# GLOBAL WIND ORGANISATION TRAINING STANDARD

Basic Safety Training (BST) (Onshore/Offshore)

> Version 13 October 2019



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# 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 <sub>2</sub>	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
ILCOR	International Liaison Committee on Resuscitation
LSA	Life Saving Appliances
PLB	Personal Locating Beacon
MES	Marine Evacuation Systems
МОВ	Man Over Board
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
MAC	Manual handling Assessment Chart
WTG	Wind Turbine Generator

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# 2 TERMS AND DEFINITIONS



Term	Definition
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
Must	For clarity where the word must is used in this standard it shall have the same meaning as shall
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
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 prevention	Preventing the user of a personal fall protection system from going into a free fall
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
Restraint system	Personal fall protection system which prevents the user from reaching zones where the risk of a fall from height exists
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
Fall arrest system	Personal fall protection system which limits the impact force on the body of the user during fall arrest
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
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.

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# 3 CHANGE LOG

Amendment Date	Approved by & date
Version	Description of changes

Amendment Date	Sept 2019	Approved by & date	GWO TC Sept 2019
Version	13	Description of changes	

#### October 2019 – minor corrections

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.

#### 2019 - Working at Heights & Manual Handling Review

- Working group to combine the two modules. Therefore, V13 of BST has 6 modules.
- Insertion of new module 5 "Working at height and manual handling combined"
- Comprehensive review of both manual handling and working at height 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.

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#### **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 heights 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 Delegate performance assessment form

- Name changed from "Control Measures".
- Wording updated to use delegate 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

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e.g. 1.1 Aims and objectives of the BST fire awareness module becomes subsection 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 subsection 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 height & 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

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- 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 Delegate 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.

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#### Working at height changes

#### 12.3 – Working at heights instructor to delegate 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 inline 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.

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- 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.

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- 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 height & Manual handling combined

 New module combining the lessons and elements of manual handling into the working at heights training.

Amendment Date	April 1 2019	Approved by & date	GWO TC 20.03.19
Version	12	Description of changes	

#### 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

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Amendment Date	September 10 2018	Approved by & date	GWO SC on September 20, 2018			
Version	11	Description of change	S			
Sea Survival review	1					
Duration change						
- Course reduced	l from 1½ day o	duration to 1				
Primarily by moving t	heory elements	into the practical element	ts.			
Overall changes						
Elements moved and	integrated					
<ul> <li>Element 8.1/8.</li> <li>Element 9.1,9.3</li> <li>Element 5.1,5.3</li> <li>Element 6.1 modeling</li> <li>Element 10.1,1</li> </ul>	2 moved to Les 2,9.3,9.4,9.5,9. 2,5.3,5.4,5.5 m oved to Lesson 0.2,10.3 - 5.3,5	son 5 6 and 3.1,3.2,3.3,4.1 and oved to Lesson 7 8 5.4,5.5 and 7.1 into Lesso	l 8.2 moved to Lesson 6 on 9			
Element specific chan	<u>ges</u>					
<ul> <li>Updated: Addee</li> <li>Updated: 1.1, a</li> <li>Updated: 1.2, a</li> <li>Updated: 1.3, 7</li> <li>Updated: 1.5, t</li> <li>Updated: Lessa</li> <li>"demonstrate"</li> <li>Updated: Lessa</li> <li>"demonstrate"</li> <li>Updated: Lessa</li> <li>Updated: Lessa</li> <li>Updated: Lessa</li> <li>Updated: 3.4, a</li> <li>due to the topia</li> <li>Updated: 4.1.3</li> <li>Updated: 5.1, t</li> <li>Furthermore, it</li> <li>Updated: 6.2.1</li> <li>updated: 6.2, a</li> <li>Updated: 6.2, f</li> </ul>	<ul> <li>Element specific changes</li> <li>Updated: Added new introduction Lesson, aligning with latest developed standards</li> <li>Updated: 1.1, added referral to G+ guidelines alignment</li> <li>Updated: 1.1, Aims &amp; Objectives wording</li> <li>Updated: 1.2, duration section to 2x4 hours</li> <li>Updated: 1.3, Trainer - Delegate Ration, practical to 1:4</li> <li>Updated: 1.5, time table to reflect the 1-day duration setup</li> <li>Updated: Lesson 3, Learning objectives. Drowning content was changed from "demonstrate" to "explain" to reflect the theory perspective of the lesson</li> <li>Updated: Lesson 3, Learning objectives. Hypothermia level changed from "various steps" to "symptoms" due to details being covered in first aid</li> <li>Updated: 3.4, drowning. Changed from "Explain" and "demonstrate", to "explain" due to the topic being covered in first aid</li> <li>Updated: 4.1.3, added "Correct pre-use check" based on survey feedback</li> <li>Updated: 5.1, the instructor must now only "explain" and not "demonstrate". Furthermore, it is now SAR operation and not organisation</li> <li>Updated: 6.2.1, added "Including different types of evacuation, by use of equipment or manual evacuation" to make it more precise</li> <li>Updated: 6.2, changed "safe" to "controlled"</li> <li>Updated: 6.2, first aid elements removing "various" to make it more precise</li> <li>Updated: 6.2.10, from "safe" to "controlled"</li> </ul>					
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- 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 "delegates 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 delegate 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 delegate
- 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 emphasize 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, Delegates shall demonstrate Helicopter rescue from water as demonstrated by staff" as it is deemed sufficient that the delegates 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	May 31 2017	Approved by & date	Approved by GWO SC on April 27		
Version	10	Description of changes			
Content	Content				
<ul> <li>New intro "Scope" replaces "Foreword and Editorial"</li> </ul>					
<ul> <li>General section: Target group detailed to "personnel working in a wind turbine environment"</li> </ul>					

- 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, 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, 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:

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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/delegate ratio, equipment and performance criteria remain in modules

Module learning outcomes and lesson elements merged into "detailed description".

Amendment Date		Approved by & date					
Version	9	Description of changes	5				
General	General						
Individual module upo	late versions on	n front page of standard re	emoved.				
Delegate prerequisites	5						
Added prerequisite for Training Provider prior	Added prerequisite for Delegate to possess a personal WINDA ID and provide it to the Training Provider prior to completing the course.						
All sections							
Changed certification training to WINDA.	Changed certification requirement from issuing a certificate to instead upload a record of training to WINDA.						
Changed requirement Delegates have provid	from handing c led their WINDA	out certificates to Delegate A ID.	es to instead ensure that				
Validity Period							
Changed text to inclue	Changed text to include uploading of records to WINDA						
Entire document							
Switched logo to new GWO logo							
eft the date field in the medical self-check forms blank.							

Amendment Date	.03.2016	Approved by & date	GWO SC 15.03.2016
Version	8	Description of changes	
Introduction			

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Updated the requirements for renewal of certificate.

First Aid Module

Corrected numerical error in point 3.3

Amendment Date	01.12.2015	Approved by & date	
Version	7	Description of change	S

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 Heights 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 moduel saying "However, a climb to a higher height than the minimum height stated in this Standard can be an indicator of the Delegate'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)

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A	mendment Date	12.03.2014	Approved by & date	GWO SC 27-03-2014	
Ve	ersion	6	Description of changes		
•	Appendix and Chai	nge Log			
•	<ul> <li>Appendix removed. Change Log moved from the end to the beginning of this document after the title page.</li> </ul>				
W	orking at Heights M	odule			
•	1.1: Length of Working at Heights 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.				
Er	Entire GWO Basic Safety Training Standard Document (All Modules)				
Sr be	Small corrections to spelling, grammar, styles and tables (no meanings of sentences have been changed)				

Amendment Date	21.11.2013	Approved by & date		
Version	5	Description of changes		
Entire GWO Basic Safety Training Standard Document (All Modules)				
<ul> <li>Delegate prerequisites corrected for each Module (Section 1.3)</li> </ul>				
Physical demands corrected for each Module (Section 1.4)				

Amendment Date	04.11.2013	Approved by & date		
Version	4	Description of changes		
Entire GWO Basic Safety Training Standard Document (All Modules)				
<ul> <li>Spelling, grammar corrected (no meanings of sentences have been changed), format corrected</li> </ul>				



- Delegate 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	17.06.2013	Approved by & date	
Version	3	Description of changes	S
Entire GWO Basic Safe	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	22.01.2013	Approved by & date	
Version	2	Description of changes	5

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, Delegates 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	15.07.2012	Approved by & date	GWO SC 30-07-2012	
Version	1	Description of changes		
Module Manual Handling				

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#### Records

It has been added min. 5 years

Module Fire Awareness

• 1.8 Timetable

 $10\ {\rm min.}\ {\rm have}\ {\rm been}\ {\rm added}\ {\rm to}\ {\rm practise}\ {\rm and}\ {\rm scenario-based}\ {\rm training.}\ {\rm Total}\ {\rm time}\ {\rm is}\ {\rm now}\ 210\ {\rm min.}$ 

- Control Measures have been corrected
- Records

Added min. 5 years

Module Working at Heights

• 1.7 Delegate 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

Karabiner EN362 has to have an automatic locking system

Control Measures have been corrected

Module Sea Survival

• 1.7 Delegate performance assessment

The section has been rewritten

Records

Added min. 5 years

Control Measures have been corrected

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# 4 SCOPE

The Global Wind Organisation (GWO) is an association of Wind Turbine owners and manufacturers with the aim of supporting an injury-free work environment in the wind industry. An objective of GWO is to develop common industry training and best practice Standards for health and safety as a vital and necessary way forward to reduce risks for personnel in the wind industry working on site and to reducing environmental risks across Europe and the globe.

This Standard has been developed in response to the demand for recognizable Basic Safety Training (BST) 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 pertaining to the installation, service and maintenance of wind turbine generators and wind power plants.

This Standard describes the requirements for **Basic Safety Training** courses that are recommended by the members of GWO.

The full standard covers 6 modules:

- 1) First Aid
- 2) Manual Handling
- 3) Fire Awareness
- 4) Working at Height
- 5) Working at & Manual Handling combined
- 6) Sea Survival

The members of the Global Wind Organisation (GWO) recognize 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 work situation where they as duty-holders are accountable for safety. Training is verified through the GWO database WINDA.

Where national legislation sets higher requirements for the specific training, the Training Provider shall incorporate these requirements into the training program.

Additional training may be required for company or country specific reasons.

This standard has been developed by the GWO Training Committee. Disputes and potential non-conformities should be brought to the attention of the GWO Audit and Compliance Committee.

The standard has been approved by the GWO executive committee.

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# 5 GENERAL REQUIREMENT TO GWO BASIC SAFETY TRAINING

Upon completion of the Global Wind Organisation (GWO) Basic Safety Training (BST) Delegates will 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 Delegates with important skills, which include Fire Awareness, First Aid, Working at Heights and Manual Handling. To enable Delegates to work in the offshore environment, an additional GWO Sea Survival training shall be completed.

### 5.1 Overview

The GWO Basic Safety Training is divided into the following 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
- **Note:** Module 5 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 2 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 delegate 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 an offshore wind structure.

Personnel that performs job functions that has 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.

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# 5.3 Aims and objectives

This BST Training shall enable Delegates 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 Conformity with other Training

The GWO BST standard sets out minimum requirements.

The modules, learning objectives, lessons and elements may be delivered in the order that fits best for the specific training situation.

Provided the minimum requirements of the BST are met the Training Provider may choose to incorporate delivery of other similar certified training.

### 5.5 Legal requirements

The Training Provider shall identify whether national legislation sets additional requirements for Basic Safety Training or prohibits delivery of certain elements.

If so, the Training Provider shall incorporate these identified requirements in the training.

# 5.6 Duration of BST Modules

The total contact time for completing the stand-alone modules in this basic safety training standard is estimated to be **40 hours**. This is based on the time estimates given in the module timetables and summarised in table 5-6 below.

The training provider must not exceed the times per day given in table 5-7 below.

The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to the modules of the basic training standard in a way that is constructive for the entire class.



Modules	Duration
First Aid	13 hours 20 minutes
Manual Handling	3 hours 35 minutes
Fire Awareness	3 hours 20 minutes
Working at Heights	13 hours 25 minutes
Working at height & Manual handling combined	14 hours 50 minutes
Sea Survival	6 hours 40 minutes

Table 5-6 - Duration of the GWO BST Modules

	Maximum duration per day
Contact time	8 hours
Total training day	10 hours

Table 5-7 - Maximum durations for training days

**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).

Within the module timetables, approximate duration 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.

### 5.7 Validity period

The Basic Safety Training Modules are valid for the period stated in the table 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 certificate's 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.

A Delegate is only allowed to attend a refresher course in the specific Training Module prior to the date of expiry on the current certificate or training records.

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If a certificate or training record is expired, the Delegate must attend the full Basic Safety Training Module(s) to obtain a new training record.

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

Course/Modules	Certificate Validity (Months)
First Aid	24
Manual Handling	24
Fire Awareness	24
Working at Heights	24
Working at height & Manual handling combined	24
Sea Survival	24

Table 5-7 - GWO BST Certificate validity periods

### 5.8 Delegate prerequisites for the BST

All personnel participating in Basic Safety Training shall be medically fit and capable of fully participating.

Training providers shall have a procedure that requires Delegates to sign a statement stating that they are medically fit to participate in the safety training and that they do not suffer from any medical illness or are under influence of any narcotic substance or alcohol. The Annex 2: Medical Self-Assessment Form shall be used if no other equivalent procedure is in place.

Delegates' signatures testifying to their medical fitness shall be collected prior to the start of the basic safety training course.

Furthermore, Delegates shall have created a personal Delegate profile in WINDA and provide their own WINDA ID prior to completing the BST training.

### 5.9 Physical demands

BST Modules may potentially be physically demanding.

If there is any doubt regarding the medical fitness of any Delegate, the Training Provider shall stop training the Delegate and seek a physician's advice.

**Note:** Practical exercises shall be designed and delivered solely to meet this Standard and shall not place any physical or mental demands on the Delegates other than those required to meet this Standard.

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# 6 GENERAL RESOURCES REQUIRED TO DELIVER BST MODULES

The Training Provider shall ensure that Staff, facilities and equipment are in place to support the training of Delegates.

### 6.1 Staff

Training Staff shall possess appropriate qualifications and experience to ensure that all training and supportive activities are carried out in accordance with current legislation e.g. First Aid Instructors need to be certified First Aid Instructors according to national legislation and/or recommended guidelines.

Training Staff shall be:

- 1) Trained in instructional/ lecture techniques and/ or have documented instructional/ teaching experience.
- 2) Included in an on-going training programme, which includes visits to onshore and/ or offshore WTGs (tower, nacelle, hub) prior to instructing BST Modules, to enable them to maintain and update skills related to the BST Modules they instruct. Training Staff shall physically visit the tower, nacelle and hub of WTGs.

A person with First Aid qualifications shall be present during all practical training.

All Staff shall possess the appropriate competencies to conduct/ assist the elements of training they have been assigned to.

# 6.2 Facilities and Equipment

The full range of facilities and equipment relevant to the modules delivered shall be available during the training. The following facilities criteria shall be adhered to.

# 6.3 Theory training facilities

Facilities shall be designed to enable each Delegate to see, hear and fully participate in the taught subject matter.

# 6.4 Practical training facilities

All facilities shall be maintained and where appropriate, inspected and tested in accordance with current national legislation and manufacturers' recommendations.

Risk assessments shall be conducted and documented for all training facilities. The Training Provider shall hold the required permits to operate the facilities.

The learning process is facilitated by identical or comparable elements comparing the training environment and the delegates' working environment. Identical or comparable elements enhances the application of what is learned.

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The practical training facilities and a training environment are expected to incorporate as many identical or comparable elements to a real wind turbine working environment as possible.

The objective is that the practical training facility should enable each Delegate to individually and/or as part of a team, see, hear and practice the taught subject matter in such a way, that it resembles the working practices in a real wind turbine environment.

The facilities shall enable training to be executed by doing relevant work tasks end-toend under realistic simulated working procedures, and/or realistic simulated emergency situations (fire, first aid, evacuation or casualty rescue) end-to-end scenarios in a real or simulated wind turbine environment.

# 6.5 Training Equipment

The equipment required for the delivery of the BST modules is shown in Annex 3.

The required equipment for training shall be available and shall fulfil national legal requirements.

The equipment shall be maintained, inspected and tested in accordance with current national legislation and manufacturers' recommendations. Risk assessments shall be conducted and documented for all training equipment. The Training Provider shall hold the required permits to operate relevant equipment.

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# 7 UNDERSTAND GWO LEARNING OBJECTIVES

The described learning objectives (expected learning outcome) are the foundation of the course contents and what the delegate performance assessment must be based upon.

Traditionally learning objectives are prepared within three different domains of learning – knowledge, skills and attitude. A learning objective describes the expected learning outcome on completion of a module or a course, within one or more learning domains.

If a learning objective is related to more than one domain of learning, e.g. to knowledge *and* skills, one learning objective per learning domain is often prepared – to enable a better understanding of the learning objective.

The GWO Training Provider may apply teaching methods (didactics) that are appropriate to the course participants prior training, education and cultural backgrounds, but should always aim to provide course participants ample possibility to perform hands-on demonstrations and learning reflection.

# 7.1 Taxonomy

To formulate a measurable learning objective, taxonomy is used to describe the *level* of expected learning outcome within a learning domain.

As an example, belonging to the learning domain of knowledge, to have a delegate *name* or **recognize** something, as oppose to have him **explain** it in his own words, or even *apply* or **demonstrate** what he has learned – describes different performance levels, i.e. different taxonomy levels.

Different taxonomies are associated with different learning domains, for instance:

Knowledge: such as Bloom's "cognitive taxonomy"

• Intellectual knowledge, mental skills and procedures

*Skills*: such as Simpson's "psychomotor taxonomy"

• Physical skills, cognitive controlled and observable

Attitude: such as Krathwohl's "affective taxonomy"

Attitude and feelings to the learning

Selecting a suitable taxonomy level, an *action verb* expresses the expected behavior of the delegate, thus describing the taxonomy level of a learning objective.

