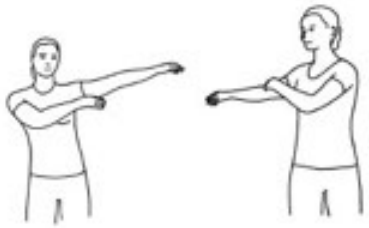
Start in the push-up position with your hands placed under your shoulders. Pull your belly button towards your spine and tighten your leg and upper body muscles. Breathe in, lifting one straight leg towards the ceiling, then lower it again.
Switch legs until you have done a total of 10 repetitions.
Sets: 2 , Reps: 10

22. Hand on the back

Place your hand on your back and try to reach the opposite shoulder blade. Hold the position for 30 seconds. Switch arms.
Duration: 30 sec, Sets: 2

23. Write the number eight

Stand with one arm straight at shoulder height. Write the number eight with this arm, switch arms and repeat. Perform the exercise for approximately 30 seconds with each arm.
Sets: 2 , Duration: 30 sec



24. Arm Swing w/torso rotation

Swing your arms freely from side to side. Let your upper body, hips and pelvis follow the motion. Stand balanced and steady on your feet. Keep the shoulders relaxed during the motion. Breathe naturally.
Sets: 2 , Duration: 30 sec

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Sunday
Warm-up routine for wind technicians

Seven programmes, each with four exercises to be repeated twice; total duration approx. 10 minutes.
The exercises are put together to achieve full-body warm-up and stretching.

25. Reverse lunge

Stand with your feet together and your hands on your hips. Lift one leg and take a large step backwards shifting your weight backwards. When your leg touches the floor, slowly descend until your knee almost touches the floor and briefly hold the position. Press up and return to the starting position.

Sets: 2 , Reps: 10

26. Stretch of back and shoulders

Stand with your hands folded behind your head. Move your elbows slowly forwards and backwards. For each repetition, push a little bit further, increasing the range. But remember that it must not be painful.

Duration: 30 sec, Sets: 2

27. Stretch of neck and shoulder

Keep your hands behind your back, lower both shoulders and lean your head down toward one shoulder. Hold for 30 seconds and repeat for opposite side.

Duration: 30 sec, Sets: 2

28. Stretch of shoulders and upper back

Reach one arm up and behind your neck with fingers pointing towards the opposite shoulder blade. Reach the other arm behind your lower back with fingers pointing towards the opposite shoulder blade. Move your hands towards each other and if possible make your finger tips touch and grab hold. Hold the position for 30 seconds if you can. Do the same to the opposite side.

Duration: 30 sec, Sets: 2

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ANNEX 3 - MANUAL HANDLING RISK ASSESSMENT

This is an instructor guidance elaborating the concept of aggravating factors related to manual handling risk assessment.

The baseline of assessing manual lifts is the load weight and the distance from the spine in the lower back (the reaching distance), respectively.

While assessing manual handling, number of additional risk factors to the lift must be considered, which, individually and especially combined, will enhance the strain on the musculoskeletal system. These factors are the, so-called, aggravating factors.

Prior to delivering the Manual Handling Module, instructors should review local instructors and risks assessments for the tasks planned, including assessment of whether a given task should be solved by the participants by using a handling aid.

1. Load Weight and Reaching Distance

The following guidance introduces some simple tools to help identify 'low-risk' manual handling tasks and introduces a hierarchy of control that can be used to help identify simple solutions to reduce risk from manual handling further. Tasks outside of these guidelines should be assessed by an appropriately qualified professional using more detailed assessment tools or a full manual handling risk assessment for the task.

Lifting and lowering filters

Use the guideline filters for lifting and lowering (shown in Figure 1) to help you identify low-risk tasks. The guideline filters do not set specific weight limits, so the guidelines are not 'safe limits' for lifting and carrying. They use broad assumptions or generalisations where, if met, the risk of injury is considered to be low.

Working outside the limits is likely to increase the risk of injury, which can lead to ill health. The guidelines are derived from lifting capacity data which show differences between men and women in the population (rather than individuals). Where the handling task falls within the filter guidelines, you do not normally need to do any other form of risk assessment unless you have individual workers who may be at significant risk. If you are unsure, complete a more detailed assessment.

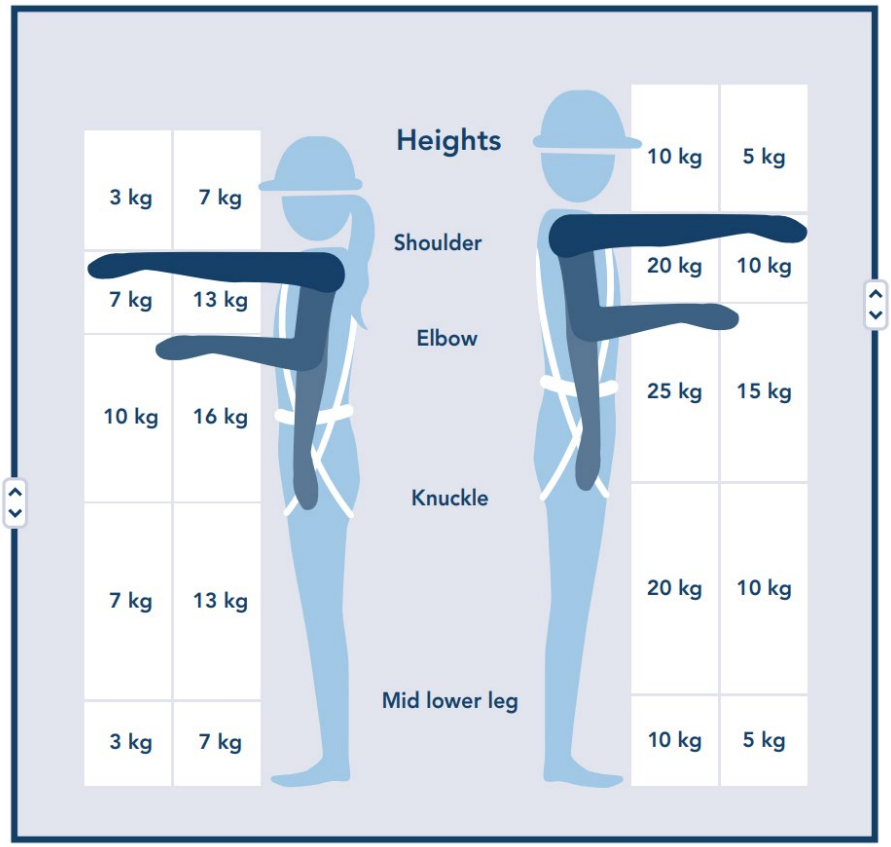


Figure 1-Lifting and lowering filters

Note *Figure 1 assumes that the load is easily grasped with both hands and is handled in reasonable working conditions, with the worker in a stable body position*

Risk assessment, lifting and lowering

1. Each box in Figure 1 contains a filter value for lifting and lowering in that zone. The filter values in the boxes are reduced if handling is done with arms extended, or at high or low levels, as that is where injuries are most likely to happen and will most likely be harmful to health. Such lifts must be evaluated separately.

2. Observe the work activity you are assessing and compare it to Figure 1. First, decide which zone or zones the worker's hands pass through when moving the load. Then assess the maximum weight being handled. If it is less than the value given in the matching box, it is within the guidelines.

3. If the worker's hands enter more than one zone during the operation, use the smallest weight. Use an in-between weight if the hands are close to a boundary between zones.

4. Lifting and lowering. Do I need to make a more detailed assessment? You will need to make a more detailed assessment using an appropriate tool, e.g. full risk assessment checklists (or equivalent) if:

a. the handling operation must take place with the hands outside the zones in Figure 1

b. the weight exceeds those in Figure 1

c. the handling involves torso twisting

d. the handling is more frequent than one lifts every two minutes

e. the handling is done by a team

f. the handling operations are complex, for example, the weights vary significantly or there are several start and finish locations

g. the lift does not meet the conditions given for using the guidelines, for example, if the load is difficult to grasp or handle

h. the person lifting may be at significant risk, for example, new or expectant mothers, young workers, those new to the job, or those with a disability, significant health problem or recent injury

Carrying risk assessment

You can apply the filter weights for lifting and lowering in Figure 1 to carrying operations where the load:

a. is held against the body

b. is carried no further than about 10m without resting

c. does not prevent the person from walking normally

d. does not obstruct the view of the person carrying it

e. does not require the hands to be held below knuckle height or much above elbow height

f. Where you can carry the load securely on the shoulder without lifting it first (for example, by sliding it onto your shoulder), you can apply the filter values up to 20m

Pushing and pulling risk assessment

In pushing and pulling operations, the load might be slid, rolled, or moved on wheels. Observe the worker's general posture during the

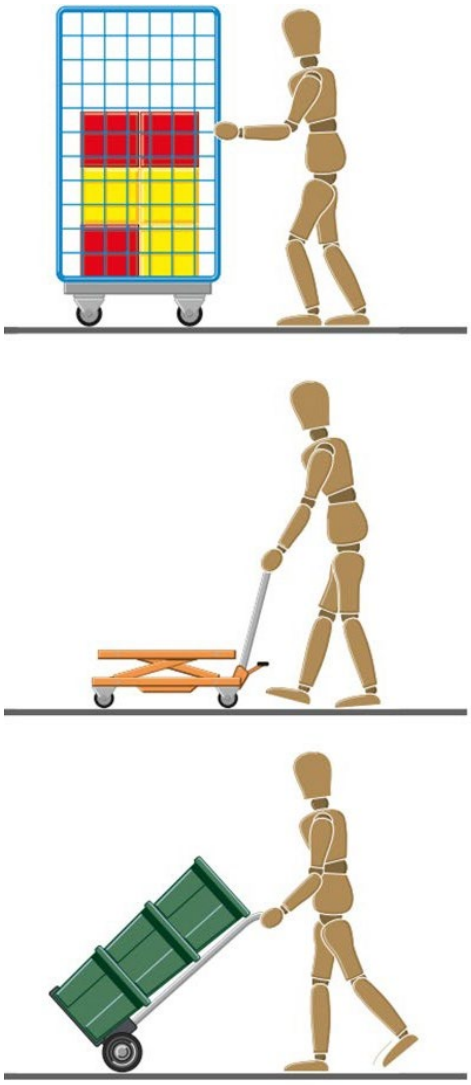


Figure 2 Acceptable push/pull postures[1]

operation. Figure 2 shows some acceptable push/pull postures. The task is likely to be low risk if:

- the force is applied with the hands
- the torso is largely upright and not twisted
- the hands are between hip and shoulder height
- the distance moved without a pause or break is no more than about 20m

When do I need to make a more detailed assessment?
If the load can be moved and controlled very easily, for example with one hand, you do not need to do a more detailed assessment. You should make a more detailed assessment using, for example, the RAPP tool or full risk assessment checklists (or equivalent) if:

- the posture shows that the task requires significant forces, for example, leaning
- here are extra risk factors like slopes, uneven floors, constricted spaces or trapping hazards

2. Aggravating Factors

The aggravating factors of the lifting operation must be considered which, individually and especially in combination, will enhance the strain on the musculoskeletal system posing a risk of injury and manual handling harmful to health.

Examples of aggravating factors; categorised by the four elements of the TILE principle:

Basic dynamic risk assessment – TILE principle

All manual handling tasks should be preceded by a basic dynamic risk assessment carried out by the persons planning to carry out the task before commencing the activity. This can be conducted using the simple and well known TILE approach.

[1] UK Government Copyright (by permission)

T-Task	I-Individual(s)	L-Load	E-Environment

For ‘Task’ considerations should include:

a. no suitable handling aid is available

b. holding loads away from torso

c. lifting below knee height or above shoulder height

d. carrying, pushing, pulling or precise positioning of the load reaching upwards

e. twisting or stooping

f. large vertical movement

g. long carrying distances

h. strenuous pushing or pulling

i. unpredictable movement of loads

j. frequent or prolonged physical effort

k. lifting for a longer period of time

l. insufficient rest or recovery

m. team effort

n. a work rate imposed by a process

For ‘Individual(s)’ capability considerations should include:

a. pose a risk to those with a health problem or a physical or learning difficulty

b. no warm-up

c. require unusual capability previous and pre-existing injuries

d. pose a risk to those who are pregnant

e. pose a risk to new workers/young people

f. require special information/training

g. unusual strength or height required for the activity

h. specialist knowledge or training required

For the ‘Load’ considerations should include:

a. heavy

b. bulky or unwieldy

c. difficult to grasp

d. difficult to grip

e. unstable or unpredictable

f. contents likely to move or shift

g. intrinsically harmful (e.g. sharp/hot)

h. sharp edges

For the Work Environment considerations should include:

a. constraints on posture, e.g. working on knees, laying on back

b. restricted spaces

c. poor floors, e.g. greasy, wet, uneven

d. variations in levels, e.g. stairs, thresholds

e. hot/cold/humid conditions

f. strong air movements, e.g. outside of tower, nacelle, etc

g. poor lighting conditions

h. weather conditions; rain, gust, wind, temperature

Additionally, it is recommended to consider additional factors including whether the activity is hindered or enhanced by wearing particular protective clothing or PPE and work/organisation (psychosocial) factors such as training, sudden changes in workload, communication, consultation, etc.

3. Good Handling Technique

A good handling technique is no substitute for other risk-reduction steps, such as providing lifting aids, or improvements to the task, load or working environment. Moving the load by rocking, pivoting, rolling or sliding is preferable to lifting it in situations where there is limited scope for risk reduction. However, good handling technique forms a very valuable addition to other risk-control measures. To be successful, good handling technique needs both training and practice. The training should be carried out in conditions that are as realistic as possible, emphasising its relevance to everyday handling operations in the workplace.