Learning objectives in this standard are followed by an indication of the taxonomy level and domain in brackets e.g. (L3 – Skill)

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	Knowledge	Skills	Attitude
3	Application / Applying To use in a new situation.	Guided response Follows instructions to build a	Value Demonstrates belief in the
	Solving problems by applying acquired knowledge, facts, techniques and rules in a different way. Applying a procedure to a familiar or unfamiliar task. Using a manual to calculate and operate. <b>Action verbs:</b> Apply, Change, Choose, Compute, Demonstrate, Modify, Operate, Practice, Prepare, Schedule, Solve, Write.	model. Using a tool after observing an expert demonstrate how to use it. Be able to demonstrate an activity to other learners. Can complete the steps involved in the procedure as directed. <b>Action verbs:</b> Accomplish, Achieve, Calibrate, Complete, Control, Demonstrate, Perform, Refine, Show.	company described process. Shows the ability to solve problems. Informs management on matters that one feels strongly about. Decide worth and relevance of ideas and tasks. <b>Action verbs:</b> Argue, Challenge, Confront, Complete, Debate, Criticize, Justify, Join, Propose.
2	Comprehension / Understanding Construct a meaning from instructional messages, including oral, written and graphic communication. Demonstrating basic understanding of facts and ideas. Explain in your own words the steps of performing a complex task. Action verbs: Classify, Distinguish, Estimate, Explain, Express, Give, Illustrate, Indicate, Locate, Predict, Summarize, Translate.	Set Awareness or knowledge of the ability needed to use the skill. Carry out tasks from verbal or written instructions. Showing eagerness to assemble components to complete a task. Knows and acts upon a sequence of steps in a process. Action verbs: Access, Build, Complete, Conduct, Execute, Implement, Operate, Perform, Recreate.	<b>Respond</b> Completing work assignments with highly respect to the agreement. Participating in team problem solving activities. Questions new ideas and concepts in order to fully understand them. Participate actively and respectful in discussions. Showing enthusiasm. <b>Action verbs:</b> Assist, Contribute, Discuss, Present, Question, Report, Respond, Tell, Write.
1	Knowledge / Remembering Memory of facts, terminology, rules, sequences, procedures, etc. Locating knowledge in long- term memory and retrieving relevant knowledge from long- term memory. Action verbs: Arrange, Define, Describe, Find, Identify, List, Name, Outline, Recognize, Relate, Recall, Retrieve.	Perception Watch instructor and repeat action, process or activity. Recognizing sounds or pictures that indicate certain functionalities. Estimate the event of a certain function and be prepared for it. Action verbs: Attempt, Copy, Duplicate, Follow, Organize, Repeat, Sketch, Replicate, Reproduce.	Receive Listening to discussions of controversial issues with an open mind. Respecting the rights of others. Listen to others and remember their opinions. Be positive and creative to what is being taught. Action verbs: Ask, Be open to, Concentrate, Discuss, Focus, Follow, Listen, Reply Take part

Table 7-1 - Learning domains with taxonomy level 1-3 Used by GWO.

**Note:** Higher taxonomy levels exist.

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# 8 ADMINISTRATION AND CERTIFICATION OF BST MODULES

### 8.1 Administrative arrangements

Appropriate for the enrolment and certification of Delegates and all aspects of the delivery of training shall be in accordance with this Standard.

### 8.2 Delegate performance assessment

Delegates shall be assessed according to the learning outcomes by means of direct observation and oral and/or written questions, where appropriate.

Training Providers shall have a documented procedure in place for dealing with Delegates not meeting the stated learning outcomes.

# 8.3 Requirement to upload training record in WINDA

Training Providers are responsible for uploading a record of training to WINDA, the GWO online database of training records. This must be done as soon as possible and no later than 10 working days after completion of the training program.

Each record shall contain the following:

- 1) Delegate's WINDA ID
- 2) Course code
- 3) Course completion date

#### **Course codes:**

Module	Course Code	
First Aid	FA	
Manual Handling	МН	
Fire Awareness	FAW	
Working at Height	WAH	
Sea Survival	SS	

Table 8-3 - GWO BST Module course codes

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

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# 8.4 Training Providers own Records and Certificates issue

The Training Provider shall in accordance with the criteria for Training Provider maintain own records of Delegates.

Upon request from GWO or any of the members of GWO, the Training Provider shall be able to verify the training and competence records of any specific personnel either attending a course and/or performing training of a course by name and nationality.

Training providers may issue other additional proof of training, e.g. as paper certificate or plastic cards. If the training provider chooses to do so, it is recommended (not a requirement) to include the delegate WINDA id.

# 8.5 Delegate performance assessment form

An example delegate performance assessment form is provided in Annex 1. The Training Provider may adapt the Control Measures Form to other media.

The Trainer keeps a delegate performance form (or adaptation) for each delegate until the completion / evaluation of the BST Module.

The delegate performance assessment form (or adaption) is a final evaluation tool for the instructors to assess Delegates during practical elements. It allows measurement of the number of violations in regard to safety, competency, or attitude.

It shall be used as a progressive evaluation tool to discuss the performance of a Delegate in guiding them to success and it also serves as supporting documentation if a Delegate passes or fails the Module. If a Delegate fails to meet the demands of the BST module, they shall attend a new BST Module.

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# 9 BST MODULE 1 - FIRST AID

# 9.1 Aims and objectives of the BST First Aid Module

The aim of this BST Module is to enable delegates to administer safe and effective First Aid in the wind turbine industry/ WTG environment, in accordance with GWO First Aid training through theoretical and practical training.

Furthermore, this training will enable the delegate to perform cardiopulmonary resuscitation (CPR) and use an automated external defibrillator (AED).

The BST First Aid Module shall ensure that:

- The Delegates are able to demonstrate understanding of the importance of carrying out First Aid in a safe and sound manner, in accordance with the legislative requirements of their geographic location and according to the International Liaison Committee on Resuscitation (ILCOR) hereunder the European Resuscitation Council (ERC) and American Heart Association (AHA) guidelines (L2 - Knowledge)
- The Delegates are able to identify and explain normal function, normal signs and symptoms of injuries and illness related to the human body (L1 – Skills & Knowledge)
- The Delegates are able to demonstrate understanding and correct order of management in an emergency situation in a Wind Turbine Generator (WTG) environment (L3 – Skills & Knowledge)
- The Delegates are able to demonstrate correct use of lifesaving First Aid using the Primary Survey "C" - A - B - C including the use of an Automatic External Defibrillator (AED) (L3 - Skills)
- The Delegates are able to demonstrate correct use of the Secondary Survey (L3 Skills)
- The Delegates are able to demonstrate correct use of Primary and Secondary Survey including the use of First Aid equipment in a First Aid scenario (L3 -Skills)

# 9.2 Duration of the BST First Aid Module

The total contact time for completing this first aid module is estimated to be 13 hours and 20 minutes. This is based on the time estimate given in the module timetable.

The training provider must not exceed the times per day given in table 9-2 below.

The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to first aid in a way that is constructive for the entire class.

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	Maximum duration per day		
Contact time	8 hours		
Total training day	10 hours		

Table 9-2 - 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 First Aid Instructor to Delegate Ratio

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

The ratio shown for practical sessions indicates the maximum number of Delegates to be supervised by one instructor during each activity.

Module	Session	Instructor to Delegate Ratio
DCT First Aid	Theory	1:12
BST FIRST AID	Practical	1:6

 Table 9-3 - GWO First Aid module Instructor to delegate ratio

# 9.4 Equipment for First Aid Module

The equipment required for training as listed in Annex 3 must be available and must fulfil national legal requirements as listed in table A3-1 in annex 3 where applicable.

# 9.5 First Aid Module Time Table

The order in which the elements of this BST training Module are delivered may vary.

Within the module timetables, approximate duration 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.

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Lesson		Element		Approx. 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	On-going assessment (Control Measures)	
		1.6	Motivation	
			TOTAL	15 min.
2	Legislation/Risks/Hazards	2.1	2.1 Risks and hazards	
		2.2	2.2 First Aid guidelines	
		2.3	National legislation	
		2.4	Global legislation	
			TOTAL	25 min.
3	Anatomy	3.1	Life conditions for the human body	
		3.2	Structure, functions and signs - the human body	
		3.3	Serious and minor illness - signs symptoms and function	
		3.4	3.4 Use of anatomy and First Aid in emergency situations	
TOTAL 50 min.				
4	Management of an incident	4.1	Safety awareness in an emergency situation	
		4.2	Management of an incident	
		4.3	Emergency Rescue Teams	
	-	r	TOTAL	50 min.
5	Lifesaving First Aid using	5.1	Primary Survey "C"-A - B - C	
	("C"-A - B - C)	5.2	"C" Critical bleeding	
		5.3	Technical specifications of an AED	
		5.4	AED safety procedures	
		5.5	Correct use of an AED	
		5.6	Unresponsive	


		5.7	Unresponsive, not breathing	
		5.8	CPR	
		5.9	Obstruction of airways	
		5.10	Bleeding, internal and external	
		5.11	Shock	
		-	TOTAL	250 min.
6	Secondary survey	6.1	Secondary survey	
		6.2	First Aid - different incidents types	
		6.3	Deterioration of incidents	
		6.4	Psychological First Aid	
		-	TOTAL	110 min.
7	Scenario-based training	7.1	Practise First Aid techniques	
		-	TOTAL	285 min.
8	Evaluation	8.1	Summary	
		8.2	Evaluation	
		8.3	Training records	
			TOTAL	15 min.
			GRAND TOTAL	800 min.

Table 9-5 - GWO First Aid Module timetable

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### 9.6 Detailed description of the First Aid module

The learning outcomes specified for the First Aid Module are:

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

### Lesson 1 - INTRODUCTION

15 min.

The aim of this lesson is to give the Delegates the needed awareness of the of the course content and the facilities involved in order to ensure that all Delegates are aware of what to expect and what is expected of them during the course.

To successfully complete this lesson of the BST Module, Delegates shall be aware of:

- 1) Safety instructions and emergency procedures
- 2) Facilities
- 3) Who the instructor and other Delegates are
- 4) Aims and main learning objectives
- 5) On-going assessment according to GWO Control Measures
- 6) Motivation for the course

#### ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Training Staff shall **explain**:

- 1.1.1 Safety instructions according to internal procedures
- 1.1.2 Emergency procedures and emergency exits in the localities the Delegates can be expected to be located during the course

#### ELEMENT 1.2 - FACILITIES

Training Staff shall:

1.2.1 Explain general description of the facilities on the location (Administration, dining area, restrooms, toilets, etc.)

#### ELEMENT 1.3 - INTRODUCTION

Training Staff shall:

1.3.1 Give a short introduction, including their backgrounds as instructors

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Delegates shall:

1.3.2 Give a short introduction, including job function and expected primary geographic work location

Training Staff shall:

1.3.3 Explain the programme of the BST Module, including breaks and meal times

ELEMENT 1.4 - SCOPE AND MAIN OBJECTIVES

Training Staff shall:

1.4.1 Explain the Scope and main objectives of this BST Module

#### **ELEMENT 1.5 - ON-GOING ASSESSMENTS**

Training Staff shall:

- 1.5.1 Explain the reasons for the on-going assessment
- 1.5.2 Explain the GWO Control Measures and their use

#### **ELEMENT 1.6 - MOTIVATION**

Training Staff shall:

- 1.6.1 Explain the importance of personal involvement in the course
- 1.6.2 Explain the definition and need for correct First Aid
- 1.6.3 Explain the chain of survival

### Lesson 2 - RISKS / HAZARDS / LEGISLATION

25 min.

The aim of this lesson is to give the Delegates the needed awareness and to inform them of the relevant risks/hazards/legislation and demands in order to ensure their knowledge of the roles, responsibilities and rules that apply to First Aid.

To successfully complete this lesson of the BST Module, Delegates shall be able to:

- 1) Explain risks and hazards relating to First Aid in a WTG environment (L2 Knowledge, Attitude)
- 2) Summarize national legislation relevant to First Aid (L2 Knowledge)
- 3) Explain different First Aid guidelines ILCOR e.g. ERC and AHA (L2 Knowledge)

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4) Recognise global legislation - the differences in international regulations between countries relevant to First Aid (L1 - Knowledge)

#### ELEMENT 2.1 - RISK AND HAZARDS

Training Staff shall lead the group discussion on:

- 2.1.1 Risks and hazards involved in an incident relevant for job functions within the wind industry:
  - a. Site organisation and types of units on a site
  - b. Onshore
  - c. Offshore

#### **ELEMENT 2.2 - FIRST AID GUIDELINES**

#### Training Staff shall:

2.2.1 Explain different Basic Life Support guidelines e.g. from ERC and AHA.

#### **ELEMENT 2.3 - NATIONAL LEGISLATION**

Training Staff shall:

- 2.3.1 Explain applicable legislation
- 2.3.2 Explain legislative requirements
- 2.3.3 Explain legal responsibilities
- 2.3.4 Explain the role of First Aid in the industry.

#### **ELEMENT 2.4 - GLOBAL LEGISLATION**

Training Staff shall:

- 2.4.1 Explain Differences in national regulations between countries
- 2.4.2 Explain Applicable legislation
- 2.4.3 Explain Legal responsibilities.

### Lesson 3 - ANATOMY

#### 50 min.

The aim of this lesson is to give the Delegates basic knowledge and skills regarding the human body in order to support the primary and secondary survey. Delegates will

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be able to identify and explain normal function, normal signs and signs, functions and symptoms of injuries and illness related to the human body.

To successfully complete this lesson of the BST Module, Delegates shall be able to **demonstrate**:

- 1) Understanding of life conditions for the human body (L2 Knowledge)
- 2) Knowledge of the structure, functions and signs of the human body (Level 2 Knowledge)
- 3) Knowledge and skills for detecting abnormal signs, symptoms and functions of injuries (Level 2 Skills & Knowledge)
- 4) Knowledge and skills for detecting abnormal signs and symptoms of illness related to the human body (Level 2 Skills & Knowledge)
- 5) Understanding of anatomy and First Aid in emergency situations (Level 2 Knowledge, Attitude)

#### ELEMENT 3.1 - LIFE CONDITIONS FOR THE HUMAN BODY

Training Staff shall:

- 3.1.1 Explain normal life conditions for the human body
  - a. Human cells and life conditions
  - b. Cells and oxygen (O<sub>2</sub>)
  - c. Cells and carbon dioxide (CO<sub>2</sub>)

#### ELEMENT 3.2 - STRUCTURE, FUNCTIONS AND SIGNS - THE HUMAN BODY

Training Staff shall:

- 3.2.1 Explain and demonstrate vital systems of the human body
  - a. Nervous system
  - b. Respiratory system
  - c. Circulatory system
  - d. Other systems

Nervous system

- a. Anatomy of the nervous system
- b. Structure, functions and normal signs
- c. Threats to the nervous system

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Respiratory system

- a. Anatomy of the respiratory system
- b. Structure, functions and normal signs
- c. Threats to the respiratory system

#### Circulatory system

- a. Anatomy of the circulatory system
- b. Structure, functions and normal signs
- c. Threats to the circulatory system

#### Blood filled organs

- a. Placement of kidneys, liver and spleen
- b. Effects of injury of the organs

#### ELEMENT 3.3 - SERIOUS INJURIES - SIGNS, SYMPTOMS AND FUNCTION

Training Staff shall:

- 3.3.1 Explain and demonstrate serious injuries
  - a. Nervous system
  - b. Respiratory system
  - c. Circulatory system
  - d. Other systems

#### ELEMENT 3.4 - USE OF ANATOMY AND FIRST AID IN EMERGENCY SITUATIONS

Training Staff shall:

- 3.4.1 Demonstrate assessment of a casualty
  - a. From structure, function and symptoms to correct First Aid treatment of a casualty
  - b. Airway Breathing Circulation (A B C)

### Lesson 4 - MANAGEMENT OF AN INCIDENT

50 min.

The aim of this lesson is to give the Delegates the needed knowledge and skills to manage an incident in a wind turbine environment.

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To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Knowledge and skills for safety awareness and personal protection equipment in an emergency situation (Level 2 - Skills & Knowledge)
- 2) Knowledge and skills to manage an incident (Level 2 Skills & Knowledge)
- 3) Understanding of support from Emergency Rescue Teams in WTG environments. (Level 2 Knowledge)

# ELEMENT 4.1 - SAFETY AWARENESS AND PERSONAL PROTECTION EQUIPMENT IN AN EMERGENCY SITUATION

Training Staff shall:

- 4.1.1 Explain and demonstrate safety in an emergency situation
  - a. Appropriate safety behaviour and awareness of hazards as a First Aider in a WTG environment
  - b. Safety for all persons involved in an incident
  - c. Universal precautions (e.g. Personal Protective Equipment) against infections; protection and use of barriers in emergency situations
  - d. Moving or not moving a casualty

#### Delegates shall:

- 4.1.2 Demonstrate moving a casualty
  - a. Moving a casualty with two First Aiders
  - b. Moving a casualty alone

ELEMENT 4.2 - MANAGEMENT OF AN INCIDENT

Training Staff shall:

- 4.2.1 Explain and demonstrate managing an incident
  - a. How to follow an efficient and correct First Aid structure
  - b. Analysis and management of an incident
  - c. Different emergency situations in the wind industry
  - d. Call for help challenges onshore
  - e. Call for help challenges offshore

Delegates shall:

- 4.2.2 Demonstrate managing an incident
  - a. How to follow an efficient and correct First Aid structure

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- b. Analysis, assessment and management of an incident
- c. Different emergency situations in the wind industry
- d. Call for help challenges onshore
- e. Call for help challenges offshore

#### ELEMENT 4.3 - EMERGENCY RESCUE TEAMS

Training Staff shall:

- 4.3.1 Explain emergency Rescue Teams
  - a. Functions of Emergency Rescue Teams
  - b. Co-operation with Emergency Rescue Teams
  - c. Challenges for Emergency Rescue Team on site

### Lesson 5 - LIFESAVING FIRST AID USING PRIMARY SURVEY

250 min.

The aim of this lesson is to give the Delegates the knowledge and skills to follow a methodical sequence to establish techniques so each life-threatening condition can be identified in a priority order and dealt with on a "find and treat" basis in an emergency situation. Delegates will have the knowledge and skills to be able to use an Automatic External Defibrillator (AED).