There is no single correct way to lift and there are many different approaches, each with merits and advantages in particular situations or individual circumstances. The content of training in good handling technique should be tailored to the particular handling operations likely to be carried out, beginning with relatively simple examples and progressing to more specialised handling operations as appropriate. For example:

a. employees should be able to identify loads that may cause injury when handled. Increases in size often indicate an increase in weight and difficulty of handling

b. where the size of the item is less important than how full it is, e.g. in the case of a dustbin containing refuse, they should assess the load by looking inside it or use techniques such as rocking the load from side to side before attempting to lift it

c. they should also treat unfamiliar loads with caution. Drums which appear to be empty or other closed containers should be tested, e.g. by trying to raise one end

d. they should apply force gradually when testing loads. If employees feel too much strain, they should be encouraged to look for another way of handling the load safely

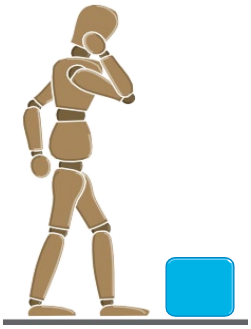
The following list illustrates some important points which are relevant to a basic two-handed symmetrical lift – a lift using both hands that takes place in front of and close to the body, without any twisting.

Basic lifting operations

Rocking a load to assess its ease of handling.

Figure 2 -Basic lifting operations[2]

[2] UK Government Copyright (by permission)



Think before handling/lifting. Plan the lift/ handling activity. Where is the load going to be placed? Use appropriate handling aids where possible. Will help be needed with the load? Remove obstructions, such as discarded wrapping materials. For long lifts, such as from floor to shoulder height, consider resting the load mid-way on a table or bench to change grip.

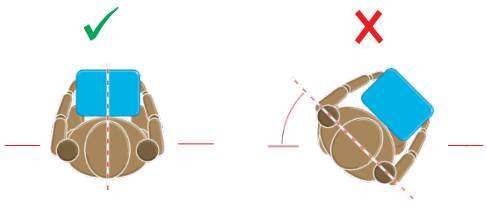
Keep the load close to the waist. Keep the load close to the waist for as long as possible while lifting. The distance of the load from the spine at waist height is an important factor in the overall load on the spine and back muscles. Keep the heaviest side of the load next to the body. If a close approach to the load is not possible, try to slide it towards the body before attempting to lift it.

Adopt a stable position. The feet should be apart with one leg in front of the other (alongside the load if it is on the ground) to increase the stability of the worker's posture. The worker should be prepared to move their feet during the lift to maintain a stable posture. Wearing over- tight clothing or unsuitable footwear may make this difficult.

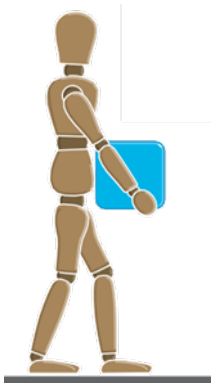
Ensure a good hold on the load. Where possible, hug the load as close as possible to the body. This may be better than gripping it tightly only with the hands.
Moderate flexion (slight bending) of the back, hips and knees at the start of the lift is preferable to either fully flexing the back (stooping) or fully flexing the hips and knees (full/ deep squatting)
Don't flex the back any further while lifting. This can happen if the legs begin to straighten before starting to raise the load. The worker should start the movement with the strong leg muscles while keeping the back posture constant.

Figure 2 -Basic lifting operations[3]

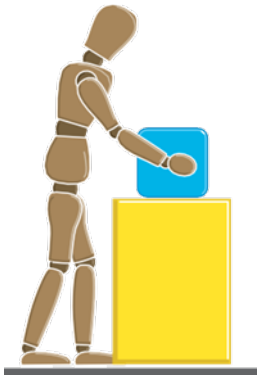
[3] UK Government Copyright (by permission)



Avoid twisting the back or leaning sideways especially while the back is bent. Keep shoulders level and facing in the same direction as the hips. Turning by moving the feet is better than twisting and lifting at the same time.



Keep the head up when handling. Look ahead not down at the load once it has been held securely.
Move smoothly. Do not jerk or snatch the load as this can make it harder to keep control and can increase the risk of injury.
Don't lift or handle more than can be easily managed. There is a difference between what people can lift and what they can safely lift. If in doubt, seek advice or get help.



Put down, then adjust. If precise positioning of the load is necessary, put it down first, then slide it into the desired position.

Figure 2 basic lifting operations [4]

Source of reference

This Annex is based upon:

a. legal requirements and guidelines of the Danish and UK EHS authorities and legislation on manual handling

[4] UK Government Copyright (by permission)

b. G+ Manual Handling Case Studies doc.

c. https://www.hse.gov.uk/pubns/books/l23.htm

d. Equinor Ergonomics and Manual Handling Study 2018

e. contains public sector information published by the UK Health and Safety Executive and licensed under the Open Government Licence'

Note *Local legal requirements must always be adhered to when performing manual handling*

ANNEX 4 - VERSION HISTORY

Amendment date	Version	Approved by & date	Description of changes
DECEMBER 2022	16.1	GWO TC	Version V16. 1 Dec2022 Annex 1 Equipment Lists BST Working at Height. Table A4-1 Country specific equipment standards – Working at Height) PP 222/3. BST Sea Survival. Table A1-5 Country specific equipment standards – Sea Survival) PP225 Full Body Harness reference for Europe and UK. The following erroneous reference removed "…or EN 813" (Europe). In UK, "…or BS EN 813" VersionV16Sep22 Section 5. 7 and 12.2 Participants pre-requisites: New pre-requisites added: Prerequisites for participating in the Sea Survival module is a valid GWO Working at Height training certificate– because: 1) To ensure safe climbing and descending on ladders. WaH gear is not the syllabus for sea survival – just tools to conduct exercises 2) To make participants feel safe and comfortable in trusting fall arrests, SRLs and descend/rescue device (fx milan) 3) To keep a flow in the training activities and not spend time on individual introductions to the gear Section 12.3 Instructor qualification pre-requisites added: A competent GWO BST Sea Survival module instructor must adhere to the instructor qualifications as per the Requirements for GWO Training as well as holding a valid GWO Working at Height training certificate Section 12.5 Note added: The local training site emergency response plan may call for a further number of qualified safety and rescue personnel Time 12-5 adjusted according to changes in lessons and elements Lesson 3, Cold water immersion: mitigate hypothermia is changed to minimize the risk of hypothermia Element 3.3 b) "tPA" corrected to TPA Element 3.3 added: Instructor shall: Present examples of individual and collective actions to minimize the risk of hypothermia while in the water ("HELP" – Heat Escape Lessening Positions)

Lesson 5 – “SAR and GMDSS” unfolded: SeARch and rescue and Global Maritime Distress & Safety Systems

Element 5.3 Physical actions to detection – learning objective: participants can recognise and name relevant distress signals and actions to enhance detection (Knowledge, basic level)

Lesson 6, Practical Sea Survival Duration changed to 140 min

New learning objective: Take responsibility of performing safe evacuation from a WTG transition piece (Ability, intermediate level)

Element 6.1 – Correct donning and use of LAS and PPE – new instructor activity added: Observe participants practicing the donning of LSA and PPE as well as performing buddy-check, and provide constructive feedback on the participants’ efforts on donning and buddy-checking

New participants action added: Decide how to apply the instructor’s feedback to the following exercises Element 6.2 Risks related to evacuation into water – adjusted learning objective: participants understand and can discuss sea survival techniques in relation to evacuation into water

(Knowledge, intermediate level)

Element 6.2 Instructor shall explain and demonstrate:

- Controlled entry form not more than 1 m height
- Evacuation by helicopter sling
- collective techniques to minimize the risk of hypothermia, including Heat Escape Lessening Posture (‘HELP’)

Furthermore feedback is deleted and a discussion added instead: Facilitate discussions on risks related to evacuation into water and prepare participants for the practical exercise

Participants actions: Discuss risks and options concerning:

Floating and swimming without life jacket deleted Donning life jacket in the water deleted

Techniques to enhance chances of being spotted deleted

Discuss collective techniques to minimize the risk of hypothermia including Heat Escape Lessening Posture (‘HELP’) individual swimming techniques

New Element 6.3 Warm Up added: Aim of this element is to mitigate risks of musculoskeletal injuries from the practical elements of the training and to support manual handling culture of always to warm up prior to physical activities

New Element 6.4 Controlled entry into the water from TP ladder New element 6.5 Individual and collective swimming techniques

New element 6.6 Correct usage of life raft

Participants shall not righten a life raft, but instructor must demonstrate

Element Emergency (double) descent by constant rate descender

Added to the instructor activity: detachment in the water (single and double evacuation). Various types of accessories for each detachment may be applied or demonstrated, e.g. quick release, carabiner, restraint lanyards, types of detachment etc. To cover risks of panic, bodily malfunction, accessibility due to body positioning and equipment restraints

The participants shall practise double evacuation with manual inflation of life jacket and detachment in the water

The summary by exercise is depending of training time available and local training facility risk assessment

Element 8.2 MOB note adjusted to The theoretical knowledge of general procedures and awareness in case of a man overboard incident, may be presented as part of instructional activities and discussions in lesson 6, Sea Survival.

Lesson 9 Transfer practical – The practical transfer training is designed as a two-step sequence of practical learning activities: 1) training the procedure for transfer from CTV to Transition piece and back to CTV, and 2) practising live transfer from CTV to Transition piece and back to CTV

Duration changed to 130 min Equipment annex:

Rigid life vest is no longer required because wind employees travelling on CTVs bring their own

inflatable lifejackets

Inflatable lifejackets (automatic inflation for instructor's demonstration and manual release for practice)

In relation to transfer trainings:

ladder simulating a WTG boat landing suitable for practicing safe transfer between ladder and boat

If an alternative ladder system is used for dry transfer training, it must comply to standards 14122-4 (part 4) or similar

Boat or dynamic platform to simulate a moving vessel in waves < 0.5 m suitable for practicing safe transfer to and from WTG ladder

Various types of accessories for each detachment quick release, restraint lanyard etc.

Amendment date	Version	Approved by & date	Description of changes
APRIL 2022	15	GWO TC APRIL 2022	

Module 1, First Aid reviewed, including updated duration of total contact time from 13 hours to 4 hours

Substantial Changes to the Module:

The module is decreased from 7 lessons to 5 lessons.

The total contact time of the module is decreased from 13 hours and 20 to 7 hours.

Lesson 2 is updated according to a training needs analysis done by the GWO review working group of what a wind turbine technician needs to be able to do as a basic first aider.

Therefore, lesson 2 is aimed at enabling the participants to recognise signs and symptoms of life threating situations and save lives and prevent injury to the casualty by being able to use Primary Survey to provide the correct and effective lifesaving first aid in case of an emergency situation in the wind industry.

Lesson 3 is updated according to a review of general injury and illness statistics from the GWO members, which led to a focus on how to do a head-to-toe examination and the listed relevant incidents in lesson 3:

4) Burns

5) Chemical contacts to the eye

6) Medical emergency situations: Heart attack & Stroke

7) Hypothermia

8) Fractures

Lesson 4 is updated with a new split between mandatory and additional scenarios, which can be combined at will during the scenario-based training as long as all the mandatory scenarios are covered. The mandatory scenarios are:

1) One electrical incident

2) One incident with either a stroke (circulatory, respiratory, central nervous system) or a heart attack

3) two scenarios must include a “head-to-toe” examination of the casualty

4) CPR using an AED

All the above updates are based on a training need analysis of what a wind turbine technician needs to be able to do as a first aider. This analysis included a review of general injury and illness statistics from the GWO members among others origin from ON and OFF erection, service, lifting and transfer operations. In addition, the updates are also a consequence of the project scope given by the GWO Training Committee to increase the competitiveness of BST and BSTR First Aid modules e.g. by reducing the contact time, where working group has focused on combing instructional valid principles such as reducing the amount of (presented) information with a thorough analysis of the training needs to achieve the best possible outcome.

Learning objective in lesson 1 & 2 alters to singular with possible misalignment with gender neutral (plural) pronouns

<u>Module 2, Manual Handling reviewed, including reviewed annexes for Warm-up and Manual Handling Risk Assessment</u>

Substantial Changes to the Manual Handling Module:

The module is decreased from 7 lessons to 5.

Technical theory has been deleted and necessary theory has been transferred to be applied during the practical training.

Warm-up. The warm-up lesson 3 focuses on building culture, and Annex 2 now offers an inspiring warm-up program that is possible to conduct on the pier and on larger vessels prior to transfer. Warm-up should not just be conducted in relation to the training. Warm-up is essential for mitigating musculoskeletal injuries, and a culture of always to warm-up prior to manual handling and other physically demanding tasks must be always supported by training providers.

The elements in the practical training and exercises are structured in work related physical postures: kneeling, lifting, pushing/pulling, carrying and so on. The 7 elements are inspired from G+ reports, Equinor study on Manual Handling (2018) and work group participants studies and experiences. Applying TILE principle is now part of all practical elements.

Annex 3 – Manual Handling risk assessment – the guiding tools are unfolded to be more user-friendly for the instructor.

Taxonomy alignment throughout the BST standard

The section Understanding GWO learning objectives has been updated to reflect the reviewed GWO Taxonomy Framework

All learning objectives have been updated with action verbs that reflect the taxonomic levels (basic, intermediate, and advanced level) and the domain (knowledge, skills, and ability) without changing the content of the element

Action verb ‘demonstrate’ in learning objectives are changed to relevant action verb level/domain.

Learning activity “demonstrate” was changed to ‘practise’ because during training activities, the participants are in a learning process and abilities should be trained, not evaluated

Learning activities have been aligned to match the updated learning objectives with a focus on participant engagement

The instructor’s perspective has been changed to a generic perspective accommodating different types of training

All instructor guidelines have been compiled in one section under the individual elements

More guidelines on the use of feedback have been added to emphasize its importance and ensure its effective use by involving the participants

All learning objectives have been numbered throughout the standard

New learning objectives have been created for all lessons that describe the overall ability the participants should acquire during the specific lesson. This focuses the attention on how knowledge and skills support the responsible performance of the employee in the context of the job and the deeper involvement enables participants to learn and remember more deeply.