To successfully complete this BST Module, Delegates shall be able to **demonstrate**:

- Immediate First Aid actions using Primary Survey "C" A B C (Level 3 -Skills & Knowledge)
- Detection and treatment of a causality with critical bleeding "C" (Level 3 Skills. Knowledge & Attitude)
- 3) Correct use of an AED (Level 2 Skills & Knowledge)
- 4) Correct First Aid to an unresponsive and breathing casualty (Level 2 Skills & Knowledge)
- 5) Correct First Aid to an unresponsive and not breathing casualty (Level 2 Skills & Knowledge)
- 6) Knowledge and skills regarding Cardiopulmonary Resuscitation (CPR) (Level 3 -Skills & Knowledge)
- 7) Correct First Aid for obstruction of airways (Level 2 Skills & Knowledge)
- 8) Correct First Aid for bleeding external and internal (Level 2 Skills & Knowledge)
- 9) Correct First Aid for shock (Level 2 Skills, Knowledge and Attitude)

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#### ELEMENT 5.1 - PRIMARY SURVEY "C"- A - B - C

The Instructor shall:

5.1.1 Explain the "C"- A-B-C principle

The Instructor shall:

5.1.2 Demonstrate the procedure of the primary survey

#### ELEMENT 5.2 - "C" CRITICAL BLEEDING

The Instructor shall:

- 5.2.1 Explain haemostasis of Critical/Catastrophic external haemorrhage:
- 5.2.2 Explain the threat and detection of catastrophic bleeding

The Instructor shall:

- 5.2.3 Demonstrate correct treatment of a casualty with catastrophic external haemorrhage including the use of first aid equipment:
  - a. Direct pressure
  - b. Pressure dressings

#### ELEMENT 5.3 - TECHNICAL SPECIFICATIONS OF AN AED

Training Staff shall:

5.3.1 Explain theory and technical specifications of an AED

#### ELEMENT 5.4 - AED SAFETY PROCEDURES

Training Staff shall:

5.4.1 Explain AED safety procedures

#### ELEMENT 5.5 - CORRECT USE OF AN AED

Training Staff shall:

- 5.5.1 Demonstrate correct use of an AED
  - a. Single First Aider
  - b. Two First Aiders

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#### **ELEMENT 5.6 - UNRESPONSIVE**

Training Staff shall:

- 5.6.1 Explain and demonstrate First Aid to an unresponsive casualty
  - a. Reasons for being unresponsive
  - b. Threats
  - c. Primary Survey ("C" A B C)
  - d. Recovery position single First Aider
  - e. Recovery position two First Aiders
  - f. First Aid equipment

#### Delegates shall:

- 5.6.2 Practice and demonstrate First Aid to an unresponsive casualty
  - a. Threats
  - b. Primary Survey ("C"- A B C)
  - c. Recovery position single First Aider
  - d. Recovery position two First Aiders
  - e. Use of First Aid equipment

#### ELEMENT 5.7 - UNRESPONSIVE, NOT BREATHING

#### Training Staff shall:

- 5.7.1 Explain and demonstrate First aid for unresponsive and not breathing
  - a. Reasons for being unresponsive and not breathing
  - b. Threats
  - c. Primary Survey ("C" A B C)
  - d. Performing CPR on adults single First Aider
  - e. Performing CPR on adults two First Aiders
  - f. Use of First Aid equipment

#### ELEMENT 5.8 - CPR

#### Delegates shall:

- 5.8.1 Practice and demonstrate First aid for Unresponsive and not breathing
  - a. Primary Survey ("C"- A B C)
  - b. Performing CPR on adults

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c. Use of first aid equipment

#### **ELEMENT 5.9 - OBSTRUCTION OF AIRWAYS**

Training Staff shall:

- 5.9.1 Explain and demonstrate First aid for obstruction of airways
  - a. Reasons for obstruction of airways
  - b. Threats
  - c. Primary Survey ("C"- A B C)
  - d. Adults

Delegates shall:

- 5.9.2 Practice and demonstrate First Aid in case of obstruction of airways
  - a. Primary Survey ("C"- A B C)
  - b. Adults

#### ELEMENT 5.10 - BLEEDING, INTERNAL AND EXTERNAL

Training Staff shall:

- 5.10.1 Explain and demonstrate First aid for external bleeding:
  - a. Reasons for external bleeding
  - b. Threats
  - c. Primary Survey ("C"- A B C)
  - d. Use of First Aid equipment
  - e. Use of other equipment

Delegates shall:

- 5.10.2 Practice and demonstrate First Aid when a casualty is bleeding externally
  - a. Primary Survey ("C"- A B C)
  - b. Use of First Aid equipment
  - c. Use of other equipment
- 5.10.3 Bleeding, internal

Training Staff shall:

- a. Explain reasons for internal bleeding
- b. Explain threats

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- c. Demonstrate the primary Survey ("C"- A B C)
- d. Demonstrate the use of First Aid equipment

Delegates shall:

- 5.10.4 Practice and demonstrate First Aid when a casualty is bleeding internally
  - a. Primary Survey ("C"- A B C)
  - b. Use of First Aid equipment

#### ELEMENT 5.11 - SHOCK

#### Training Staff shall:

- 5.11.1 Explain and demonstrate shock
  - a. Reasons for shock
  - b. Types of shock
  - c. Threats
  - d. Primary Survey ("C"- A B C)
  - e. Use of First Aid equipment
  - f. Physiological First Aid

#### Delegates shall:

- 5.11.2 Practice and demonstrate First Aid for Shock
  - a. First Aid Primary Survey ("C"- A B C)
  - b. Use of First Aid equipment
  - c. Physiological First Aid

### Lesson 6 - SECONDARY SURVEY

#### 110 min.

The aim of this lesson is to give the Delegates the knowledge and skills to be able to assess, assist and provide the necessary First Aid to minor incidents.

To successfully complete this BST Module, Delegates shall be able to **demonstrate**:

- 1) Correct Secondary Survey (L3 Skills)
- 2) Knowledge and skills for managing different incidents approach and assessments (L3 Skills & Knowledge)

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3) Knowledge and skills regarding psychological First Aid (L3 – Skills, Knowledge & Attitude)

#### ELEMENT 6.1 - SECONDARY SURVEY

Training Staff shall:

- 6.1.1 Explain correct Secondary Survey
- 6.1.2 Explain the general conditions of secondary survey using the A-B-C-D-E principle
- 6.1.3 Explain the A B C D E- principle in the context of the secondary survey:
  - a. D: Disability/Neurologic assessment
  - b. E: Exposure and environmental control

#### Training Staff shall:

6.1.4 Demonstrate the differences between/indications for sitting, lying and shock position (conscious/unconscious) and the importance of keeping up body temperature

#### ELEMENT 6.2 - FIRST AID - DIFFERENT INCIDENTS TYPES

Training Staff shall:

- 6.2.1 Demonstrate different incidents
  - a. Bleeding
  - b. Burns
  - c. Chemical contacts
  - d. Hypothermia
  - e. Hyperthermia
  - f. Bite wounds
  - g. Eye injury
  - h. Fractures
  - i. Injury to joints, muscles and bones
  - j. Rest Ice Compression Elevation (R I C E) method
  - k. First Aid equipment for incidents

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#### ELEMENT 6.3 - DETERIORATION OF INCIDENTS

Training Staff shall:

- 6.3.1 Explain minor to serious incidents
  - a. Minor incident escalating to a serious incident
  - b. In a WTG environment

#### ELEMENT 6.4 - PSYCHOLOGICAL FIRST AID

Training Staff shall:

- 6.4.1 Explain psychological First Aid
  - a. Normal reactions to an unusual situation
  - b. To a casualty
  - c. To the surroundings and next of kin
  - d. Reactions after acting as a First Aider

### Lesson 7 - SCENARIO-BASED TRAINING

285 min.

The aim of this lesson is to give the Delegates the knowledge and skills to be able to assess, assist and provide the correct First Aid in an incident.

To successfully complete this BST Module, Delegates shall, through different scenarios, be able to demonstrate:

- 1) Managing incidents approach and assessments (L3 Skills, Knowledge & Attitude)
- 2) Correctly assessing, assisting and providing the necessary First Aid in an incident (L3 Skills & Knowledge)
- 3) Correct use of First Aid equipment (L3 Skills & Knowledge)

#### ELEMENT 7.1 - PRACTICE FIRST AID TECHNIQUES

Training Staff shall:

#### 7.1.1 Explain safety procedures in the training area

Delegates shall:

7.1.2 Practice and demonstrate lifesaving First Aid techniques through relevant scenarios according to the Control Measures form

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Training Staff shall:

- 7.1.3 Ensure that the following topics are covered during scenario-based training:
  - a. Managing incidents
  - b. Providing necessary lifesaving First Aid
  - c. Correct use of First Aid equipment
  - d. Knowledge of and skills for AED safety procedures
  - e. Correct use of an AED

This scenario-based training shall be conducted as group work with one or more Delegates as First Aiders, while the other Delegates act as Casualty / Casualties or Observer / s. Each Delegate shall, as a minimum, act as First Aider at least one time. Relevant First Aid equipment shall be available and used at all times during scenariobased 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.

At least one scenario must be based on an electrical incident.

- 7.1.4 First Aid situations:
  - a. Dropped object serious head injury, unresponsive, breathing
  - b. Fall from heights external bleeding, unresponsive, breathing
  - c. Serious internal bleeding
  - d. Serious external bleeding
  - e. Unresponsive with normal breathing
  - f. Unresponsive, not breathing
  - g. CPR using an AED
  - h. Seizures (e.g. epileptic seizure)
  - i. Asthma
  - j. Stroke (circulatory, respiratory, central nervous system)
  - k. Serious burns (Chemical, electrical, thermal and sun)
  - I. Hypothermia
  - m. Heat related illness (heat stroke, heat exhaustion, hyperthermia, cramps etc.)
  - n. Crush injury
  - o. Eye injury
  - p. Electrical accidents minor/serious

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- q. Amputation
- r. Minor incident escalating to a serious incident
- s. Traffic related accident

Training Staff shall:

- 7.1.5 Facilitate a debriefing about first Aid situations
  - a. Review positive actions observed during exercise
  - b. Suggest points for improvement
- 7.1.6 Facilitate a debriefing about complex incidents with several (2-5) casualties in wind turbine working environments
  - a. Review positive actions observed during exercise
  - b. Suggest points for improvement

### Lesson 8 - EVALUATION

15 min.

The aim of this lesson is to summarize the Module and give the Delegates the opportunity to do an open-minded review of the training and the instructor.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

1) Active participation in the evaluation

#### **ELEMENT 8.1 - SUMMARY**

Training Staff shall:

8.1.1 Summarize the Module and give the Delegates final feedback

#### ELEMENT 8.2 - EVALUATION

#### Delegates shall:

8.2.1 Conduct a written evaluation

Training Staff shall:

8.2.2 Give necessary feedback on the written evaluations

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#### **ELEMENT 8.3 - TRAINING RECORDS**

Training Staff shall:

8.3.1 Ensure that all Delegates are registered with a personal Delegate profile in WINDA and have provided their WINDA ID to the Training Provider prior to completing the training course.

### 9.7 Delegate Performance Assessment

Assessment of learning outcomes:

Delegates will be assessed according to the learning outcomes stated in the detailed module description 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 Delegate shall demonstrate the ability to deal with a casualty that is:

- 1) Unconscious
- 2) Requires CPR
- 3) A scenario as detailed in Lesson 8

The formal evaluation of knowledge of above scenarios shall be in accordance with the Control Measures Form (template provided as Annex 1). The Trainer keeps the Control Measures Forms until the completion/ evaluation of the BST Module. Training Providers shall have a documented procedure in place for dealing with persons not meeting the stated learning outcomes. If a Delegate fails to meet the demands, they shall attend a new BST First Aid Module.

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# 10 BST MODULE 2 - MANUAL HANDLING

### 10.1 Aims and objectives of the BST Manual Handling Module

The aim of this Module is to encourage positive Manual Handling and ergonomic behaviour, encourage delegates to consider alternatives to manual handling through planning and to train delegates ability to perform Manual Handling tasks in a safe manner in the wind turbine industry/environment.

The training shall be designed to improve and refresh Delegates' awareness through both theoretical knowledge and practical training. The main focus shall be on eliminating risk and controlling hazards and practicing correct techniques if elimination is not possible.

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

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

The BST Manual Handling Module shall ensure that:

- 1) The Delegates are able to **demonstrate** a problem-solving approach to Manual Handling in a wind turbine environment (L3 Skill)
- 2) The Delegates are able to **demonstrate** Manual Handling risk reduction techniques (L3 Skill)
- 3) The Delegates are able to **identify** aspects of their job tasks that could increase their risk of developing muscular/ skeletal injuries (L2 Knowledge)
- 4) The Delegates are able to **demonstrate** understanding of the importance of carrying out work duties in a safe and sound manner in accordance with the legislative requirements of their geographic work location (L2 Knowledge)
- 5) The Delegates are able to **demonstrate** understanding of safe practises of Manual Handling, including the correct handling of equipment (L2 Knowledge)
- 6) The Delegates are able to **identify** signs and symptoms of injuries related to poor Manual Handling techniques and have knowledge of reporting methods (L2 – Knowledge)

### 10.2 Duration of the BST Manual Handling Module

The total contact time for completing this manual handling module is estimated to be 3 hours and 35 minutes. This is based on the time estimate given in the module timetable.

The training provider must not exceed the times per day given in table 10-2 below.

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The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to manual handling in a way that is constructive for the entire class.

	Maximum duration per day
Contact time	8 hours
Total training day	10 hours

Table 10-2 - Maximum durations for training days

### 10.3 Manual Handling Trainer/Delegate Ratio

The ratio shown for theory sessions indicates the maximum number of Delegates that shall attend the course.

The ratio shown for practical lessons indicates the maximum number of Delegates to be supervised by an instructor during each activity.

Module	Session	Instructor to Delegate Ratio
PST Manual Handling	Theory	1:12
	Practical	1:12

Table 10-3 - GWO Manual Handling module instructor to delegate ratio

### 10.4 Equipment for Manual Handling Module

The equipment required for training as listed in Annex 3 must be available and must fulfil national legal requirements as listed in table A3-1 in annex 3 where applicable.

### 10.5 BST Manual Handling Module time table

The order in which the elements of this BST training Module are delivered may vary.

Within the module timetables, approximate duration 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.

Lesson		Element		Approx. Duration
1	Introduction	1.1	Safety instructions and emergency procedures	
		1.2	Facilities	
		1.3	Introduction	

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		1.4	Scope and main learning objectives		
		1.5	On-going assessments (Control Measures)		
		1.6	Motivation		
		-	TOTAL	15 min.	
2	Legislation and	2.1	Global legislation		
	behavioural safety	2.2	National legislation		
		2.3	Behavioural safety		
			TOTAL	15 min.	
3	Spinal	3.1	Anatomy		
	anatomy and	3.2	Symptom awareness		
	postare	3.3	Reporting methods		
			TOTAL	20 min.	
4	Planning manual handling	4.1	T.I.L.E. principle		
		4.2	Further control measures		
			TOTAL	20 min.	
5	Measures to prevent injury during training	5.1	Control measures and warm up		
			TOTAL	20 min	
6	Manual handling: risk controls & proper manual	6.1	Risk and hazards in the wind turbine industry		
	handling techniques	6.2	Proper manual handling techniques		
		6.3	Practice in safe lifting technique		
	TOTAL 110 min.				
7	Evaluation	7.1	Summary		
		7.2	Evaluation		
		7.3	Training records		
			TOTAL	15 min.	
GRAND TOTAL 2:					

Table 10-5 - GWO Manual handling module timetable

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### 10.6 Detailed description of the BST Manual Handling Module

The learning outcomes specified for the BST Manual Handling Module are:

### Lesson 1 - INTRODUCTION

#### 15 min.

The aim of this lesson is to give the Delegates the needed awareness of the course content and the facilities involved in order to ensure all Delegates are aware of what to expect and what is expected of them in the course.

To successfully complete this BST Module, Delegates shall be aware of:

- 1) Safety instructions and emergency procedures
- 2) Facilities
- 3) Who the Instructor and other Delegates are
- 4) Aims and main learning objectives
- 5) On-going assessment, according to GWO Control Measures
- 6) Motivation for this BST course

#### ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

#### Training Staff shall **explain:**

- 1.1.1 Explain safety instructions, according to internal procedures
- 1.1.2 Explain the emergency procedures and emergency exits in the localities the Delegates can be expected to be located during the course

#### ELEMENT 1.2 - FACILITIES

#### Training Staff shall **explain:**

1.2.1 General description of the on-site facilities (Administration, dining area, restrooms, toilets, etc.)

#### ELEMENT 1.3 - INTRODUCTION

Training Staff shall:

1.3.1 Give a short introduction, including their backgrounds as instructors

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Delegates shall:

1.3.2 Give a short introduction, including job function and expected primary geographic work location

Training Staff shall:

1.3.3 Explain the programme of the BST Module, including breaks and meal times

ELEMENT 1.4 - SCOPE AND MAIN OBJECTIVES

Training Staff shall:

1.4.1 Explain the scope and main objectives of this BST Module

#### **ELEMENT 1.5 - ON-GOING ASSESSMENTS**

Training Staff shall:

- 1.5.1 Explain the reasons for the on-going assessment
- 1.5.2 Explain the GWO Control Measures and their use

#### **ELEMENT 1.6 - MOTIVATION**

Training Staff shall:

- 1.6.1 Explain the importance of personal involvement in the course
- 1.6.2 Explain the definition and need for correct Manual Handling

### Lesson 2 - LEGISLATION AND BEHAVIOURAL SAFETY

15 min.

The aim of this lesson is to increase the Delegates needed awareness and to inform them of the relevant legislation and demands in order to ensure the Delegates' understanding of the roles, responsibilities and rules that apply to Manual Handling.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- Describe internationally recognised legislation relevant to Manual Handling (L1

   Knowledge)
- 2) Describe national legislation relevant to Manual Handling (L1 Knowledge)
- 3) Explain the consequences of injuries (L2 Knowledge)
- 4) Explain the possible causes of injuries (L2 Knowledge)

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#### ELEMENT 2.1 - GLOBAL LEGISLATION

Training Staff shall:

- 2.1.1 Explain applicable legislation
- 2.1.2 Explain legal responsibilities

#### **ELEMENT 2.2 - NATIONAL LEGISLATION**

Training Staff shall:

- 2.2.1 Explain applicable legislation
- 2.2.2 Explain legislative requirements
- 2.2.3 Explain legal responsibilities
- 2.2.4 Role of industry organisations

#### ELEMENT 2.3 - BEHAVIORAL SAFETY

Training Staff shall:

- 2.3.1 Explain the consequences of incorrect Manual Handling
- 2.3.2 Highlight the importance of staying injury-free
- 2.3.3 Lead a discussion about the causes of injuries and attributing factors (e.g. time vs. effort/conditions/risk, putting job before self, negative habits, previous injuries, etc.)

Delegates shall:

- 2.3.4 Explain how incorrect manual handling can affect them
- 2.3.5 Explain how a work-related injury can affect them

### Lesson 3 - SPINAL ANATOMY AND POSTURE

20 min.

The aim of this lesson is to enable the delegates to reduce the risk of muscular and spinal injuries through awareness of the risks and by using exercise to train the back and shoulder muscles.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain common muscular and skeletal injuries (L2 Knowledge)
- 2) Explain spinal anatomy, including prolapsed disc and the importance of neutral posture (L2 Knowledge)

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- 3) Explain shoulder anatomy, including common injuries (L2 Knowledge)
- 4) Explain typical symptoms of muscular and skeletal injury and the importance of early detection and treatment (L2 Knowledge)
- 5) Explain typical injury reporting methods (L2 Knowledge)
- 6) Demonstrate the ability to use practical exercises for training the back and shoulders (L3 Skill)

#### ELEMENT 3.1 - ANATOMY

Training Staff shall:

- 3.1.1 Lead a discussion about muscular and skeletal Injuries related to Manual Handling, including:
  - a. back Injuries, e.g. prolapsed disc,
  - b. muscle strains
- 3.1.2 Explain the relationship between injury and spinal anatomy and posture
- 3.1.3 Explain the relationship between shoulder anatomy and common injuries when working above shoulder height e.g. tendonitis, bursitis

Delegates shall:

- 3.1.4 Describe typical muscular and skeletal injuries to the back and shoulders related to manual handling
- 3.1.5 Describe the relationship between muscular and skeletal injuries, and spinal anatomy and posture.

#### ELEMENT 3.2 - SYMPTOM AWARENESS

Training Staff shall:

3.2.1 Lead a discussion about symptom awareness and the importance of early detection and treatment

#### Delegates shall:

- 3.2.2 Describe typical symptoms of muscular and skeletal injuries
- 3.2.3 Explain the importance of early detection and treatment

#### **ELEMENT 3.3 - REPORTING METHODS**

Training Staff shall:

3.3.1 Lead a discussion about reporting methods and procedures in case of injuries

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- a. National requirements
- b. Company specifics

Delegates shall:

3.3.2 Describe typical injury reporting methods

### Lesson 4 - PLANNING MANUAL HANDLING

20 min.

The aim of this lesson is to enable the delegates to reduce the risk of injury resulting from incorrect manual handling by assessing the risks and planning the task.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain the Task Individual Load Environment (T.I.L.E.) Principle (L2 Knowledge)
- 2) Explain how to assess and control risks and aggravating factors using a MAC tool (L2 Knowledge)
- 3) Explain further Control Measures (L2 Knowledge)
- **Note:** Please refer to annex 5: Manual handling risk assessment for details on T.I.L.E. Principle and assessing aggravating factors and risks. The annex 5 may be used as a basis for developing training material.