The Introduction lesson for all standards has been updated to ensure alignment between all GWO training standards for generic lessons. New aim in lesson 1 “The aim of this lesson is for the participants to be motivated and to engage in the training safely at a training facility, while recognising what is expected of them during the training.”

The Training Review lesson for all standards has been updated to ensure alignment between all GWO training standards for generic lessons

For all modules, the title of lesson Learning outcomes of the XXX Module changed to Detailed description of the XXX Module

2. Terms and definitions – listed in alphabetical order

2. Terms and definitions – Definitions of Manual handling added

Amendment date	Version	Approved by & date	Description of changes
JANUARY 2021	14		

Change in total training standard:

“Delegate” changed to “Participants”. (Plural - to avoid using his/hers in following text. Instead, we use "their")

“Training staff” changed to “the instructor” “Attitude” changed to “Ability”

BST 6: New version of “Understanding GWO learning objectives” Changes to BST Sea Survival Module January 2021:

Throughout the Sea Survival module:

All learning objectives moved to relevant learning elements and tagged with domain and level (e.g., Ability, intermediate level)

Learning activities are adjusted with more focus on participants involving activities - and some responsibility is placed on the participant engagement

Instructor/Participants ratio: Added: Note: There must always be at least 2 instructors or rescue person present during practical training

BST SS Timetable:

Adjusted in accordance with new headings on lessons and elements Lesson 9: 150 min; lesson 10: 35 min

Lesson 1, Introduction:

Motivation: new wording added: Instructor shall facilitate a group discussion or Q/A activity on:

The importance of personal involvement in the course, why advanced rescue preparedness and skills are relevant, How the participants will be challenged, and why

Participants shall engage in group discussions and share own experiences New Human Factors section added

Lesson 2, Legacy – is changed to Safety culture and legacy

Aim is adjusted to: The aim of this lesson is to give the participants the needed awareness of site organisation and relevant legislation in relation to safety culture and organisation to ensure that the candidates are aware of the roles, personal responsibilities and rules that apply to offshore wind farms.

Learning objective adjusted to: Having successfully completed this lesson, participants will show interest in rescue and recovery organisation and safety culture on site and seek guidance when needed. (Ability, basic level)

Lesson 3, title from: “Exposure, cold, hypothermia, drowning” to “Cold water immersion”. Sea sickness is added as a hazard with precautious actions

Element 3.5 Learning objective: The participants can describe the consequences from seasickness (Knowledge, basic level)

Element 3.6 - Learning objective: The participants can describe the main risks from stay in contaminated water (Knowledge, basic level)

Contaminated water is added as a hazard with precautious actions Lesson 5 – 5.2.1 New technology added (SART – AIS – AIS – SART)

Lesson 6 – new 6.2.16: Floating and swimming without a life jacket and donning the life jacket while in the water

Element 6.4: Inflation of raft is a crew task. 2. The learning outcome from watching a video launch with possibility to pause or re-view is much deeper than a one-time demo.

New Element 6.5 – Helicopter rescue from water: Participants practice donning HELO sling in the water

Emergency descend changed to practicing double evacuation with detachment in the water Lesson 7 -

Element 7.2: (Dynamic/Floating->Static/fixed; Static/fixed->Dynamic/floating; Dynamic/floating-

>Dynamic/floating)

Element 7.6: New risk added - . . . including dropped objects Lesson 8 –

Adjusted aim: The aim of this lesson is to inspire the participants to ensure safe conduct on installations, vessels, and WTG´s during normal operations and in case of emergencies and evacuation. And to seek guidance when needed.

Adjusted Learning objective: After successfully having completed this lesson of the BST Sea Survival module, participants will show interest in safe conduct in wind industry environment and seek guidance when needed (Ability, basic level)

Element 8.2. MOB deleted – new learning objective: The participants can explain relevant actions when a person falls in the water

Lesson 9 – New title: Safe transfer of oneself between Motivation: The movement of equipment

and tools is not to be prioritised during SS-module is covered in other modules of BST, such as Manual Handling

Adjusted learning objective: After successfully having completed this lesson of the BST Sea Survival module, the participants can take responsibility for conducting safe transfer for themselves between dock and vessel and between WTG and vessel

Element 9.1.1 Safe transfer of self and equipment – “Equipment” deleted as equipment storage is a crew responsibility

9.1. Learning objective changed to Ability, intermediate level

Lesson 10 – Test and training review: new section on Evaluation and feedback Annex 1 – Equipment list

Cradle, rescue net deleted, as MOB rescuing MOB is deleted from curriculum Emergency descent device added

Self-Retractable Lifeline (SRL) unfolded

Added: Ladder simulating a WTG boat landing suitable for practicing safe transfer between ladder and boat

Added: Boat suitable for practicing safe transfer to and from WTG ladder

Added: “…of the country in which the actual training is taking place” to underline, that the table A3- 41 is regional examples only

Amendment date	Version	Approved by & date	Description of changes
OCTOBER 2020	13.1		

- GWO Standard updated to match the Corporate Visual identity of GWO (CVI)
- Each module now contains a cover page and the module name listed in the header as reference.
- New ISO Code added to standard
- All previous versions of the Change log have now been moved to Annex 4. The current change log remains at the start of the standard.
- Duplicate information removed from Section 4. Scope

The following sections have been removed due to this information now included in the new Requirements for Training Providers and Requirements for Certification Bodies (released May 2020)

Section 5

5.4 Conformity with other training – section removed

5.5 Legal Requirements – Section Removed

Section 6

6.1 Staff – section removed

6.2 Facilities and Equipment – section removed/Equipment now moved to section 5.9

6.3 Theory training facilities – section removed

6.4 Practical training facilities – section removed

6.5 Training Equipment – section removed

Section 8

8.1 Administrative arrangements – section removed

8.2 Participant performance assessment – section removed

8.3 Requirement to upload training record in WINDA – section removed (course Codes have now been moved to section 5.6)

8.4 Training Providers own Records and Certificates issue – section removed

8.5 Participant performance assessment form – section removed

Annex 1

- Participant Performance Assessment Form – Section removed (now in the Requirements for Training Providers)

Annex 2

- Medical Assessment Form – Section removed (now in the Requirements for Training Providers)

All section reference numbers have now been updated

Amendment date	Version	Approved by & date	Description of changes
SEPTEMBER 2019	13	GWO TC SEPT 2019	

<u>October 2019 – minor corrections</u>

Following release of the standard there have been some reports of grammatical errors in the document, these have been corrected.

- Sections 10.7, 12.7 and 13.7 have been aligned with the learning objectives in the lessons.

To align with the North American market there have been some wording changes throughout and the imperial measurements have been included where applicable. These changes do not affect the learning outcomes.

<u>2019 - Working at Heights & Manual Handling Review</u>

Working group to combine the two modules. Therefore, V13 of BST has 6 modules.