#### ELEMENT 4.1 - T.I.L.E. PRINCIPLE

Training staff shall:

- 4.1.1 Lead a discussion about basic, quick risk assessment, e.g. identification of aggravating factors, assess the level of risk, control the risk
- 4.1.2 Lead a discussion about planning Manual Handling correctly by using the T.I.L.E. principle, including load weight, reaching distance and aggravating factors:
  - a. Task (e.g. reaching, bending, stooping, repetition, duration, location, distance, hazards, pace)
  - b. Individual (e.g. warm up, posture, capability, height, size)
  - c. Load (e.g. weight and reaching distance, handles, size, temperature, texture)
  - d. Environment (e.g. space constraints, cold or heat, rain, wind, obstacles, stairs, poor lighting, vibrating, floor conditions)

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Delegates shall:

5.1.3 Explain the T.I.L.E principle, and how to mitigate aggravating factors and risks

#### ELEMENT 4.2 - FURTHER CONTROL MEASURES

Training staff shall:

- 4.2.1 Explain further control measures to reduce risk of injury, including:
  - a. Mechanical handling (e.g. cranes, scissor lifts, trolleys, steps)
  - b. PPE correct fit (e.g. correct sizes, boot laces tied)
  - c. Breaking up loads & team lifting
  - d. Protecting pre-existing injuries
  - e. Adequate lighting
  - f. Good housekeeping

### Lesson 5 - 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 delegates are briefed in the control measures employed in the practical training area and to warm up prior to performing rescue exercises.

#### ELEMENT 5.1 - CONTROL MEASURES AND WARM UP

The instructor shall:

- 5.1.1 Explain further control measures for the specific training facilities and training to avoid injury during the training.
- 5.1.2 Verify that the delegates can explain the principles of operation of the PPE and equipment to be used during practical training sessions.
- 5.1.3 Ensure that any hazardous energy sources which may affect the delegates during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the delegates.
- 5.1.4 Lead a warm-up session of the major muscle groups of the body and the ankles, wrists and back.

Delegates shall:

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

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### Lesson 6 - MANUAL HANDLING: RISK CONTROLS & PROPER MANUAL HANDLING TECHNIQUES

#### 110 min.

The aim of the lesson is to practice safe lifting techniques in a variety of scenarios in wind turbine work environments. To the greatest possible extent, the scenarios should include the challenges that were mentioned by Delegates during lesson 3.

The key learning from the BST Manual Handling Module lessons shall be practised during scenario-based training.

To successfully complete this BST Module, Delegates must be able to:

- 1) Discuss the risks associated with manual handling in the wind industry (L2 Knowledge)
- Demonstrate the ability to stretch and warm-up specific muscle groups (L3 Skill)
- 3) Demonstrate the ability to use proper manual handling techniques (L3 Skill)

#### ELEMENT 6.1 - RISK AND HAZARDS IN THE WIND TURBINE INDUSTRY

During this lesson the Delegates' experience and their observations shall be included and to the greatest possible extent this should be driving the discussion. When relevant, behavioural safety shall further be drawn into the discussion.

The Delegates are motivated to mention any specific situations where they find it hard to appropriately use correct Manual Handling techniques.

Based on Delegates' experience, the training staff shall:

- 6.1.1 Lead a discussion about Risks and hazards of Manual Handling relevant to the job functions within the wind industry such as:
  - a. Awkward positions
  - b. Forceful exertions
  - c. Repetitive motions
  - d. Contact stress
  - e. Exposure of local body parts and entire body to mechanical vibrations
  - f. Duration of exposure
  - g. Frequency of exposure
  - h. Intensity of exposure
- 6.1.2 Lead a discussion about how to avoid the risks and hazards and improve safety while executing Manual Handling related tasks

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#### ELEMENT 6.2 - PROPER MANUAL HANDLING TECHNIQUES

Training staff shall:

- 6.2.1 Demonstrate how to stretch and warm-up muscle groups relevant to the task
- 6.2.2 Demonstrate how to use proper manual handling techniques, including:
  - a. Safe lifting techniques from floor
  - b. Safe lifting techniques from height (e.g. bench, shelving rack)
  - c. Safe lifting techniques using 2 or more persons
  - d. Proper handling of at least two different types of loads (weight, shape) in at least three different manual handling scenarios simulating a wind turbine work situation with one or more obstacles (stairs, uneven floors and/or in a constrained space)

**Note:** Appropriate mechanical lifting aids can be included in the practical exercises.

#### ELEMENT 6.3 - PRACTICE IN PROPER MANUAL HANDLING TECHNIQUES

The practical training shall be structured in such a way that Delegates gain practical understanding of the theory introduced in the previous lessons.

Specifically, experiences and challenges that were discussed during lesson 3 "Risks and hazards" shall be reviewed and applied during this scenario-based training.

Training Staff shall:

6.3.1 Explain safety procedures in the training area

Delegates shall:

- 6.3.2 Demonstrate the ability to stretch and warm-up muscle groups relevant to the task
- 6.3.3 Practice and demonstrate proper manual handling techniques in scenarios relevant to the industry, covering the points in sub-element 6.2.2 and according to the Control Measures form

(see Lesson 6 Notes below)

Training Staff shall facilitate debriefing:

- 6.3.4 Scenario-based training
  - a. Review positive actions observed during exercise
  - b. Suggest points for improvement

Formal assessment of knowledge (see Section 10.7)

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#### Lesson 6 Notes:

- 1) Each Delegate will benefit most if they participate in a practise scenario based on a wind turbine work environment.
- 2) Lifting various objects in the correct and proper manner. These can be of different shapes and sizes but shall not weigh more than 15 Kg (33.07 lbs).
- 3) I In teams (2 or more persons if required according to local policy), perform a correct lift of a load that weighs no more than 30 Kg (66.17 lbs) and is unwieldy, difficult to grasp, difficult to grip, with contents likely to move or shift (e.g. a rescue dummy)
- 4) The lesson elements concerned with manual handling should be practiced during subsequent exercises where the delegates are performing exercises for rescue and evacuation from height and at any other time where they are handling equipment or props for exercises.

Training staff should observe and provide immediate constructive feedback to the delegates focusing on the following areas:

- a. Reducing manual handling using suitable handling aids where possible
- Planning of manual handling tasks using the T.I.L.E. Principle and MAC tool - considering the load weight, maximum reaching distance and aggravating factors
- c. Correct manual handling techniques

### Lesson 7 - EVALUATION

15 min.

The aim of this lesson is to summarize the Module and give the Delegates the opportunity to conduct an open-minded review of the training and the instructor.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

1) Active participation in the evaluation

#### ELEMENT 7.1 - SUMMARY

Training Staff shall:

7.1.1 Summarize the Module and give the Delegates final feedback

#### ELEMENT 7.2 - EVALUATION

Delegates shall:

7.2.1 Conduct a written evaluation

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Training Staff shall:

7.2.2 Give necessary feedback on the written evaluations

#### ELEMENT 7.3 - TRAINING RECORDS

Training Staff shall:

7.3.1 Ensure that all Delegates are registered with a personal Delegate profile in WINDA and have provided their WINDA ID prior to completing the training course.

### 10.7 Delegate Performance Assessment

Assessment of learning outcomes:

Delegates will be assessed according to the learning outcomes stated in the detailed module description 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 Delegate shall demonstrate:

#### Correct Manual Handling throughout, including:

- 1) Reducing manual handling using suitable handling aids where possible
- Planning of manual handling tasks using the T.I.L.E. Principle and a MAC tool considering the load weight, maximum reaching distance and aggravating factors

#### **Correct manual handling techniques**

1) 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.

The formal evaluation of knowledge of above scenarios shall be in accordance with the Control Measures Form (template provided as Annex 1). The Trainer keeps the Control Measures Forms until the completion/ evaluation of the BST Module.

Training Providers shall have a documented procedure in place for dealing with Delegates not meeting the stated learning outcomes. If a Delegate fails to meet the demands, they shall attend a new BST Manual Handling Module.

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# 11 BST MODULE 3 - FIRE AWARENESS

### 11.1 Aims and objectives of BST Fire Awareness Module

The aim of this course is to give the delegates the basic knowledge and skills through theoretical and practical training.

Delegates should be able 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 delegates should be able to efficiently extinguish an initial fire by using basic hand held firefighting equipment.

The BST Fire Awareness Module shall ensure that:

- 1) The Delegates are able to **demonstrate** knowledge of the development and spread of fire (L2 Knowledge)
- 2) The Delegates are able to **demonstrate** knowledge of the causes of fires in wind turbines and the related dangers (L2 Knowledge)
- 3) The Delegates are able to **identify** any sign of a fire in a wind turbine environment (L3 Skill)
- The Delegates are able to **demonstrate** knowledge of the contingency plans in a wind turbine environment, including smoke detection and emergency escape procedures (L2 – Knowledge)
- 5) The Delegates are able to **demonstrate** correct actions for discovering a fire including correct use and fire extinguishing using firefighting equipment in a WTG (Level 3 Skills)

### 11.2 Duration of BST Fire Awareness Module

The total contact time for completing this fire awareness module is estimated to be 3 hours and 20 minutes. This is based on the time estimate given in the module timetable.

The training provider must not exceed the times per day given in table 11-2 below.

The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to fire awareness in a way that is constructive for the entire class.

	Maximum duration per day
Contact time	8 hours
Total training day	10 hours

Table 11-2 - Maximum durations for training days

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**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).

### 11.3 Fire Awareness Instructor to Delegate Ratio

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

Other ratios indicate the maximum number of Delegates to be supervised by (an) instructor(s) during each activity.

Module	Session	Instructor to Delegate Ratio
DCT Eiro Awaranaas	Theory	1:12
DST FILE AWARENESS	Practical	1:6

Table 11-3 - GWO Fire Awareness module instructor to delegate ratio

### 11.4 Equipment for Fire Awareness Module

The equipment required for training as listed in Annex 3 must be available and must fulfil national legal requirements as listed in table A3-1 in annex 3 where applicable.

### 11.5 BST Fire Awareness module timetable

The order in which the elements of this BST training Module are delivered may vary.

Within the module timetables, approximate duration 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.

Lesson		Element		Approx. Duration
1	Introduction	1.1	Safety instructions and emergency procedures	
		1.2	Facilities	
		1.3	Introduction	
		1.4	Scope and main objective	
		1.5	On-going assessments	
		1.6	Motivation	

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	TOTAL 15 min.				
2	Legislation	2.1	Global legislation		
		2.2	National legislation		
	_		TOTAL	5 min.	
3	Fire combustion and fire	3.1	Types of fires		
	spread	3.2	Fire triangle		
		3.3	Fire spread		
		3.4	Fire gases		
			TOTAL	20 min.	
4	Fire extinction	4.1	Contingency plan		
		4.2	Assessing the fire		
		4.3	Fire classes		
		1	TOTAL	25 min.	
5	Fire Prevention	5.1	Fire hazards		
		5.2	Fire preventive measures		
			TOTAL	20 min.	
6	Firefighting equipment in	6.1	Pre-use inspection		
	a WIG	6.2	Correct use of firefighting		
			equipment	20	
				20 min.	
/	Practise and scenario-	/.1	Practice		
		7.2	Scenario-based training		
	TOTAL 80 min.				
8	Evaluation	8.1	Summary		
		8.2	Evaluation		
		8.3	Training records		
			TOTAL	15 min.	
	GRAND TOTAL 200 min.				

Table 11-5 - GWO Fire Awareness module timetable

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### 11.6 Detailed description of BST Fire Awareness Module

### Lesson 1 - INTRODUCTION

#### 15 min.

The aim of this lesson is to give the Delegates the needed awareness of the course content and the facilities involved in order to ensure that all Delegates are aware of what to expect and what is expected of them during the course.

To successfully complete this BST Fire Awareness Module, Delegates shall be aware of:

- 1) Safety instructions and emergency procedures
- 2) Facilities
- 3) Who the instructor and other Delegates are
- 4) Aims and primary learning objectives
- 5) On-going assessment according to GWO Control Measures
- 6) Motivation for this course
- **Note:** The administrative part of the registration shall be completed before the course commences.

#### ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Training Staff shall:

- 1.1.1 Explain safety instructions according to internal procedures
- 1.1.2 Explain emergency procedures and emergency exits for the areas the Delegates will be located during the course

#### ELEMENT 1.2 - FACILITIES

#### Training Staff shall:

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

#### ELEMENT 1.3 - INTRODUCTION

Training Staff shall:

1.3.1 Give a short introduction, including their backgrounds as instructors

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Delegates shall:

1.3.2 Give a short introduction, including job function and expected primary geographic work location

Training Staff shall:

1.3.3 Explain the programme of the BST Fire Awareness Module, including breaks and meal times

ELEMENT 1.4 - SCOPE AND MAIN OBJECTIVES

Training Staff shall:

1.4.1 Explain the scope and main objectives of this BST Fire Awareness Module

#### ELEMENT 1.5 - ON-GOING ASSESSMENTS

Training Staff shall:

- 1.5.1 Explain the reasons for the on-going assessment
- 1.5.2 Explain the GWO delegate performance assessment form and their use

#### ELEMENT 1.6 - MOTIVATION

Training Staff shall:

- 1.6.1 Explain the importance of personal involvement in the course
- 1.6.2 Explain the definition and need for correct Fire Awareness

### Lesson 2 - LEGISLATION

5 min.

The aim of this lesson is to give the Delegates the needed knowledge of relevant legislation and requirements that apply to fire prevention and firefighting equipment related to the industry.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Knowledge of global legislation relevant to fire prevention and firefighting equipment in relation to the industry (L2 Knowledge & Attitude)
- Knowledge of firefighting equipment in relation to the industry (L2 -Knowledge)
- 3) Knowledge of national legislation relevant to fire prevention and firefighting equipment in relation to the industry (L2 Knowledge)

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#### **ELEMENT 2.1 - GLOBAL LEGISLATION**

Training Staff shall:

- 2.1.1 Explain relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry *onshore*
- 2.1.2 Explain relevant legislation and requirements that apply to fire prevention and firefighting equipment in relation to the industry *offshore*

#### **ELEMENT 2.2 - NATIONAL LEGISLATION**

Training Staff shall:

- 2.2.1 Explain applicable legislation
- 2.2.2 Explain national legislative requirements
- 2.2.3 Explain legal responsibilities
- 2.2.4 Explain local authorities

### Lesson 3 - FIRE COMBUSTION AND FIRE SPREAD

20 min.

The aim of this lesson is to give the Delegates the needed general awareness of combustion, fire spread, the different types of fires and the composition of smoke to understand the elements needed for a fire and more importantly, how to extinguish as well as an understand how fire spreads and the dangers of smoke.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Knowledge of the different types of fires and the material state, including the type of material surface (L1 Knowledge)
- 2) Understanding of basic fire theory e.g. the triangle of combustion (L2 Knowledge)
- 3) Understanding of fire spread and the dangers of fire gases (L2 Knowledge)

#### ELEMENT 3.1 - TYPES OF FIRES

Training Staff shall:

- 3.1.1 Explain the types of fires (solid, liquid, gas)
- 3.1.2 Explain material state, including how surface size influences combustion

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Delegates shall:

3.1.3 Explain the types of fires and the state of material, including the influence of the size of the surface

### ELEMENT 3.2 - FIRE TRIANGLE

Training Staff shall:

3.2.1 Explain the elements needed for a fire to occur with reference to the 3 sides of the triangle of combustion (oxygen, material and temperature)

Delegates shall:

3.2.2 Explain the triangle of combustion

### ELEMENT 3.3 - FIRE SPREAD

Training staff shall:

- 3.3.1 Explain fire spread by (in relation to the wind energy industry)
  - a. Conduction
  - b. Convection
  - c. Radiation
  - d. Direct Burning

Delegates shall:

3.3.2 Explain how a fire can spread

### **ELEMENT 3.4 - FIRE GASES**

Training staff shall:

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

Delegates shall:

3.4.2 Explain the composition and hazards of fire gases based on the materials in a WTG

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### Lesson 4 - FIRE EXTINGUISHING

### 25 min.

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

To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate knowledge and understanding of contingency plans and the importance of knowing what to do in an emergency (L2 Knowledge & Attitude)
- 2) Demonstrate knowledge and understanding of how to assess a fire and know how to act in a given situation (L2 Knowledge & Attitude)
- 3) Identify the right fire extinguishing media according to the fire classes (L1 Knowledge)

### ELEMENT 4.1 - CONTINGENCY PLAN

### Delegates shall explain:

- 4.1.1 An example of a contingency plan in a wind turbine
- 4.1.2 Examples of the importance of knowing beforehand what to do in an emergency
- 4.1.3 When and how to use a personal escape mask if applicable

### Training Staff shall **ensure**:

4.1.4 Correct understanding of a contingency plan in a wind turbine and examples of the importance of knowing correct actions prior to an emergency

### ELEMENT 4.2 - ASSESSING THE FIRE

### Delegates shall **explain**:

- 4.2.1 Fire intensity curve
- 4.2.2 How to assess the fire and how to act based on the assessment of the fire

Training Staff shall **ensure**:

4.2.3 Correct understanding of the fire intensity curve, how to assess the fire and what to do based on the assessment of the fire

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### ELEMENT 4.3 - FIRE CLASSES

### Delegates shall explain:

- 4.3.1 Methods of extinguishing fires with reference to the fire triangle
- 4.3.2 Fire classes
- 4.3.3 Which extinguishing media found in a WTG can be used for various fire classes

Training Staff shall **ensure**:

4.3.4 Correct understanding of the fire classes and the various fire extinguishers available for extinguishing various fire types

	Fire Class by Global Region			
глетуре	Europe	North America	Australia	
Combustible Materials	А	А	А	
Flammable Liquids	В	В	В	
Flammable Gasses	С	В	С	
Flammable Metals	D	D	D	
Electrical Fire	Not Classified	С	E	
Cooking Oils and Fats	F	К	F	

Table L4-3 – Fire Classes by Region

# Lesson 5 - FIRE PREVENTION

### 20 min.

The aim of this lesson is to give the Delegates the needed knowledge and understanding of taking preventive measures to improve fire safety in a WTG.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Knowledge of hazards relating to fires within the wind industry (L2 Knowledge & Attitude)
- Knowledge and understanding of the importance of personal behavior as a fire prevention measure and how to improve fire safety during daily work (L2 -Knowledge & Attitude)

### ELEMENT 5.1 - FIRE HAZARDS

Delegates shall **explain**:

5.1.1 Fire hazards and risks in a WTG (manned/unmanned)

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Training Staff shall **ensure**:

5.1.2 Correct understanding of fire hazards and risks in WTGs (manned/unmanned)

### ELEMENT 5.2 - FIRE PREVENTION MEASURES

### Delegates shall **explain**:

- 5.2.1 How to improve fire safety in the daily work
- 5.2.2 Fixed systems in a WTG

Training Staff shall **ensure**:

- 5.2.3 Correct understanding of how to improve fire safety and fixed systems in WTGs
- 5.2.4 Awareness of fixed systems in WTGs, 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 give the Delegates the needed knowledge and skills to be able to use firefighting equipment in a WTG efficiently and without the risk of injuries.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Knowledge and understanding of pre-use inspection of various firefighting equipment with emphasis on equipment found in a WTG (L2 Knowledge & Attitude)
- Knowledge and understanding of safe distances and correct, efficient and safe use of various firefighting equipment with emphasis on equipment found in a WTG (L2 - Knowledge & Attitude)
- Knowledge and understanding of advantages and disadvantages of various firefighting equipment with emphasis on equipment found in a WTG (L2 -Knowledge & Attitude)

### ELEMENT 6.1 - PRE-USE INSPECTION

Delegates shall:

- 6.1.1 Explain the importance of pre-use inspection of firefighting equipment
- 6.1.2 Demonstrate how to perform pre-use inspection of firefighting equipment

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### Training Staff shall **ensure**:

6.1.3 Correct understanding of the importance of and how to perform pre-use inspection of firefighting equipment

### ELEMENT 6.2 - CORRECT USE OF FIREFIGHTING EQUIPMENT

Training Staff shall:

- 6.2.1 Explain and demonstrate advantages and disadvantages of various firefighting equipment in WTGs
- 6.2.2 Demonstrate safe distance and precautions with various firefighting equipment
- 6.2.3 Demonstrate correct, efficient and safe use of various firefighting equipment in WTGs
- **Note:** As a minimum handheld carbon dioxide (CO<sub>2</sub>) and water extinguisher, including fire blankets shall be demonstrated, and dry chemical shall be explained.

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

### Lesson 7 - PRACTICE AND SCENARIO-BASED TRAINING

80 min.

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

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Efficient and safe use of the firefighting equipment in a WTG (L3 Knowledge, Attitude & Skills)
- 2) The ability to assess the fire and act in a correct manner upon discovering a fire in a WTG (L3 Knowledge, Attitude & Skills)

### ELEMENT 7.1 - PRACTICE

Delegates shall:

- 7.1.1 Practice and demonstrate efficient and safe use of CO<sub>2</sub> extinguishers
- 7.1.2 Practice and demonstrate efficient and safe use of the fire blanket

Formal assessment of knowledge (see Section 11.7)

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### ELEMENT 7.2 - SCENARIO-BASED TRAINING

Training Staff 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

Delegates shall:

- 7.2.3 Demonstrate safe evacuation from a smoke-filled environment
- 7.2.4 Demonstrate correct action of discovering fire or smoke in a WTG (various mock scenarios in WTGs)

Formal assessment of knowledge (see Section 11.7)

### Lesson 8 - EVALUATION

15 min.

The aim of this lesson is to summarise the Module and give the Delegates the opportunity to conduct an open-minded review of the training and the instructor.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

1) Active participation in the evaluation

### **ELEMENT 8.1 - SUMMARY**

Training Staff shall:

8.1.1 Summarise the BST Module and give the Delegates final feedback

### ELEMENT 8.2 - EVALUATION

Delegates shall:

8.2.1 Conduct a written evaluation

Training Staff shall:

8.2.2 Give necessary feedback on the written evaluations

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### **ELEMENT 8.3 - TRAINING RECORDS**

Training Staff shall:

8.3.1 Ensure that all Delegates are registered with a personal Delegate profile in WINDA and have provided their WINDA ID prior to completing the training course.

### 11.7 Delegate Performance Assessment

Assessment of learning outcomes:

Delegates will be assessed according to the learning outcomes stated in Section 1.6. 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 Delegate shall demonstrate:

- 1) Safe evacuation from a smoke-filled area
- 2) Correct action on discovering a fire or smoke in a WTG

The formal evaluation of knowledge of above scenarios shall be in accordance with the Control Measures Form (template provided as Annex 1). The Trainer keeps the Control Measures Forms until the completion/ evaluation of the BST Module.

Training Providers shall have a documented procedure in place for dealing with Delegates not meeting the stated learning outcomes. If a Delegate fails to meet the demands, they shall attend a new BST Fire Awareness Module.

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# 12 MODULE 4 - BST WORKING AT HEIGHTS

### 12.1 Aims and objectives of the BST Working at Heights Module

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

The BST Working at Heights Module shall ensure that:

- The Delegates are able to **demonstrate** knowledge of hazards and risks associated with working at height specific to a wind turbine generator (WTG) (L2 - Knowledge)
- 2) The Delegates are able to **demonstrate** understanding of current national and regional legislation regarding working at heights (L2 Knowledge)
- 3) The Delegates are able to **demonstrate** correct identification of PPE, including identification of Global and regional standard markings e.g. harness, hard hat, lanyards, etc. (L3 Skill)
- 4) The Delegates are able to **demonstrate** the knowledge and skills to correctly perform pre-use inspection, service, store and correctly fit relevant PPE, e.g. harness, fall arrest lanyards, guided type fall arrest lanyards and work positioning lanyards (L2 Knowledge & L3 Skill)
- 5) The Delegates are able to **demonstrate** correct use of the relevant PPE, e.g. harnesses fall arrest lanyards, guided type fall arresters and work positioning lanyards. This includes correct identification of anchor points and correct conduct on ladder (L3 Skill)
- 6) The Delegates are able to **demonstrate** correct use of evacuation devices (L3 Skill)
- The Delegates are able to **demonstrate** how to approach rescue situations in WTGs and use rescue equipment efficiently (L3 – Skill & attitude)
- **Note:** This course is not designed to test the Delegate's capability and aptitude for working at heights, i.e. it is not a test for fear of heights.

### 12.2 Duration of the BST Working at Heights Module

The total contact time for completing this working at heights module is estimated to be 13 hours and 25 minutes. This is based on the time estimate given in the module timetable.

The training provider must not exceed the times per day given in table 12-2 below.

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The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to working at height in a way that is constructive for the entire class.

	Maximum duration per day
Contact time	8 hours
Total training day	10 hours

Table 12-2 - Maximum durations for training days

**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).

### 12.3 Working at Heights Instructor to Delegate Ratio

The ratio shown for theory sessions indicates the maximum number of Delegates attending the course.

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

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

Table 12-3 - GWO Working at height module instructor to delegate ratio

# 12.4 Equipment for Working at Heights Module

The equipment required for training as listed in Annex 3 must be available and must fulfil national legal requirements as listed in table A3-4 in annex 3 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 Delegate'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), enabling the Delegate to conduct pre-use inspection and to use other safety equipment products

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compared to those taught during this Module – based on the manufacturer's user manual but without additional formal training.

Where reasonably practicable the training provider shall eliminate the risk of a fall from height. Where it is not possible to eliminate the risk of a fall then the fall factor experienced by any person shall be kept as low as is reasonably practicable.

GWO recommends a maximum fall factor of 0.5. To calculate this the following formula has been used,

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

using the maximum allowed lanyard of length 2.00 m and a fall of 1.00 m,

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

*Factor* (FF) = 0.5.

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

During the evacuation exercise the delegates 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 delegate descend from a minimum height using a rescue or evacuation device.

To ensure that for all fall protection equipment that may be used that there will be enough clearance below the anchor point, and to ensure that the delegates can experience a descent of sufficient duration for meaningful learning transfer, the GWO recommends that the anchor point is a minimum of 6.75 m (22.15') above the ground or structure directly below the anchor point. The recommended 6.75 m (22.15') clearance under the anchor point is explained in detail in annex 3.

If a training provider deviates from the recommended anchor point height of 6.75 m (22.15') to a lower height, then the following additional control measures must be in place,

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

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- ii. demonstrate that the equipment will prevent the person from coming into contact with the ground or structure directly below the anchor point, and,
- iii. 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 3 section 4, and,
- b. the potential fall factor shall not exceed 0.5, and,
- c. delegates must experience a descent from a platform that is a minimum of 4.5 m (14.76') above the ground.

# 12.5 BST Working at Heights Module Time Table

The order in which the elements of this BST training Module are delivered may vary.

Within the module timetables, approximate duration 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.

Lesson		Eleme	Element	
1	Introduction	1.1	Safety instructions and emergency	
			procedures	
		1.2	Facilities	
		1.3	Introduction	
		1.4	Scope and main objectives	
		1.5	On-going assessment	
		1.6	Motivation	
	•	-	TOTAL	15 min.
2	Legislation	2.1	Global legislation	
		2.2	National legislation	
			TOTAL	20 min.
3	Harness	3.1	Proper inspection of PPE	
		3.2	How to fit the harness correctly	
		3.3	How often the harness shall be approved globally (EU, UK, USA, etc.)	
		3.4	Documentation	
		3.5	Maintenance of PPE	
TOTAL				30 min.

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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	
	1	Ī	TOTAL	25 min.
5	Vertical fall	5.1	Legal requirements	
	arrest systems	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	6.1	Legal requirements	
	lanyards	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	8.1	Types of backup systems	
	lifelines	8.2	Different allowed maximum angles	
		8.3	How to attach correctly to the harness	
		8.4	Approved anchor points for backup	
			systems	
		8.5	The importance of using backup systems	
		8.6	Pre-use inspection	
			TOTAL	10 min.

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9	Measures to prevent injury during training	9.1	Control measures and warm up	
	•		TOTAL	20 min.
10	Practical	10.1	Vertical fall arrest systems	
	exercises	10.2	Fall prevention	
		10.3	Fall arrest lanyards	
		-	TOTAL	60 min.
11	Emergency	12.1	Contents of an evacuation kit	
	procedures	12.2	Preparing equipment for use	
		12.3	Safe and correct evacuation	
		12.4	Safe behaviour	
			TOTAL	80 min.
12	Workshop: risks	11.1	Using the BST working at heights course	
	and hazards	11.2	Suspension trauma	
			TOTAL	30 min.
13	PPE review	11.1	The individual parts of the PPE	
			equipment	
				10 min.
14	and rigging setup	14.1	devices	
		14.2	Correct use of rescue devices and slings	
		•	TOTAL	20 min.
15	Measures to	15.1	Control measures and warm up	
	prevent injury			
				20 min
10	Decensor entereitere	1.6 1		20 min.
10	Rescue exercises	16.1	Rescue exercises in wind turbines	
		16.2	Sare and correct rescue	
		10.3	PPE	
		-	TOTAL	355 min.
17	Evaluation	15.1	Summary	
		15.2	Evaluation	
		15.3	Training records	
			TOTAL	15 min.
			GRAND TOTAL	805 min.

Table 12-5 - GWO Working at height module timetable

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# 12.6 Detailed description of BST Working at Heights Module

# Lesson 1 - INTRODUCTION

### 15 min.

The aim of this lesson is to give the Delegates the needed awareness of the course content and the facilities in order to ensure that all Delegates are aware of what to expect and what is expected of them during the course.

To successfully complete this BST Working at Heights Module, Delegates shall be aware of:

- 1) Safety instructions and emergency procedures
- 2) Facilities
- 3) Who the instructor and other Delegates are
- 4) Aims and primary learning objectives
- 5) On-going assessment according to GWO Control Measures
- 6) Motivation for this BST course

### ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Training Staff shall:

- 1.1.1 Explain safety instructions according to internal procedures
- 1.1.2 Explain emergency procedures and emergency exits in the areas where the Delegates can be expected to be located during the course

### **ELEMENT 1.2 - FACILITIES**

Training Staff shall:

1.2.1 Explain general description of the on-site facilities (Administration, dining area, restrooms, toilets, etc.)

### ELEMENT 1.3 - INTRODUCTION

Training Staff shall:

1.3.1 Give a short introduction, including their backgrounds as instructors

Delegates shall:

1.3.2 Give a short introduction, including their job function and expected primary geographic work location

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Training Staff shall:

1.3.3 Explain the program of the BST Module, including time for breaks and meals

### ELEMENT 1.4 - SCOPE AND MAIN OBJECTIVES

Training Staff shall:

1.4.1 Explain the scope and main objectives of this BST Module

**ELEMENT 1.5 - ON-GOING ASSESSMENTS** 

Training Staff shall:

- 1.5.1 Explain the reasons for the on-going assessment
- 1.5.2 Explain the GWO delegate performance assessment form and their use

### **ELEMENT 1.6 - MOTIVATION**

Training Staff shall:

- 1.6.1 Explain the importance of personal involvement in the course
- 1.6.2 Explain the definition and need for correct Working at Heights

### Lesson 2 - LEGISLATION

20 min.

The aim of this lesson is to introduce the Delegates to the site organisation and relevant legislation in order to ensure the Delegates' are aware of the roles, responsibilities and rules that apply to onshore and offshore wind farms.

To successfully complete this BST Module, Delegates shall be able to:

- Describe internationally recognised legislation relevant to Working at Height (L1 – Knowledge)
- 2) Describe national legislation relevant to Working at Height (L1 Knowledge)

### ELEMENT 2.1 - GLOBAL LEGISLATION

Training Staff shall:

- 2.1.1 Explain applicable legislation
- 2.1.2 Explain legal responsibilities

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### **ELEMENT 2.2 - NATIONAL LEGISLATION**

Training Staff shall:

- 2.2.1 Explain applicable legislation
- 2.2.2 Explain legislative requirements
- 2.2.3 Explain 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 delegate to perform a pre-use inspection of a harness, be able to identify when a harness requires a formal inspection and approval, explain basic maintenance of a harness, and to correctly fit and adjust a harness.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate the ability to perform a pre-use inspection of a random full body harness (L3 Skill)
- Demonstrate the ability to correctly fit and adjust a random full body harness (L3 – Skill)
- 3) Explain approvals according to appropriate equipment guidelines (EU, UK, USA, Canada, Mexico etc.) (L2 Knowledge)
- 4) Identify the approval documentation, equipment serial number, authorisation date, etc. (L2 Knowledge)
- 5) Explain how to maintain a full body harness (L2 Knowledge)

### **ELEMENT 3.1 - PRE-USE INSPECTION**

Training Staff shall:

- 3.1.1 Briefly introduce the generic approach to safety equipment as described in the equipment appendix to this module
- 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 Explain manufacturer and/or legal inspection periods
- 3.1.5 Explain the principals and importance of self-inspection of a full body harness for defects and significant wear, including:
  - a. Observe proper size
  - b. Markings and labels

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- 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
- I. 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 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

Delegates shall:

- 3.1.9 Demonstrate 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
- 3.1.10 Correctly identify the standards markings and inspection dates on a full body harness

### ELEMENT 3.2 - FITTING

Training staff 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 covering the following:
  - a. Shoulder straps should be loosened

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- b. Leg straps sit well
- c. Abdominal strap should sit well
- d. Chest strap (strapped slightly above or on the chest)
- e. Pivot link shall be at the hip and shall be flexible, may not sit as high that it can damage ribs and internal organs by a fall

Delegates shall:

3.2.3 Practice and demonstrate 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**

Training Staff shall:

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

### ELEMENT 3.4 - DOCUMENTATION

Training Staff shall:

- 3.4.1 Explain Documentation, instrument number, authorisation date, etc.
- 3.4.2 Explain how to identify the approval documentation, equipment serial number, authorization date, etc.

### **ELEMENT 3.5 - MAINTENANCE**

Training Staff shall:

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

### Lesson 4 - FALL PREVENTION

25 min.

The aim of this lesson is to enable the delegates to use fall / travel restraint and work positioning lanyards to prevent a fall and reduce the risk of injuries whilst working at height

To successfully complete this BST Module, Delegates shall be able to:

1) Demonstrate the ability to attach a fall / travel restraint lanyard and work positioning lanyard correctly to the ladder system (L3 – Skill)

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- 2) Demonstrate the ability to Correctly use fall / travel restraint lanyards and work positioning lanyards with focus on their own personal safety (L3 Skill)
- Demonstrate the ability to attach fall / travel restraint lanyards and work positioning lanyards correctly to the harness (front and/or rear attachment points, and/or side D-rings) (L3 – Skill)
- 4) Explain that fall prevention is preferred over fall arrest (L2 Knowledge & attitude)
- 5) Explain the importance of using work positioning lanyards in order to leave hands free for work (L2 Knowledge & attitude)
- 6) Demonstrate the ability to perform a pre-use inspection of a fall / travel restraint lanyard and a work positioning lanyard (L3 Skill)

### ELEMENT 4.1 - FALL PREVENTION OVER FALL ARREST

Training Staff 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 whilst attached to a work positioning lanyard

### ELEMENT 4.2 - PRE-USE INSPECTION

Training Staff 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 principals 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. Carabiners/connectors 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

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- 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 Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

Delegates shall:

4.2.4 Demonstrate the ability to perform a pre-use inspection of a random fall / travel restraint lanyard and work positioning lanyard (demonstrated during this module), covering the points demonstrated in this element, before working at height during practical exercises

### ELEMENT 4.3 - CORRECT ATTACHMENT TO ANCHOR POINTS

Training Staff shall:

- 4.3.1 Explain the importance of personal safety when using work positioning lanyards, Delegates shall never lose focus for 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

Delegates shall:

- 4.3.3 Identify and select certified and structural anchor points for the attachment of fall / travel restraint lanyards and work positioning lanyards
- 4.3.4 Demonstrate the ability to correctly attach fall / travel restraint lanyards and work positioning lanyards, covering the scenarios presented in this element, whilst working at height during practical exercises

### ELEMENT 4.4 - CORRECT ATTACHMENT TO THE HARNESS

Training Staff 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)

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### ELEMENT 4.5 - THE IMPORTANCE OF USING WORK POSITIONING

Training Staff shall:

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

### Lesson 5 - VERTICAL FALL ARREST SYSTEMS

#### 25 min.

The aim of this lesson is to enable the delegate to perform a pre-use inspection of various types of vertical fall arrest systems and to use a random vertical fall arrest system whilst working at height

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain the legal requirements and practical skills for using fall arrest systems when working at heights (L2 Knowledge)
- Demonstrate the ability to perform a pre-use inspection of a random vertical fall arrest system including pre-use inspection of a random fall arrest glider/slider (L3 – Skill)
- 3) Demonstrate the ability to correctly attach a random vertical fall arrest glider/Slider to the matching rail/wire (L3 Skill)
- 4) Demonstrate the ability to safely and correctly use a vertical fall arrest system whilst working at height (L3 Skill)
- 5) Explain country and region specific approvals of vertical fall arrest systems (L2 Knowledge)

### ELEMENT 5.1 - LEGAL REQUIREMENTS

Training Staff 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

### ELEMENT 5.2 - PRE-USE INSPECTION

Training Staff shall:

5.2.1 Demonstrate how to perform a pre-use inspection of a vertical fall arrest system by the following principals and covering:

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- 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 required/chosen to instruct this Module, by the following principals and covering:
  - 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, salt water exposure and significant wear of: Fall arrester, cam, energy absorber and 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/instructions for "UP" orientation (pointing towards the sky when climbing up/down)
  - j. Gravity stop functionality works as intended
  - k. Fall indicator
  - I. Carabiners/connecting elements operate and lock as intended, cannot disconnect completely and has 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 the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

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### Delegates shall:

5.2.5 Demonstrate the ability to perform a pre-use inspection of a random vertical fall arrest system including matching fall arrest glider/slider (demonstrated during this module) before working at height during practical exercises

### ELEMENT 5.3 - CORRECT ATTACHMENT AND DETACHMENT

### Training Staff shall:

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

### Delegates shall:

- 5.3.2 Demonstrate the ability to correctly attach/detach a random glider/slider to the rail/wire of a matching vertical fall arrest system prior to and whilst working at height during practical exercises
- 5.3.3 Explain that the symbol/instructions for "UP" orientation of fall arrester must always point to the sky and does not indicate the climbing direction