Insertion of new module 5 “Working at heights and manual handling combined”

Comprehensive review of both manual handling and working at heights modules

Document changes

Formatting of document changed and aligned throughout document, includes numbering all

sections, lessons, elements, sub-sections, and tables for ease of reference. Inserted Section 2 - Terms and definitions

Section 3 - Change log layout changed, for ease of reading Annex 3 – Manual handling risk assessment moved to Annex 5 Equipment lists for all modules moved to Annex 3.

Inserted Annex 4 – Guideline for warm-up exercises

Anchor point height review

Requirement for anchor point height changed to a recommendation. With additional control measures if using a lower height.

Overall Changes

- Version changed from 12 to 13
- Date changed to reflect most recent date of changes.
- Added level and domain to all learning objectives (e.g., L2 – Knowledge) for ease of understanding)
- Aims for each lesson updated
- Taxonomy action verbs moved to each lesson element
- Module 5 Working at height & Manual Handling is Added

Section specific changes

1 Table of contents

- Updated to reflect changes to standard.

2 Terms and Definitions

- Inserted.

3 Change Log

- Format changed for ease of reading.

4 Scope

- Changed number of modules from 5 to 6.

5.1 Overview

- Changed number of modules from 5 to 6 under overview.
- Inserted working at height and manual handling combined course.

5.6 Duration of BST Modules

- Section reworked to give clarity to contact time and total training day.
- Duration given as total contact time
- Inserted table 5-7 to clarify maximum durations per day.

6.5 Training equipment

- Reworked to include reference to equipment lists in Annex 3.

8.5 Participant performance assessment form

- Name changed from “Control Measures”.
- Wording updated to use participant performance assessment instead of control measures.

9 BST Module 1 – First Aid

- Numbered to section 9 and all subsequent subsections now 9.x

e.g., 1.1 Aims and objectives of the BST First Aid module becomes sub-section 9.1.

10 BST Module 2 – Manual handling

- Numbered to section 10 and all subsequent subsections now 10.x

e.g., 1.1 Aims and objectives of the BST fire awareness module becomes sub-section 10.1.

11 BST Module 3 – Fire awareness

- Numbered to section 11 and all subsequent subsections now 11.x

e.g., 1.1 Aims and objectives of the BST fire awareness module becomes sub-section 11.1.

12 BST Module 3 – Working at height

- Numbered to section 1 and all subsequent subsections now 12.x

e.g., 1.1 Aims and objectives of the BST working at height with manual handling module becomes sub-section 12.1.

13 BST Module 4 – Working at Heights & Manual Handling Combined

- New combined module inserted

14 BST Module 5 – Sea survival

- Numbered to section 14 and all subsequent subsections now 13.x

e.g., 1.1 Aims and objectives of the BST sea survival module becomes sub-section 14.1.

ANNEX 3 Equipment list

- Moved manual handling risk assessment to Annex 5 and inserted equipment list to align with other standards

ANNEX 4 Guideline for warm-up exercises

- Inserted

ANNEX 5 Manual handling risk assessment

- Moved from Annex 3

Sub-Section specific changes

9.1 Aims and Objectives of the BST First Aid module

- Aim updated to include CPR and AED.

9.2 ,10.2, 11.2, 12.2, 13.2 &14.2 Duration of the BST xx Module

- Section reworked throughout to clarify contact time and total training day.
- More accurate time estimates.

9.4, 10.4, 11.4, 12.4, 13.4 & 14.4 Equipment for xx module

- Moved list of equipment to Annex 3
- 12.4 & 13.4 Changed the requirement to a recommendation for an anchor point height of 6.75 m, with the change included additional control measures if the height is lower.

9.5, 10.5, 11.5, 12.5, 13.5 & 14.5 xx module timetables

- Table format adjusted and standardised.

9.6, 10.6, 11.6, 12.6, 13.6 & 14.6 Detailed description of the xx module

- Paragraph styles aligned throughout the lessons, elements & notes.
- Bullets removed and replaced with numbering throughout.

9.7, 10.7, 11.7, 12.7, 13.7 & 14.7 Participant performance assessment

- Paragraph styles aligned throughout.

Manual handling changes

Reduced from 8 lessons to 7 lessons.

10.1 Aims and objectives of the BST manual handling module

- Learning objective list order changed to reflect hierarchy of control.

Lesson 2 – Legislation and behavioural safety

- Lesson 6 incorporated into lesson 2.

- Time increased to 15 minutes.
- Inserted learning objectives 3 & 4.
- Inserted element 2.3 – behavioural safety.

Lesson 3 – Spinal anatomy and posture

- Moved form lesson 4.

Lesson 4 – Planning manual handling

- Moved form lesson 5.
- Name changed from “T.I.L.E. Principle and assessing aggravating factors.
- Time increased to 20 minutes.

Lesson 5 – Measures to prevent injury during training

- New lesson.

Lesson 6 – Manual Handling: Risk controls & Proper manual handling techniques

- Previous lesson 3 incorporated.
- Name changed from lifting techniques and scenario-based training.

Fire awareness changes

Lesson 4 – Fire extinguishing

- Inserted table L4-3 of fire classes in element 4.3.4.

Working at height changes

12.3 Working at Heights instructor to participant ratio

Changed from 1:4 to 1:6 for practical exercises (Remains 1:4 for on-site).

12.4 Equipment for Working at Heights module

- Inserted an explanation of the generic approach to training.
- Added a requirement to reduce the potential fall factor.
- Inserted additional control measures for a reduction in anchor point height

Lesson 1 - Introduction

- Time reduced to 15 minutes in line with other GWO Modules.

Lesson 3 – Harness

- Element 3.1 – Name changed to Pre-use inspection.
- Element 3.1 - Expanded pre-use inspection.
- Element 3.2 – Name changed to Fitting.
- Element 3.3 – Name changed to Periodic inspections.
- Element 3.4 – Name changed to documentation.
- Element 3.5 – Name changed to maintenance.

Lesson 4 – Fall prevention

- Name changed from work positioning lanyards.
- Moved from lesson 6 in line with the hierarchy of control.
- Element 4.1 – Inserted and incorporates previous element 6.5.
- Element 4.2 – Name changed and moved from 4.6.
- Element 4.2 – Expanded pre-use inspection.
- Element 4.3 – Name changed and moved from 4.1.
- Element 4.4 – Name changed and moved from 4.3.

Lesson 5 – Vertical fall arrest systems

- Time reduced to 25 minutes.
- Element 5.2 – Name changed.
- Element 5.2 – Expanded pre-use inspection.
- Element 5.3 – Name changed to correct attachment and detachment.
- Element 5.5 – Name changed to Periodic inspections.

Lesson 6 – Fall arrest lanyards

- Time increased to 55 minutes.
- Inserted learning objectives for double hook climbing and fall factor
- Element 6.1 – Name changed to legal requirements.
- Element 6.2 – Name changed to pre-use inspection and moved from element 6.7.
- Element 6.2 – Expanded pre-use inspection.
- Element 6.3 – Name changed to correct attachment to harness and moved from element 6.2.
- Element 6.4 – Inserted.