### **ELEMENT 5.4 - CORRECT USE**

### Training Staff shall:

5.4.1 Demonstrate how to correctly use a vertical fall arrest system

Delegates shall:

5.4.2 Demonstrate the ability to correctly use a random vertical fall arrest system during practical exercises, including from now on ALWAYS do a "hang-test/load test" attaching to the system before commencing climbing up/down - to test that the fall arrester operates, and locks as intended

### **ELEMENT 5.5 - PERIODIC INSPECTIONS**

Training Staff shall:

- 5.5.1 Explain how Delegates 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 delegate must seek out which inspection periods apply in the country where they will be working

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### ELEMENT 5.6 - CORRECT DOCUMENTATION

Training Staff shall:

5.6.1 Explain how Delegates can find the correct documentation

### Lesson 6 - FALL ARREST LANYARDS

### 55 min.

The aim of this lesson is to enable the delegates to safely use fall arrest lanyards whilst working at height

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain the legal requirements for using fall arrest systems when Working at Heights (L2 Knowledge)
- Demonstrate the ability to perform a pre-use inspection of a fall arrest lanyard (L3 – Skill)
- 3) Demonstrate the ability to correctly attach fall arrest systems to the harness (front and rear attachment points) (L3 Skill)
- 4) Value and apply the principle of selecting anchor points which reduce the fall factor to as low as possible (L3 Attitude & skill)
- 5) Explain how to detect if PPE has experienced a fall (Fall indicator) (L2 Knowledge)
- 6) Explain the differences between twin fall arrest lanyards and single fall arrest lanyards, as well as the different ways of usage (L2 Knowledge)
- 7) Demonstrate the ability to use twin tail fall arrest lanyards whilst double hook climbing (L3 Skill)
- 8) Explain approved anchor points (L2 Knowledge)
- 9) Explain the importance of always using a fall arrest system (L2 Attitude & Knowledge)

### **ELEMENT 6.1 - LEGAL REQUIREMENTS**

Training Staff shall:

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

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### **ELEMENT 6.2 - PRE-USE INSPECTION**

Training Staff 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 principals 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: Energy absorber, and lanyard rope, webbing, plastic, metal and heatshrinkable tubing
  - e. All moving parts work correctly, with no excessive play
  - f. Carabiners/connectors 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)
  - I. 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 Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

Delegates shall:

6.2.4 Demonstrate the ability to perform a pre-use inspection of a random fall arrest lanyard (demonstrated during this module) before working at height during practical exercises

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### ELEMENT 6.3 - CORRECT ATTACHMENT TO HARNESS

Training Staff shall:

6.3.1 Demonstrate how to attach fall arrest lanyards correctly to the harness (back, or possible front, attachment point) according to manufacturer's user manual and relevant country specific requirements/restrictions

Delegates shall:

6.3.2 Demonstrate the ability to correctly attach fall arrest lanyards to a harness before working at height during practical exercises

### ELEMENT 6.4 - FALL FACTOR

Training staff 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

Delegates 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 delegates to attach their fall arrest lanyards. The lowest anchor points should be a minimum of 6.75 m above ground level (see explanations in section 12.4 and in annex 3).

### **ELEMENT 6.5 - FALL INDICATORS**

Training Staff shall:

6.5.1 Show an example of a fall arrest lanyard where the fall indicator shows that it has experienced a fall

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6.5.2 Demonstrate how to identify if the fall arrest lanyard has experienced a fall by using the fall arrest lanyards fall indicator

### ELEMENT 6.6 - TWIN AND SINGLE FALL ARREST LANYARDS

Training Staff 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 and required and recommended distance between twin fall arrest lanyard anchor point attachment points climbing ladders

Delegates shall:

- 6.6.3 Demonstrate the ability to correctly use single and/or twin fall arrest lanyards whilst working at height during practical exercises
- 6.6.4 Demonstrate the ability to correctly use twin and / or single fall arrest lanyards whilst double hook climbing maintaining the correct distance between the anchor points

### ELEMENT 6.7 - APPROVED ANCHOR POINTS FOR ATTACHMENT

Training Staff 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)
- **Note:** Approved anchor points shall be pointed out to the Delegates during practical exercises, to the extent needed.

#### ELEMENT 6.8 - THE IMPORTANCE OF ALWAYS USING FALL ARREST SYSTEMS

Training Staff shall:

6.8.1 Explain the importance of always using fall arrest systems

Delegates shall:

6.8.2 Explain the importance of always using fall arrest systems

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# Lesson 7 - DROPPED OBJECTS

### 15 min.

The aim of this lesson is to reduce the risk of injury arising from dropped objects in and around wind turbine.

To successfully complete this BST Module, delegates shall be able to:

- 1) Explain the risks posed by dropped objects
- 2) Explain how to reduce the risk of dropping objects

### ELEMENT 7.1 - RISKS

Training staff 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

### **ELEMENT 7.2 - RISK REDUCTION**

Training staff 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

Delegates shall:

- 7.2.6 Demonstrate the ability to reduce the risk of dropped objects during the rest of the exercises during this course
- 7.2.7 Demonstrate the ability to stay out of the drop zone of worker at height during the practical exercises in this course

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# Lesson 8 - SELF RETRACTING LIFELINES

### 10 min.

The aim of this lesson is to enable the delegates to correctly use a backup line during practical exercises to reduce the risk of injury resulting from a fall from height. Furthermore, it will increase the delegates knowledge about self retracting lifelines enabling them to correctly and safely use these devices if they encounter them in a wind turbine.

To successfully complete this BST Module, Delegates shall be able to:

- Explain the different types of backup systems there are and how they are used, what length they come in, what the difference is between wire and strap (L2 – Knowledge)
- 2) Explain the different maximum angles that are allowed (L2 Knowledge)
- 3) Demonstrate the ability to attach a backup line correctly to the harness, either in the A point on the back or in the A point in the front (L3 Skill)
- 4) Explain the different places a backup line is allowed to be secured (L2 Knowledge)
- 5) Explain the importance of using backup lines during training (L2 Attitude & Knowledge)
- 6) Demonstrate the ability to perform a pre-use inspection of a Self-retractable lifeline (SRL) (L3 Skill)

### ELEMENT 8.1 - TYPES OF BACKUP SYSTEMS

Training Staff shall:

- 8.1.1 Explain that backup systems are required during training and that they might not necessarily be in place in a wind turbine
- 8.1.2 Explain the different types of backup systems and how they are used, size and length, how wire and strap differ.

### ELEMENT 8.2 - DIFFERENT ALLOWED MAXIMUM ANGLES

Training Staff shall:

8.2.1 Explain the different maximum angles that are allowed according to the manufacturers

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### ELEMENT 8.3 - HOW TO ATTACH CORRECTLY TO THE HARNESS

Training Staff shall:

8.3.1 Demonstrate how to attach backup systems correctly to the harness (front and rear attachment points)

Delegates shall:

- 8.3.2 Demonstrate the ability to correctly attach a backup line to their harness before working at height during practical exercises
- ELEMENT 8.4 APPROVED ANCHOR POINTS FOR BACKUP SYSTEMS

Training Staff shall:

8.4.1 Explain approved anchor points for backup systems

### ELEMENT 8.5 - THE IMPORTANCE OF USING BACKUP SYSTEMS

Training Staff shall:

8.5.1 Explain the importance of using backup systems for exercises

### **ELEMENT 8.6 - PRE-USE INSPECTION**

Training Staff shall:

- 8.6.1 Demonstrate how to perform pre-use inspection of the SRL product required / chosen to instruct this Module, by the following principals 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: Block including bolts and locking rivets (, entire cable/webbing) and connectors
  - e. All moving parts work correctly, with no excessive play
  - f. Carabiners/connectors 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)

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- k. Observe product operating temperature range
- I. Observe manufacturer's user manual for specific or additional requirements
- 8.6.2 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
- 8.6.3 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

### 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 ensuring that the delegates are briefed in the control measures employed in the practical training area and to warm up prior to performing rescue exercises.

### ELEMENT 9.1 - CONTROL MEASURES AND WARM UP

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 delegates 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 delegates during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the delegates.
- 9.1.4 Lead a warm-up session of the major muscle groups of the body and the ankles, wrists and back.
- 9.1.5 Verify that each delegate who is working at height (either as a casualty or a rescuer) during the following practical exercises is always attached to a backup line prior to and at all times whilst working at height. GWO recommends that a SRL is used as a backup line.

Delegates 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 delegates personal fall protection equipment

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# Lesson 10 - PRACTICAL EXERCISES

60 min.

The aim of this lesson is to give the Delegates the needed skills to be able to demonstrate safe and controlled rescue, according to the Control Measures.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate the ability to safely and correctly use the vertical fall arrest systems in the training facility (L3 Skill)
- 2) Demonstrate the ability to safely and correctly use fall restraint lanyards and work positioning lanyards (L3 Skill)
- Demonstrate the ability to safely and correctly use fall arrest lanyards (L3 Skill)
- 4) Demonstrate the ability to provide fall prevention (fall restraint) over fall arrest (L3 Attitude & skill)

### ELEMENT 10.1 - VERTICAL FALL ARREST SYSTEMS

Delegates shall:

10.1.1 Practice and demonstrate the ability to safely and correctly use vertical fall arrest systems

### **ELEMENT 10.2 - FALL PREVENTION**

Delegates shall:

10.2.1 Practice and demonstrate the ability to safely and correctly use fall restraint lanyards and work positioning lanyards to prevent a fall

### ELEMENT 10.3 - FALL ARREST LANYARDS

Delegates shall:

10.3.1 Practice and demonstrate the ability to safely and correctly use fall arrest lanyards, double hook climbing included

### Lesson 11 - WORKSHOP - RISKS/HAZARDS & SUSPENSION TRAUMA

30 min.

The aim of this lesson is to give the Delegates the needed skills to be able to identify risks and hazards in a WTG environment including suspension trauma and how to prevent them.

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To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate the ability to work safely at height in a wind turbine like environment (L3 Skill)
- 2) Demonstrate that they can discuss and explain multiple perspectives acquired through group discussions (L3 Skill)
- Explain the cause of suspension trauma, explain ways to prevent it and demonstrate how to reduce the risks if suspension trauma is suspected in a casualty (L2 – Knowledge)

### ELEMENT 11.1 - USING THE BST WORKING AT HEIGHTS COURSE

Delegates shall:

- 11.1.1 Practice and demonstrate the ability to apply the skills learned during the BST Working at Heights course in a wind turbine like environment
- 11.1.2 Discuss and explain multiple perspectives acquired through group discussions

### ELEMENT 11.2 - Suspension trauma

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
- **Note:** The class will be divided into three groups of four Delegates. The Delegates 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.

### Lesson 12 - EMERGENCY PROCEDURES

80 min.

The aim of this lesson is to enable the delegates to safely evacuate from a wind turbine using an evacuation or rescue kit.

To successfully complete this BST Module, Delegates shall be able to:

1) Describe the contents of an evacuation kit (L1 – Knowledge)

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- 2) Explain how evacuation equipment is used (L2 Knowledge)
- 3) Demonstrate the ability to perform a safe and correct single evacuation with the evacuation or rescue device in a passive mode setup (L3 Skill)
- 4) Demonstrate the ability to perform a safe and correct double evacuation with the evacuation or rescue device in an active mode setup including a connecting element between the device and the harness (L3 Skill)
- Demonstrate the ability to prepare rescue and or evacuation equipment for use, including applying personal fall protection prior to commencing evacuation (L3 – Skill)
- 6) At all times demonstrate safe behaviour in connection with evacuation, including applying personal fall protection prior to commencing evacuation (L3 – Attitude & skill)
- **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

Training Staff shall:

12.1.1 Show the contents of an evacuation kit and explain 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

### ELEMENT 12.2 - PREPARING EQUIPMENT FOR USE

Training Staff 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 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 the principles of and covering:
  - 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

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- 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 usage 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 delegate in their own organisation on course completion, requiring them to familiarise themselves with other rescue / evacuation products

### ELEMENT 12.3 - SAFE AND CORRECT EVACUATION

#### Training Staff 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 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 his 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
  - I. Disconnecting the evacuation device

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### ELEMENT 12.4 - SAFE BEHAVIOUR

Training Staff shall:

12.4.1 Explain safe behaviour in connection with evacuation

Delegates shall:

- 12.4.2 Demonstrate 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)
- 12.4.3 Demonstrate the ability to disconnect the device after reaching the ground level.
- 12.4.4 Demonstrate the ability to use techniques like attaching equipment to their harness to reduce the risk of dropped objects

### Lesson 12 Notes

- During the evacuation scenarios the delegates 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
- 2) An instructor *shall* be at the height chosen to descend from
- 3) Instructor(s) and Delegates *shall* be secured to an anchor point while waiting to descend (this can be achieved by correct use of the fall arrest lanyard)
- 4) When Delegates are demonstrating the evacuation, a safety line that is connected to the Delegate's harness *shall* be used. This will be set up and controlled by the instructor and be secured to a separate anchor point than that of the evacuation device
- 5) Although not a requirement of this standard, Delegates may repeat the evacuation exercises should sufficient time be available

### Lesson 13 - PPE REVIEW

10 min.

The aim of this lesson is to give the Delegates the opportunity to discuss the individual parts of the PPE equipment and use of the PPE in their own words.

This lesson is intended to be a recap for the beginning of day 2.

To successfully complete this BST Module, Delegates shall be able to:

1) Recall the individual parts of the PPE equipment and correct pre-use inspection and use of the PPE (L2 – Knowledge)

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### ELEMENT 13.1 - THE INDIVIDUAL PARTS OF THE PPE EQUIPMENT

Delegates shall:

11.1.1 Recall 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 delegates to utilize a rescue device in a wind turbine environment

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain the individual parts of the rescue equipment (L2 Knowledge)
- 2) Explain the correct usage of rescue devices, anchor points and various rigging configurations on a ladder system (L2 Knowledge)

### ELEMENT 14.1 - THE INDIVIDUAL PARTS OF DIFFERENT RESCUE DEVICES

Training Staff 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 utilize integrated friction device (e.g.pig tail/bull horn) to divert the rope
  - c. How to rig the device with deflection applying a friction 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 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

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### ELEMENT 14.2 - CORRECT USE OF RESCUE DEVICES & SLINGS

Training Staff shall:

- 14.2.1 Explain that pre-use inspection of the evacuation / rescue device may be omitted only if it is permitted by the manufacturer's 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 the following principals and covering:
  - 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. Carabiners / connectors 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 utilizing 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 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 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

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### 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 delegates are briefed in the control measures employed in the practical training area and to warm up prior to performing rescue exercises.

**Note:** This lesson is repeated from lesson 9 with the intention of teaching the delegates 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 delegates 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 delegates during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the delegates.
- 15.1.4 Lead a warm-up session of the major muscle groups of the body and the ankles, wrists and back.
- 15.1.5 Verify that each delegate who is working at height (either as a casualty or a rescuer) during the following practical exercises is always attached to a backup line prior to and at all times whilst working at height. GWO recommends that a SRL is used as a backup line.

Delegates 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 delegates personal fall protection equipment



### Lesson 16 - RESCUE EXERCISES

### 355 min.

The aim of this lesson is to give the Delegates the opportunity to approach rescue situations in wind turbines, to do a safe and correct rescue in wind turbines while using correct rescue devices and anchor points and to show correct behaviour on ladders with PPE.

Furthermore, this lesson will give the delegates the opportunity to practice working at height techniques whilst performing rescue exercises

To successfully complete this BST Module, Delegates shall be able to:

- Demonstrate the ability to safely approach rescue situations in wind turbines (L3 – Attitude & skill)
- 2) Demonstrate the ability to safely and correctly perform a rescue in a wind turbine environment (L3 Skill)
- 3) Demonstrate the ability to safely and correctly use rescue devices (L3 Skill)
- 4) Demonstrate the ability to safely and correctly use anchorage points (L3 Skill)
- Demonstrate safe and correct behaviour on ladder with PPE (L3 Attitude & skill)

### ELEMENT 16.1 - RESCUE SITUATIONS IN WIND TURBINES

#### Training Staff shall:

16.1.1 Explain and demonstrate how to safely approach rescue situations in wind turbines

### ELEMENT 16.2 - SAFE AND CORRECT RESCUE

Training Staff shall:

- 16.2.1 Explain and demonstrate how to conduct a safe and correct rescue in a wind turbine environment and first aid relating to rescue. The exercise shall include:
  - a. Handling a conscious / unconscious Casualty
  - b. Suspension trauma prevention
  - c. Connecting the karabiner 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

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### ELEMENT 16.3 - CORRECT BEHAVIOUR ON THE LADDER WITH PPE

Training Staff shall:

16.3.1 Explain and demonstrate the correct behaviour on ladder with PPE

Delegates shall:

- 16.3.2 Demonstrate 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 behavior on ladder with PPE
- 16.3.3 Demonstrate 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 utilizing 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 delegates shall at all times during the exercises demonstrate the ability to reduce the risk of dropped objects.

During exercise 16.3.3.c. The delegate 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 12.7)

#### Lesson 16 Notes

- During the rescue scenarios the delegates 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.
- 2) It is recommended to have the delegates familiarise themselves with the rescue equipment whilst one rescue exercise is conducted and observe one rescue exercise.

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- 3) During the rescue scenarios the delegate acting as rescuer must correctly use their work positioning lanyard to secure themselves leaving their hands free to work with the equipment and casualty
- 4) During the rescue scenarios, a rescue dummy can be used to simulate a Casualty
- 5) The instructor will notify the Delegate whether the Casualty is conscious or unconscious. Delegates may demonstrate the recovery position/seated position once the dummy has been lowered to a safe area
- 6) All appropriate PPE shall be worn during these exercises
- 7) 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 - EVALUATION

15 min.

The aim of this lesson is to summarize the Module and give the Delegates the opportunity to conduct an open-minded review of the training and the instructor.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

1) Active participation in the evaluation

### ELEMENT 17.1 - SUMMARY

Training Staff shall:

17.1.1 Summarize the BST Module and give the Delegates final feedback

### ELEMENT 17.2 - EVALUATION

Delegates shall:

17.2.1 Conduct a written evaluation

Training Staff shall:

17.2.2 Give necessary feedback on the written evaluations

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### **ELEMENT 17.3 - TRAINING RECORDS**

Training Staff shall:

17.3.1 Ensure that all Delegates are registered with a personal Delegate profile in WINDA and have provided their WINDA ID prior to completing the training course.

### 12.7 Delegate performance assessment

Assessment of learning outcomes:

Delegates will be assessed according to the learning outcomes stated in Section 1.6 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 Delegate shall participate and demonstrate:

Correct use of the evacuation/rescue device, including:

- 1) User inspection and test
- 2) Use of correct anchor points
- 3) Correct behaviour on ladder with PPE

Correct rescue methods, including:

- 1) 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 utilizing a rope clamp for rescue
- 2) Rescue of an **unconscious** Casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup
- 3) 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 delegate performance assessment form (example provided as Annex 1). The Trainer keeps the delegate performance assessment form until the completion/ evaluation of the BST Module.

Training Providers shall have a documented procedure in place for dealing with Delegates not meeting the stated learning outcomes. If a Delegate fails to meet the demands, they shall attend a new BST Working at Height Module.

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## 13 MODULE 5 – WORKING AT HEIGHT & MANUAL HANDLING COMBINED

## 13.1 Aims and objectives of the BST Working at Heights & Manual Handling Module

The aim of this module is to qualify the delegates, through theoretical and practical training, to use basic personal protective equipment and perform safe work at heights and safe and comprehensive basic rescue from heights. Furthermore, to encourage positive manual handling and ergonomic behaviour, encourage delegates to consider alternatives to manual handling through planning and to train delegates ability to perform Manual Handling tasks in a safe manner in the wind turbine industry/environment.

The BST Working at Heights with Manual Module shall ensure that:

- The Delegates are able to **demonstrate** knowledge of hazards and risks associated with working at height specific to a wind turbine generator (WTG) (L2 – Knowledge)
- 2) The Delegates are able to **demonstrate** understanding of current national and regional legislation regarding Working at Heights (L2 Knowledge)
- 3) The Delegates are able to **demonstrate** correct identification of PPE, including identification of European/Global standard markings e.g. harness, hard hat, lanyards, etc. (L3 Skill)
- 4) The Delegates are able to **demonstrate** the knowledge and skills to correctly perform pre-use inspection, service, store and correctly fit relevant PPE, e.g. harness, fall arrest lanyards, guided type fall arrest devices and work positioning lanyards (L2 Knowledge & L3 Skill)
- 5) The Delegates are able to **demonstrate** correct use of the relevant PPE, e.g. harnesses fall arrest lanyards, guided type fall arresters and work positioning lanyards. This includes correct identification of anchor points and correct conduct on ladder (L3 Skill)
- The Delegates are able to **demonstrate** correct use of evacuation devices (L3 Skill)
- 7) The Delegates are able to **demonstrate** how to approach rescue situations in WTGs and use rescue equipment efficiently (L3 Attitude and Skill)
- 8) The Delegates are able to **demonstrate** a problem-solving approach to Manual Handling in a wind turbine environment (L3 Skill)
- 9) The Delegates are able to **demonstrate** Manual Handling risk reduction techniques (L3 Skill)

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- 10) The Delegates are able to **identify** aspects of their job tasks that could increase their risk of developing muscular/ skeletal injuries (L2 Knowledge)
- 11) The Delegates are able to **demonstrate** understanding of the importance of carrying out work duties in a safe and sound manner in accordance with the legislative requirements of their geographic work location (L2 Knowledge)
- 12) The Delegates are able to **demonstrate** understanding of safe practices of Manual Handling, including the correct handling of equipment (L2 Knowledge)
- 13) The Delegates are able to **identify** signs and symptoms of injuries related to poor Manual Handling techniques and have knowledge of reporting methods (L1 Knowledge)
- **Note:** This course is not intended to test the Delegate's capability and aptitude for Working at Heights, i.e. it is not a test for fear of heights.

### 13.2 Duration of the BST Working at Heights & Manual Handling Module

The total contact time for completing this working at height and manual handling combined module is estimated to be 14 hours and 50 minutes. This is based on the time estimate given in the module timetable.

The training provider must not exceed the times per day given in table 13-2 below.

The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to working at height and manual handling in a way that is constructive for the entire class.

	Maximum duration per day
Contact time	8 hours
Total training day	10 hours

Table 13-2 - 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).



### 13.3 Working at Heights & Manual Handling Trainer/Delegate Ratio

The ratio shown for theory sessions indicates the maximum number of Delegates attending the course.

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

Module	Session	Trainer - Delegate Ratio
	Theory	1:12
BST Working at	Practical	1:6
Heights with Manual	Session (Onsite)	Trainer - Delegate Ratio
Heights with Manual Handling	Session (Onsite) Theory	Trainer - Delegate Ratio 1:12

Table 13-3 GWO BST WAH and MH instructor / delegate ratio

### 13.4 Equipment for Working at Heights & Manual Handling Module

The equipment required for training as listed in Annex 3 must be available and must fulfil national legal requirements as listed in table A3-1 in annex 3 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 Delegate'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), enabling the Delegate 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 but without additional formal training.

Where reasonably practicable the training provider shall eliminate the risk of a fall from height. Where it is not possible to eliminate the risk of a fall then the fall factor experienced by any person shall be kept as low as is reasonably practicable.

GWO recommends a maximum fall factor of 0.5. To calculate this the following formula has been used,

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

using the maximum allowed lanyard of length 2.00 m and a fall of 1.00 m,

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

*Factor* (FF) = 0.5.

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

During the evacuation exercise the delegates 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 delegate descend from a minimum height using a rescue or evacuation device.

To ensure that for all fall protection equipment that may be used that there will be enough clearance below the anchor point, and to ensure that the delegates can experience a descent of sufficient duration for meaningful learning transfer, the GWO recommends that the anchor point is a minimum of 6.75 m (22.15') above the ground or structure directly below the anchor point. The recommended 6.75 m (22.15') clearance under the anchor point is explained in detail in annex 3.

If a training provider deviates from the recommended anchor point height of 6.75 m (22.15') to a lower height, then the following additional control measures must be in place,

- a. 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;
  - i. use the value for shock absorber elongation that is provided by the equipment manufacturer, and,
  - ii. demonstrate that the equipment will prevent the person from coming into contact with the ground or structure directly below the anchor point, and,
  - iii. 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 3 section 4, and,
- b. the potential fall factor shall not exceed 0.5, and,
- c. delegates must experience a descent from a platform that is a minimum of 4.5 m (14.76') above the ground.



### 13.5 BST Working at Heights & Manual Handling Time Table

The order in which the elements of this BST training Module are delivered may vary.

Within the module timetables, approximate duration 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.

Lesson		Element		Approx. Duration
1	Introduction	1.1	Safety instructions and emergency	
		1.2	Facilities	
		1.3	Introduction	
		1.4	Scope and main objectives	
		1.5	On-going assessment	
		1.6	Motivation	
		-	TOTAL	15 min.
2	Legislation and	2.1	Global legislation	
	Behavioural Safety	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	
		1	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 Harness	
		4.5	The importance of using work positioning	
	-	-	TOTAL	25 min.
5	Vertical fall arrest	5.1	Legal requirements	
	systems	5.2	Pre-use inspection	
		5.3	Correct attachment & Detachment	
		5.4	Correct use	
		5.5	Periodic Inspections	

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		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 Harness	
		6.4	Fall indicators	
		6.5	Twin & Single fall Arrest lanyards	
		6.6	Approved anchor points for attachment	
		6.7	The importance of always using a fall	
	_		arrest system	_
			TOTAL	55 min.
7	Dropped Objects	7.1	Risks	
		7.2	Risk Reduction	
			TOTAL	15 min.
8	Self-Retracting	8.1	Types of backup systems	
	lifelines	8.2	Different maximum angles that are	
			allowed	
		8.3	How to attach correctly to the harness	
		8.4	Approved anchor points for backup	
			systems	
		8.5	The importance of using backup systems	
		8.6	Pre-use Inspection	
			TOTAL	10 min.
9	Control Measures to	9.1	Control measures and Warm up	
	prevent injury			
	during training	<u> </u>		
		1	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	Spinal anatomy and	11.1	Anatomy	
	Posture	11.2	Symptom Awareness	
		11.3	Reporting Methods	
		•	TOTAL	20 min.
12	Planning Manual	12.1	T.I.L.E. Principle	
	Handling	12.2	Further control measures	
		·	TOTAL	20 min.
13	Manual handling	13.1	Risk and hazards in the wind industry	
	Techniques	13.2	Proper manual handling Techniques	

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		13.3	Practice in proper manual handling techniques	
		-	TOTAL	45 min.
14	Emergency	14.1	Contents of an evacuation kit	
	procedure	14.2	Prepare the equipment for use	
		14.3	Safe and correct evacuation	
		14.4	Safe behaviour	
		I	TOTAL	80 min.
15	Workshop: risks and hazards and	15.1	Using the BST Working at Height with Manual handling course	
	Suspension Trauma	15.2	Suspension Trauma	
			TOTAL	30 min.
16	PPE review	16.1	The individual parts of the PPE equipment	
		-	TOTAL	10 min.
17	Rescue Devices & Rigging setup	17.1	The individual parts of the different rescue devices	
		17.2	Correct use of rescue devices and slings	
		-	TOTAL	20 min.
18	Measures to prevent injury during training	18.1	Control measures and Warm up	
			TOTAL	20 min.
19	Rescue exercises	19.1	Rescue situations in wind turbine environment	
		19.2	Safe and correct rescue	
		19.3	Safe and Correct behaviour on ladder with PPE	
TOTAL 3			355 min.	
20	Evaluation	20.1	Summary	
		20.2	Evaluation	
		20.3	Training records	
			TOTAL	15 min.
GRAND TOTAL 8				

Table 13-5 - GWO BST WAH / MH timetable

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# 13.6 Detailed description of BST Working at Heights & Manual Handling Module

### Lesson 1 - INTRODUCTION

15 min.

The aim of this lesson is to give the Delegates the needed awareness of the course content and the facilities in order to ensure that all Delegates are aware of what to expect and what is expected of them during the course.

To successfully complete this BST Working at Heights with Manual Handling Module, Delegates shall be aware of:

- 1) Safety instructions and emergency procedures
- 2) Facilities
- 3) Who the instructor and other Delegates are
- 4) Aims and primary learning objectives
- 5) On-going assessment according to GWO Control Measures
- 6) Motivation for this BST course

### ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Training Staff shall:

- 1.1.1 Explain the Safety instructions according to internal procedures
- 1.1.2 Explain the emergency procedures and emergency exits in the areas where the Delegates can be expected to be located during the course

### ELEMENT 1.2 - FACILITIES

Training Staff shall:

1.2.1 Describe the location of the on-site facilities (Administration, dining area, restrooms, toilets, etc.)

### ELEMENT 1.3 - INTRODUCTION

Training Staff shall:

1.3.1 Give a short introduction, including their backgrounds as instructors

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Delegates shall:

1.3.2 Give a short introduction, including their job function and expected primary geographic work location

Training Staff shall:

1.3.3 Explain the program of the BST Module, including time for breaks and meals

ELEMENT 1.4 - SCOPE AND MAIN OBJECTIVES

Training Staff shall:

1.4.1 Explain the scope and main objectives of this BST Module

### ELEMENT 1.5 - ON-GOING ASSESSMENTS

Training Staff shall:

- 1.5.1 Explain the reasons for the on-going assessment
- 1.5.2 Explain the GWO Control Measuresdelegate performance assessment form and their use

### ELEMENT 1.6 - MOTIVATION

Training Staff shall:

- 1.6.1 Explain the importance of personal involvement in the course
- 1.6.2 Define and explain the need for correct Working at Heights with Manual Handling

### Lesson 2 - LEGISLATION AND BEHAVIORAL SAFETY

25 min.

The aim of this lesson is to introduce the Delegates to the site organization and relevant legislation in order to ensure the Delegates' are aware of the roles, responsibilities and rules that apply to on and offshore wind farms. Additionally, enable the delegates to work safely in the wind industry and remain injury-free.

To successfully complete this BST Module, Delegates shall be able to:

- Describe internationally recognised and national standards / legislation relevant to Working at Heights (L1 – Knowledge)
- 2) Describe internationally recognised and national standards / legislation relevant to Manual Handling (L1 Knowledge)

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- 3) Explain the consequences of injuries (L2 Knowledge)
- 4) Explain the possible causes of injuries (L2 Knowledge)

### ELEMENT 2.1 - GLOBAL LEGISLATION

Training Staff shall:

- 2.1.1 Describe applicable standards / legislation
- 2.1.2 Describe legal responsibilities

### ELEMENT 2.2 - NATIONAL LEGISLATION

Training Staff shall:

- 2.2.1 Describe applicable legislation
- 2.2.2 Describe legislative requirements
- 2.2.3 Describe legal responsibilities

### ELEMENT 2.3 - BEHAVIORAL SAFETY

Training Staff 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

### Delegates shall:

- 2.3.4 Explain how a work-related injury can affect them
- 2.3.5 Explain how incorrect manual handling can affect them

### 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 delegate to perform a pre-use inspection of a harness, be able to identify when a harness requires a formal inspection and approval, explain basic maintenance of a harness, and to correctly fit and adjust a harness.

To successfully complete this BST Module, Delegates shall be able to:

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- 1) Demonstrate the ability to perform pre-use inspection of a random full body harness (L3 Skill)
- 2) Demonstrate the ability to correctly fit and adjust a random full body harness (L3 Skill)
- 3) Explain approvals according to appropriate equipment guidelines (EU, UK, USA, Canada, Mexico etc.) (L2 Knowledge)
- 4) Identify the approval documentation, equipment serial number, authorization date, etc. (L2 Knowledge)
- 5) Explain how to maintain a harness (L2 Knowledge)

### ELEMENT 3.1 - PRE-USE INSPECTION

Training Staff shall:

- 3.1.1 Briefly introduce the generic approach to safety equipment as described in the equipment appendix to this module
- 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 Explain manufacturer and/or legal inspection periods
- 3.1.5 Explain the principals 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
  - I. Soiling of harness (e.g. oil spills)
  - m. Saltwater exposure
  - n. Locks
  - o. Observe manufacturer's user manual for specific or additional requirements

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- 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 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

Delegates shall:

- 3.1.9 Demonstrate 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
- 3.1.10 Correctly identify the standards markings and inspection dates on a full body harness

### ELEMENT 3.2 - FITTING

Training staff 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 covering the following:
  - p. Shoulder straps should be loosened
  - q. Leg straps sit well
  - r. Abdominal strap should sit well
  - s. Chest strap (strapped slightly above or on the chest)
  - t. Pivot link shall be at the hip and shall be flexible, may not sit as high that it can damage ribs and internal organs by a fall

Delegates shall:

3.2.3 Practice and demonstrate 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**

Training Staff shall:

3.3.1 Explain How often the harness shall be periodically inspected globally (in the EU, UK, USA, Canada, Mexico etc.)

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### **ELEMENT 3.4 - DOCUMENTATION**

Training Staff shall:

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

### **ELEMENT 3.5 - MAINTENANCE**

Training Staff shall:

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

### Lesson 4 - FALL PREVENTION

25 min.

The aim of this lesson is to enable the delegates to use fall restraint and work positioning lanyards to prevent a fall and reduce the risk of injuries whilst working at height

To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate the ability to attach a fall restraint lanyard and work positioning lanyard correctly to the ladder system (L3 Skill)
- 2) Demonstrate the ability to Correctly use fall restraint lanyards and work positioning lanyards with focus on their own personal safety (L3 Skill)
- Demonstrate the ability to attach fall restraint lanyards and work positioning lanyards correctly to the harness (front and/or rear attachment points, and/or side D-rings) (L3 – Skill)
- 4) Explain that fall prevention is preferred over fall arrest (L2 Knowledge & attitude)
- 5) Explain the importance of using work positioning lanyards in order to leave hands free for work (L2 Knowledge & attitude)
- 6) Demonstrate the ability to perform a pre-use inspection of a fall restraint lanyard and a work positioning lanyard (L3 Skill)

### ELEMENT 4.1 - FALL PREVENTION OVER FALL ARREST

Training Staff shall:

4.1.1 Explain why fall prevention is better than fall arrest

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- 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 / travel arrest lanyard while using a work restraint or work positioning lanyard
- 4.1.4 Explain how to change position whilst attached to a work positioning lanyard

### ELEMENT 4.2 - PRE-USE INSPECTION

Training Staff 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 principals 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. Karabiners/connectors 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 / travel 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 Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

### Delegates shall:

4.2.4 Demonstrate the ability to perform a pre-use inspection of a random fall / travel restraint lanyard and work positioning lanyard (demonstrated during this module), covering the points demonstrated in this element, before working at height during practical exercises

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### ELEMENT 4.3 - CORRECT ATTACHMENT TO ANCHOR POINTS

Training Staff shall:

- 4.3.1 Explain the importance of personal safety when using work positioning lanyards, Delegates shall never lose focus for their own safety
- 4.3.2 Demonstrate how to correctly attach fall restraint lanyards and work positioning lanyards:
  - a. To the ladder stiles and reinforced ladder rungs
  - b. To certified and structural anchor points

Delegates shall:

- 4.3.3 Identify and select certified and structural anchor points for the attachment of fall / travel restraint lanyards and work positioning lanyards
- 4.3.4 Demonstrate the ability to correctly attach fall restraint lanyards and work positioning lanyards, covering the scenarios presented in this element, whilst working at height during practical exercises

### ELEMENT 4.4 - CORRECT ATTACHMENT TO THE HARNESS

Training Staff 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)

### ELEMENT 4.5 - THE IMPORTANCE OF USING WORK POSITIONING

Training Staff shall:

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

### Lesson 5 - VERTICAL FALL ARREST SYSTEMS

25 min.

The aim of this lesson is to enable the delegate to perform a pre-use inspection of various types of vertical fall arrest systems and to use a random vertical fall arrest system whilst working at height

To successfully complete this BST Module, Delegates shall be able to:

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- 1) Explain the legal requirements for using fall arrest systems when working at Height (L2 Knowledge)
- Demonstrate the ability to perform a pre-use inspection of a random vertical fall arrest system including pre-use inspection of a random fall arrest glider/slider (L3 – Skill)
- 3) Demonstrate the ability to correctly attach a random vertical fall arrest glider/slider to the matching system rail/wire (L3 Skill)
- 4) Demonstrate the ability to safely and correctly use a vertical fall arrest system whilst working at height (L3 Skill)
- 5) Explain country and region specific approvals of vertical fall arrest systems (L2 Knowledge)

### ELEMENT 5.1 - LEGAL REQUIREMENTS

Training Staff 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

### ELEMENT 5.2 - PRE-USE INSPECTION

Training Staff shall:

- 5.2.1 Demonstrate how to perform a pre-use inspection of a vertical fall arrest system by the following principals and covering:
  - 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 required/chosen to instruct this Module, by the following principals and covering:
  - a. Identify which vertical fall arrest system the guided type fall arrester matches with, including matching cable size
  - b. Markings and labels

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- 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 karabiners
- 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/instructions for "UP" orientation (pointing towards the sky when climbing up/down)
- j. Gravity stop functionality works as intended
- k. Fall indicator
- I. Karabiners/connecting elements operate and lock as intended, cannot disconnect completely and has 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 the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

Delegates shall:

5.2.5 Demonstrate the ability to perform a pre-use inspection of a random vertical fall arrest system including matching fall arrest glider/slider (demonstrated during this module) before working at height during practical exercises

### ELEMENT 5.3 - CORRECT ATTACHMENT AND DETACHMENT

#### Training Staff shall:

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

Delegates shall:

5.3.2 Demonstrate the ability to correctly attach/detach a random glider/slider to the rail/wire of a matching vertical fall arrest system prior to and whilst working at height during practical exercises

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5.3.3 Explain that the symbol/instructions for "UP" orientation of fall arrester must always point to the sky – and does not indicate the climbing direction

### ELEMENT 5.4 - CORRECT USE

Training Staff shall:

5.4.1 Demonstrate how to correctly use a vertical fall arrest system

#### Delegates shall:

5.4.2 Demonstrate the ability to correctly use a random vertical fall arrest system during practical exercises, including from now on ALWAYS do a "hang-test/load test" attaching to the system before commencing climbing up/down - to test that the fall arrester operates, and locks as intended

### **ELEMENT 5.5 - PERIODIC INSPECTIONS**

Training Staff shall:

- 5.5.1 Explain how Delegates 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 delegate must seek out which inspection periods apply in the country where they will be working

### ELEMENT 5.6 - CORRECT DOCUMENTATION

Training Staff shall:

5.6.1 Explain how Delegates can find the correct documentation

### Lesson 6 - FALL ARREST LANYARDS

55 min.