- Element 6.7 – Name changed to approved anchor points for attachment and moved from element 6.5.

Lesson 7 – Dropped objects

- New lesson.

Lesson 8 – Self retracting lifelines

- Name changed from backup systems for exercises.
- Time reduced to 10 minutes.
- Element 8.6 – Expanded pre-use inspection.

Lesson 9 – Measures to prevent injury during training

- New Lesson.

Lesson 10 – Practical exercises

- New Lesson.

Lesson 11 – Workshop – Risks/Hazards and suspension trauma

- Time increased to 30 minutes.
- Incorporated previous lesson 13 on suspension trauma.

Lesson 12 – Emergency procedures

- Time reduced to 80 minutes.
- Inserted learning objective for a double evacuation.
- Improved descriptions throughout.

Lesson 13 – PPE Review

- Time reduced to 10 minutes.

Lesson 14 – Rescue devices and rigging setup

- New Lesson.
- Incorporates and expands previous element 14.3.

Lesson 15 – Measures to prevent injury during training

- New Lesson.
- This lesson is a copy of lesson 9 and is inserted to allow time on day two.

Lesson 16 – Rescue exercises

- Time increased to 355 minutes.
- Removed exercise to rescue an unconscious casualty from the outside of the ladder.

Lesson 17 – Evaluation

- Time reduced to 15 minutes.

13 BST Module 5 – Working at Heights & Manual Handling Combined

- New module combining the lessons and elements of manual handling into the working at height training.

Amendment date	Version	Approved by & date	Description of changes
01.04.2019	12	GWO TC 20.03.19	

First Aid:

- Staff: Added following: First Aid Instructors need to be certified first aid Instructors according to national legislation and/or recommended guidelines
- Lesson 2: Added ref. to International Liaison Committee on Resuscitation (ILCOR)
- Lesson 3: Anatomy section simplified e.g. element 3.1 d. vital organs and their requirements, 3.4 removed, 3.5 Personal Hygiene change to Personal Protective Equipment and moved to lesson 4.1
- Lesson 5: C-ABC – adding C for catastrophic/critical bleeding
- Lesson 5: Lifesaving first aid using primary survey “C” - A - B – C – added 50 min from AED

Removal of CPR on children

- Lesson 6: AED – no longer a separate lesson but integrated in lesson 5.
- Lesson 7 - Ordinary first aid: Changed to secondary survey and increased with 50 min from the previous AED lesson.

Traffic related accidents include in lesson: 7.1.4 – the scenario-based training

Fire Awareness

- Personal escape masks Now optional in the equipment list Also part of the theory in lesson 4
- Square of combustion
- Changed to triangle

Amendment date	Version	Approved by & date	Description of changes

SEPTEMBER 10 2018	11	GWO SC SEPTEMBER 20, 2018	

Sea Survival review

Duration change

- Course reduced from 1½ day duration to 1

Primarily by moving theory elements into the practical elements.

Overall changes

Elements moved and integrated

- Element 8.1/8.2 moved to Lesson 5
- Element 9.1,9.2,9.3,9.4,9.5,9.6 and 3.1,3.2,3.3,4.1 and 8.2 moved to Lesson 6
- Element 5.1,5.2,5.3,5.4,5.5 moved to Lesson 7
- Element 6.1 moved to Lesson 8
- Element 10.1,10.2,10.3 - 5.3,5.4,5.5 and 7.1 into Lesson 9

Element specific changes

- Updated: Added new introduction Lesson, aligning with latest developed standards
- Updated: 1.1, added referral to G+ guidelines alignment
- Updated: 1.1, Aims & Objectives wording
- Updated: 1.2, duration section to 2x4 hours
- Updated: 1.3, Trainer – Participant Ratio, practical to 1:4
- Updated: 1.5, timetable to reflect the 1-day duration setup
- Updated: Lesson 3, Learning objectives. Drowning content was changed from “demonstrate” to “explain” to reflect the theory perspective of the lesson
- Updated: Lesson 3, Learning objectives. Hypothermia level changed from “various steps” to “symptoms” due to details being covered in first aid
- Updated: 3.4, drowning. Changed from “Explain” and “demonstrate”, to “explain” due to the topic being covered in first aid
- Updated: 4.1.3, added “Correct pre-use check” based on survey feedback
- Updated: 5.1, the instructor must now only “explain” and not “demonstrate”. Furthermore, it is now SAR operation and not organisation

- Updated: 6.1.2, added “immersion and transfer suits” to clarify
- Updated: 6.2.1, added “Including different types of evacuation, by use of equipment or manual evacuation” to make it more precise
- Updated: 6.2, sequence
- Updated: 6.2, changed “safe” to “controlled”
- Updated: 6.2, first aid elements removing “various” to make it more precise
- Updated: 6.2.10, from “safe” to “controlled”
- Updated: 6.3.1.5, added “Covering risks of panic, bodily malfunction, accessibility….” To help the instructors during the lesson
- Updated: 6.4.6, removed “various” to make it more precise
- Updated: 6.4.12, removed “stages” to simplify it
- Updated: 6.6.1, added “participants understand that they are to demonstrate the skills covered in Lesson 6 practical sea survival” to ensure motivation for the exercise
- Updated: 6.6.2, “safe” removed, “controlled” added
- Updated: Lesson 7, Aims and Objectives. “Dynamic-dynamic” added to reflect that all principle types of transfer are covered
- Updated: 7.2.1, dynamic – dynamic added
- Updated: 7.2.2.2, added “Various types of vessels the participant may engage in a Sea Survival Situation” due to the different operational footprint of the vessels when conducting Sea Survival
- Updated: 7.2.3.1 and 7.2.3.2, reversed the safe transfer methods to reflect the safety priorities
- Updated:7.2.4.1/2, updated the sequence to reflect operational pattern
- Updated: 8.2.2, added different types of contingency plans to make it more precise
- Updated: 9.1.2, “Storage” is added to reflect that equipment/cargo is to be handled specifically
- Updated: 9.2.1, added different types of hazards
- Updated: 9.2.2, Updated the exercises to include SRL with and without quick connector
- Updated: 9.2.4, Added “with/without quick connector” and specified that each exercise must be conducted twice by each participant
- Updated: 9.2.5, added “The ability to react to instructions and hazards during the transfers”
- Updated: 9.3.2, added “Assisted recovery from water in cooperation between casualty and rescuer by means of cradle and rescue net” to emphasise that both approaches must be covered
- Updated: 2.2, removed 2.2.2 and 2.2.3 due to potentially having 12 different nationalities on the course

- Updated:1.7, changed the numbering of the control step elements to reflect the updated sequence in the Sea Survival module
- Removed: Lesson 6, Aim & Objectives “Demonstrate the various techniques to enhance the individual and collective chances of survival and evacuation”, as this is covered in the other aims & objectives
- Removed: 6.5, Participants shall demonstrate Helicopter rescue from water as demonstrated by staff” as it is deemed sufficient that the participants observe the instructors “explaining” and “demonstrating” it
- Removed: Lesson 9, referral to G9 as this is now under the overall Aims & Objectives section
- Removed: 9.2.2, “moving equipment with Twin fall arrest lanyards” as this is impossible

Taxonomy update

Update of the taxonomy methodology to improve consistence and quality, including: update of Aims and objectives section, alignment between aims & objectives and the learning objectives, update of element taxonomy

Amendment date	Version	Approved by & date	Description of changes
MAY 31 2017	10	GWO SC APRIL 27	

Content

- New intro “Scope” replaces “Foreword and Editorial”
- General section: Target group detailed to “personnel working in a wind turbine environment”
- General: new section on “Understanding GWO Learning Objectives” incl. Taxonomy Table
- General: new section on Conformity with other training section added, allowing certified training providers to incorporate delivery of other certified training.
- first aid module: specified at least one scenario must be based on electrical incident, diabetes deleted as first aid situation
- Manual Handling: may now be delivered as combined MH and MHR course, increased discussion based learning, introduced aggravating factors in theoretical lessons, and specified scenario-based training.
- Added Annex 3: Manual handling risk assessment (aggravating factors)
- FAW module: may now be delivered as combined FAW and FAWR course, increased discussion based learning, and specified scenario-based training. Technical term fire gases implemented (instead of smoke), instruction in dry chemical extinguisher specified (reduced) to taxonomy level “explain”
- WaH module: anchor point specified to minimum 6.75 meters, always ensuring that safe distance is available for fall arrester to work.

Major layout work:

All common administrative elements now only in general sections of standard and deleted from each of the module descriptions.

- Templates for Control Measures and Medical Self-assessment forms supplied as Annex 1+2 supplied
- Specific requirements to trainer/participant ratio, equipment and performance criteria remain in modules

Module learning outcomes and lesson elements merged into “detailed description".

Amendment date	Version	Approved by & date	Description of changes
	9		

General

Individual module update versions on front page of standard removed. Participant prerequisites

Added prerequisite for Participant to possess a personal WINDA ID and provide it to the Training Provider prior to completing the course.

All sections

Changed certification requirement from issuing a certificate to instead upload a record of training to WINDA.

Changed requirement from handing out certificates to Participants to instead ensure that Participants have provided their WINDA ID.

Validity Period

Changed text to include uploading of records to WINDA Entire document

Switched logo to new GWO logo

Left the date field in the medical self-check forms blank.

Amendment date	Version	Approved by & date	Description of changes
MARCH 2016	8	GWO SC 15.03.2016	

Introduction

Updated the requirements for renewal of certificate. first aid Module

Corrected numerical error in point 3.3

Amendment date	Version	Approved by & date	Description of changes
DECEMBER 2015	7		Introduction • Removed certification requirement 3 “Type of equipment used in the course and maximum training height (BST Working at Heights Module only)” in Working at Height module. Removed due to RUK alignment. • Consequence of expired certificates added under Validity period. Working at Heights Module • Removed certification requirement 4 from point 3.3 “Type of equipment used in course and maximum training height”. Removed due to RUK alignment. • Removed part of the note in point 3.3 WaH module saying “However, a climb to a higher height than the minimum height stated in this Standard can be an indicator of the Participant’s capability and aptitude to work at heights. The maximum height used during the training must be stated on the certificate”. Removed due to RUK alignment. Sea Survival Module Alignment with updated requirements set by UK Health and Safety Executive for boat transfers: • Section 1.5: Objective (3) added • Section 1.6: Lesson 3, Lesson 4, Lesson 5, Lesson 9 and Lesson 10 altered • Section 1.9: Element 3.2, Element 4.1 and Element 4.2, Element 5.1, Element 9.2, Element 9.3, Element 10.1, Element 10.2 altered • MES (Marine Evacuation system) added to List of abbreviations • Removal of Safe Transfer from Vessel to Vessel exercise due to too high risk while practicing (current objective 4 altered and previous Element 5.6 and 10.3 deleted) • Validity reduced to 24 months (Section 3.2) Equipment for easy detachment added (Section 2.6) Equipment for easy detachment added (Section 2.6)

Amendment date	Version	Approved by & date	Description of changes
12.03.2014	6	GWO SC 27.03.2014	• Appendix and Change Log

- Appendix removed. Change Log moved from the end to the beginning of this document after the title page.

Working at Heights Module

- 1.1: Length of Working at Height course corrected from 8 hours to 16 hours.
- 1.6: Lesson 1 Introduction. The word “Refresher” removed.
- 2.6: Equipment. The version years are removed from the safety/equipment standards. The reason for this is that there are many standards that are frequently updated. Updating all of these standards with their new versions will require lots of work. If no years are mentioned, the newest version of the equipment standard will always prevail.

Entire GWO Basic Safety Training Standard Document (All Modules)

Small corrections to spelling, grammar, styles and tables (no meanings of sentences have been changed)

Amendment date	Version	Approved by & date	Description of changes
21.11.2013	5		Entire GWO Basic Safety Training Standard Document (All Modules) • Participant prerequisites corrected for each Module (Section 1.3) Physical demands corrected for each Module (Section 1.4)

Amendment date	Version	Approved by & date	Description of changes
04.11.2013	4		Entire GWO Basic Safety Training Standard Document (All Modules) • Spelling, grammar corrected (no meanings of sentences have been changed), format corrected • Participant prerequisites updated for each Module (Section 1.3) • Physical Demands updated for each Module (Section 1.4) • Added Appendix 1A to each Module (GWO’s suggestion for Medical Self-Assessment) Working at Heights Module Information about Certification (EN, ANSI, etc.) has been added for equipment list for module (Section 2.3, p. 144)

Amendment date	Version	Approved by & date	Description of changes
17.06.2013	3		Entire GWO Basic Safety Training Standard Document • Draft of Version 3 finalised • All sections updated with current information Small changes in document layout, writing corrections included

Amendment date	Version	Approved by & date	Description of changes
22.01.2013	2		Entire GWO Standard Document • Date of birth removed from GWO course certificates • Change log is now in an Appendix at the end of the GWO Standard document • Change in requirements for medical certificates for GWO courses. Now, with exception of Sea Survival, Participants may participate in a course as long as they present a physician's medical certificate prior to the end of the course Change in document layout and some language, grammar, spelling and writing corrections

Amendment date	Version	Approved by & date	Description of changes
15.07.2012	1	GWO SC 30.07.2012	Module Manual Handling • Records It has been added min. 5 years Module Fire Awareness • 1.8 Timetable 10 min. have been added to practice and scenario-based training. Total time is now 210 min. • Control Measures have been corrected

- Records

Added min. 5 years

Module Working at Height

- 1.7 Participant performance assessment

The section has been rewritten

- Equipment

Harness according to EN361/358 or EN 813/361/358 Slings EN566 according to minimum 795-B

Anchor points according to EN795A

- Records

Added min. 5 years

Carabiner EN362 has to have an automatic locking system Control Measures have been corrected

Module Sea Survival

- 1.7 Participant performance assessment

The section has been rewritten

- Records

Added min. 5 years

Control Measures have been corrected