The aim of this lesson is to enable the delegates to safely use fall arrest lanyards whilst working at height

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain the legal requirements for using fall arrest systems when Working at Heights (L2 Knowledge)
- Demonstrate the ability to perform a pre-use inspection of a fall arrest lanyard (L3 – Skill)

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- 3) Demonstrate the ability to correctly attach fall arrest systems to the harness (front and rear attachment points) (L3 Skill)
- 4) Value and apply the principle of selecting fall arrest anchor points which reduce the fall factor to as low as possible (L3 Attitude & skill)
- 5) Explain how to detect if PPE has experienced a fall (Fall indicator) (L2 Knowledge)
- 6) Explain the differences between twin fall arrest lanyards and single fall arrest lanyards, as well as the different ways of usage (L2 Knowledge)
- 7) Demonstrate the ability to use twin fall arrest lanyards whilst double hook climbing (L3 Skill)
- 8) Explain approved anchor points (L2 Knowledge)
- 9) Explain the importance of always using a fall arrest system (L2 Attitude & knowledge)

### **ELEMENT 6.1 - LEGAL REQUIREMENTS**

Training Staff shall:

6.1.1 Explain the legal requirements for using fall arrest lanyards when Working at Height

### ELEMENT 6.2 - PRE-USE INSPECTION

Training Staff 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 principals 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: Energy absorber, and lanyard rope, webbing, plastic, metal and heatshrinkable tubing
  - e. All moving parts work correctly, with no excessive play
  - f. Carabiners/connectors 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

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- 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)
- I. 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 Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

Delegates shall:

6.2.4 Demonstrate the ability to perform a pre-use inspection of a random fall arrest lanyard (demonstrated during this module) before working at height during practical exercises

### ELEMENT 6.3 - CORRECT ATTACHMENT TO THE HARNESS

Training Staff shall:

6.3.1 Demonstrate how to attach fall arrest lanyards correctly to the harness (back, or possible front, attachment point) according to manufacturer's user manual and relevant country specific requirements/restrictions

Delegates shall:

6.3.2 Demonstrate the ability to correctly attach fall arrest lanyards to a harness before working at height during practical exercises

### ELEMENT 6.4 - FALL FACTOR

Training Staff 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

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- 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

Delegates 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 delegates to attach their fall arrest lanyards.

### ELEMENT 6.5 - FALL INDICATORS

#### Training Staff 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

#### ELEMENT 6.6 - TWIN AND SINGLE FALL ARREST LANYARDS

Training Staff 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 and required and recommended distance between twin fall arrest lanyard anchor point attachment points climbing ladders

Delegates shall:

- 6.6.3 Demonstrate the ability to correctly use single and/or twin fall arrest lanyards whilst working at height during practical exercises
- 6.6.4 Demonstrate the ability to use twin and single fall arrest lanyards while double hook climbing on a ladder maintaining the correct distance between the anchor points

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### ELEMENT 6.7 - APPROVED ANCHOR POINTS FOR ATTACHMENT

Training Staff 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)
- **Note:** Approved anchor points shall be pointed out to the Delegates during practical exercises, to the extent needed.

### ELEMENT 6.8 - THE IMPORTANCE OF ALWAYS USING FALL ARREST SYSTEMS

Training Staff shall:

6.8.1 Explain the importance of always using fall arrest systems

Delegates shall:

6.8.2 Explain the importance of always using fall arrest systems

### Lesson 7 - DROPPED OBJECTS

15 min.

The aim of this lesson is to reduce the risk of injury arising from dropped objects in and around a wind turbine.

To successfully complete this BST Module, delegates shall be able to:

- 1) Explain the risks posed by dropped objects
- 2) Explain and demonstrate techniques to reduce the risk of dropping objects

### ELEMENT 7.1 - RISKS

Training staff shall:

- 7.1.1 Explain the risks posed by dropped objects
- 7.1.2 Explain which items can constitute a dropped object hazard
- 7.1.3 Describe typical injuries that can occur as a result of a dropped object

### ELEMENT 7.2 - RISK REDUCTION

Training staff shall:

7.2.1 Explain that it is never acceptable to work directly above another person

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- 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

Delegates shall:

- 7.2.6 Demonstrate the ability to reduce the risk of dropped objects during the rest of the exercises during this course
- 7.2.7 Demonstrate the ability to stay 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 delegates to correctly use a backup line during practical exercises to reduce the risk of injury resulting from a fall from height. Furthermore, it will increase the delegates knowledge about self retracting lifelines enabling them to correctly and safely use these devices if they encounter them in a wind turbine.

To successfully complete this BST Module, Delegates shall be able to:

- Explain the different types of backup systems there are and how they are used, what length they come in, what the difference is between wire and strap (L2 – Knowledge)
- 2) Explain the different maximum angles that are allowed (L2 Knowledge)
- 3) Demonstrate the ability to attach a backup line correctly to the harness, either in the A point on the back or in the A point in the front (L3 Skill)
- 4) Explain the different places a backup line is allowed to be secured (L2 Knowledge)
- 5) Explain the importance of using backup (L2 Attitude & knowledge)
- 6) Demonstrate the ability to perform a pre-use inspection of a Self-retractable lifeline (SRL) (L3 Skill)

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### ELEMENT 8.1 - TYPES OF BACKUP SYSTEMS

Training Staff shall:

- 8.1.1 Explain that backup systems are required during training and that they might not necessarily be in place in a wind turbine
- 8.1.2 Explain the different types of backup systems and how they are used, size and length, how wire and strap differ

### ELEMENT 8.2 - DIFFERENT ALLOWED MAXIMUM ANGLES

Training Staff shall:

8.2.1 Explain the different maximum angles that are allowed according to the manufacturers

### ELEMENT 8.3 - HOW TO ATTACH CORRECTLY TO THE HARNESS

Training Staff shall:

8.3.1 Demonstrate how to attach backup systems correctly to the harness (front and rear attachment points)

Delegates shall:

8.3.2 Demonstrate the ability to correctly attach a backup line to their harness before working at height during practical exercises

### ELEMENT 8.4 - APPROVED ANCHOR POINTS FOR BACKUP SYSTEMS

Training Staff shall:

8.4.1 Explain approved anchor points for backup systems

### ELEMENT 8.5 - THE IMPORTANCE OF USING BACKUP SYSTEMS

Training Staff shall:

8.5.1 Explain the importance of using backup systems for exercises

### ELEMENT 8.6 - PRE-USE INSPECTION

Training Staff shall:

- 8.6.1 Demonstrate how to perform pre-use inspection of the SRL product required / chosen to instruct this Module, by the following principals and covering:
  - a. Markings and labels

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- b. Operating weight and temperature range
- c. Equipment is within period of formal inspections
- d. Integrity, damage, corrosion, saltwater exposure and significant wear of: Block including bolts and locking rivets (, entire cable/webbing) and connectors
- e. All moving parts work correctly, with no excessive play
- f. Carabiners/connectors 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 product operating temperature range
- I. Observe manufacturer's user manual for specific or additional requirements
- 8.6.2 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
- 8.6.3 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

### 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 ensuring that the delegates are briefed in the control measures employed in the practical training area and to warm up prior to performing rescue exercises.

### ELEMENT 9.1 - CONTROL MEASURES AND WARM UP

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 delegates can explain the principles of operation of the PPE and equipment to be used during practical training sessions.

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- 9.1.3 Ensure that any hazardous energy sources which may affect the delegates during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the delegates.
- 9.1.4 Lead a warm-up session of the major muscle groups of the body and the ankles, wrists and back
- 9.1.5 Verify that each delegate who is working at height (either as a casualty or a rescuer) during the following practical exercises is always attached to a backup line prior to and at all times whilst working at height. GWO recommends that a SRL is used as a backup line.

Delegates 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 delegates personal fall protection equipment

### Lesson 10 - PRACTICAL EXERCISES

60 min.

The aim of this lesson is to enable the delegates to be able to demonstrate safe and controlled work at height, according to the Control Measures.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate the ability to safely and correctly use the vertical fall arrest systems in the training facility (L3 Skill)
- 2) Demonstrate the ability to safely and correctly use fall restraint lanyards and work positioning lanyards (L3 Skill)
- 3) Demonstrate the ability to safely and correctly use fall arrest lanyards (L3 Skill)
- 4) Demonstrate the ability to provide fall prevention (fall restraint) over fall arrest (L3 Attitude & skill)

### ELEMENT 10.1 - VERTICAL FALL ARREST SYSTEMS

Delegates shall:

10.1.1 Practice and demonstrate the ability to safely and correctly use Vertical fall arrest systems

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### **ELEMENT 10.2 - FALL PREVENTION**

Delegates shall:

10.2.1 Practice and demonstrate the ability to safely and correctly use fall restraint lanyards and work positioning lanyards to prevent a fall

### ELEMENT 10.3 - FALL ARREST LANYARDS

### Delegates shall:

10.3.1 Practice and demonstrate the ability to safely and correctly use fall arrest lanyards, double hook climbing included

### Lesson 11 - SPINAL ANATOMY AND POSTURE

20 min.

The aim of this lesson is to enable the delegates to reduce the risk of muscular and spinal injuries through awareness of the risks and by using exercise to train the back and shoulder muscles

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain common muscular and skeletal injuries (L2 Knowledge)
- 2) Explain spinal anatomy, including prolapsed disc and the importance of neutral posture (L2 Knowledge)
- 3) Explain shoulder anatomy, including common injuries (L2 Knowledge)
- 4) Explain typical symptoms of muscular and skeletal injury and the importance of early detection and treatment (L2 Knowledge)
- 5) Explain typical injury reporting methods (L2 Knowledge)
- 6) Demonstrate the ability to use practical exercises for training the back and shoulders (L3 Skill)

### ELEMENT 11.1 - ANATOMY

Training Staff shall:

- 11.1.1 Lead a discussion about muscular and skeletal injuries related to Manual Handling, including:
  - a. Back injuries e.g. prolapsed disc
  - b. Muscle strains
- 11.1.2 Explain the relationship between injury and spinal anatomy and posture

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11.1.3 Explain the relationship between shoulder anatomy and common injuries when working above shoulder height e.g. tendonitis, bursitis

Delegates shall:

- 11.1.4 Describe typical muscular and skeletal injuries to the back and shoulders related to manual handling
- 11.1.5 Describe the relationship between muscular and skeletal injuries, and spinal anatomy and posture

### **ELEMENT 11.2 - SYMPTOM AWARENESS**

Training Staff shall:

11.2.1 Lead a discussion about symptom awareness and the importance of early detection and treatment

Delegates shall:

- 11.2.2 Describe typical symptoms of muscular and skeletal injuries
- 11.2.3 Explain the importance of early detection and treatment

### **ELEMENT 11.3 - REPORTING METHODS**

Training Staff shall:

- 11.3.1 Lead a discussion about reporting methods and procedures in case of injuries
  - a. National requirements
  - b. Company specifics

Delegates shall:

11.3.2 Describe typical injury reporting methods

### Lesson 12 - PLANNING MANUAL HANDLING

20 min.

The aim of this lesson is to enable the delegates to reduce the risk of injury resulting from incorrect manual handling by assessing the risks and planning the task.

To successfully complete this BST Module, Delegates shall be able to:

1) Explain the Task Individual Load Environment (T.I.L.E.) Principle (L2 – Knowledge)

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- 2) Explain how to assess and control risks and aggravating factors by the use of a MAC tool (L2 Knowledge)
- 3) Explain further Control Measures (L2 Knowledge)
- **Note:** Please refer to annex 5: Manual handling risk assessment for details on T.I.L.E. Principle and assessing aggravating factors and risks (i.e. the use of a MAC tool). The annex 5 may be used as a basis for developing training material.

### ELEMENT 12.1 - T.I.L.E. PRINCIPLE

Training staff shall:

- 12.1.1 Lead a discussion about basic, quick risk assessment, e.g. identification of aggravating factors, assess the level of risk, control the risk
- 12.1.2 Lead a discussion about planning Manual Handling correctly by using the T.I.L.E. principle, including load weight, reaching distance and aggravating factors
  - a. Task (e.g. reaching, bending, stooping, repetition, duration, location, distance, hazards, pace)
  - b. Individual (e.g. warm up, posture, capability, height, size)
  - c. Load (e.g. weight and reaching distance, handles, size, temperature, texture)
  - d. Environment (e.g. space constraints, cold or heat, rain, wind, obstacles, stairs, poor lighting, vibrating, floor conditions)
- 12.1.3 Explain alternatives to lifting and the risks thereof

Delegates shall:

12.1.4 Explain the T.I.L.E principle, and how to mitigate aggravating factors and risks

### ELEMENT 12.2 - FURTHER CONTROL MEASURES

Training staff shall:

- 12.2.1 Explain further Control Measures to reduce risk of injury, including:
  - a. Mechanical handling (e.g. cranes, scissor lifts, trolleys, steps)
  - b. PPE correct fit (e.g. correct sizes, boot laces tied)
  - c. Breaking up loads
  - d. Protecting pre-existing injuries
  - e. Adequate lighting
  - f. Good housekeeping

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## Lesson 13 - MANUAL HANDLING: RISK CONTROLS & PROPER MANUAL HANDLING TECHNIQUES

## 45 min.

The aim of the lesson is to enable the delegates to reduce the risk of injury by using proper manual handling techniques in a wind turbine like environment. To the greatest possible extent, the scenarios should include the challenges that were mentioned by Delegates during lesson 3.

The key learning from the BST Manual Handling Module lessons shall be practiced during scenario-based training.

To successfully complete this BST Module, Delegates must be able to:

- 1) Discuss the risks associated with manual handling in the wind industry (L2 Knowledge)
- Demonstrate the ability to stretch and warm up specific muscle groups (L3 Skill)
- 3) Demonstrate the ability to use proper manual handling techniques (L3 Skill)

## ELEMENT 13.1 - RISK AND HAZARDS IN THE WIND TURBINE INDUSTRY

During this lesson the Delegates' experience and their observations shall be included and to the greatest possible extent this should be driving the discussion. When relevant, behavioural safety shall further be drawn into the discussion.

The Delegates are motivated to mention any specific situations where they find it hard to appropriately use correct Manual Handling techniques.

Based on Delegates' experience, the training staff shall:

- 13.1.1 Lead a discussion about Risks and hazards of Manual Handling relevant to the job functions within the wind industry such as:
  - a. Awkward positions
  - b. Forceful exertions
  - c. Repetitive motions
  - d. Contact stress
  - e. Exposure of local body parts and entire body to mechanical vibrations
  - f. Duration of exposure
  - g. Frequency of exposure
  - h. Intensity of exposure
- 13.1.2 Lead a discussion about how to avoid the risks and hazards and improve safety while executing Manual Handling related tasks

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## ELEMENT 13.2 - PROPER MANUAL HANDLING TECHNIQUES

Training staff shall:

- 13.2.1 Demonstrate how to stretch and warm-up muscle groups relevant to the task
- 13.2.2 Demonstrate how to use proper manual handling techniques, including:
  - a. Lifting objects from the floor
  - b. Lifting objects from height (e.g. bench, shelving rack)
  - c. Safe lifting techniques using 2 or more persons
  - d. Proper handling of at least two different types of loads (weight, shape) in at least three different manual handling scenarios simulating a wind turbine work situation with one or more obstacles (stairs, uneven floors and/or in a constrained space)

**Note:** Appropriate mechanical lifting aids can be included in the practical exercises.

## ELEMENT 13.3 - PRACTICE IN PROPER MANUAL HANDLING TECHNIQUES

The practical training shall be structured in such a way that Delegates gain practical understanding of the theory introduced in the previous lessons.

Specifically, experiences and challenges that were discussed during lesson 3 "Risks and hazards" shall be reviewed and applied during this scenario-based training.

Training Staff shall:

13.3.1 Explain the safety procedures to be adopted in the training area

Delegates shall:

- 13.3.2 Demonstrate the ability to stretch and warm-up muscle groups relevant to the task
- 13.3.3 Practice and demonstrate proper manual handling techniques in scenarios relevant to the industry, covering the points in sub-element 11.1.2 and according to the delegate assessment form *(see Lesson 13 Notes below)*

Training Staff shall facilitate debriefing:

- 13.3.4 Scenario-based training
  - a. Review positive actions observed during exercise
  - b. Suggest points for improvement

Formal assessment of knowledge (see Section 13.7)

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### Lesson 13 Notes:

- 1) Each Delegate would benefit most if they participate in a practice scenario based on a wind turbine work environment.
- 2) Lifting various objects in the correct and proper manner. These can be of different shapes and sizes but shall not weigh more than 15 Kg.
- 3) In teams (2 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)
- 4) The lesson elements concerned with manual handling should be practiced during subsequent exercises where the delegates are performing exercises for rescue and evacuation from height and at any other time where they are handling equipment or props for exercises.
- 5) Training staff should observe and provide immediate constructive feedback to the delegates focusing on the following areas:
  - a. Reducing manual handling using suitable handling aids where possible
  - Planning of manual handling tasks using the T.I.L.E. Principle and MAC tool - considering the load weight, maximum reaching distance and aggravating factors
  - c. Correct manual handling techniques

## Lesson 14 - EMERGENCY PROCEDURES

#### 80 min.

The aim of this lesson is to enable the delegates to safely evacuate from a wind turbine using an evacuation kit

To successfully complete this BST Module, Delegates shall be able:

- 1) Describe the contents of an evacuation kit (L1 Knowledge)
- 2) Explain how evacuation equipment is used (L2 Knowledge)
- 3) Demonstrate the ability to perform a safe and correct single evacuation with the evacuation device in a passive mode setup (L3 Skill)
- 4) Demonstrate the ability to perform a safe and correct double evacuation with the evacuation device in an active mode setup including a connecting element between the harness and the device. (L3 Skill)
- 5) Demonstrate the ability to prepare evacuation equipment for use, including correct usage of anchor points (L3 Skill)

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- 6) At all times demonstrate safe behaviour in connection with evacuation, including applying personal fall protection prior to commencing evacuation (L3 – Attitude & skill)
- **Note:** If there is more than one participant on the top of the training tower at one time, all need to be secured, either by the evacuation device or by their fall restraint or fall arrest systems.

### ELEMENT 14.1 - CONTENTS OF AN EVACUATION KIT

Training Staff shall:

14.1.1 Show the contents of an evacuation kit and explain 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

## ELEMENT 14.2 - PREPARING EQUIPMENT FOR USE

Training Staff shall:

- 14.2.1 Explain that pre-use inspection of the evacuation device may be omitted only if it is permitted by the manufacturer's manual and the manufacturer criteria.
- 14.2.2 Demonstrate how to perform a pre-use inspection of the rescue / evacuation device products required / chosen to instruct this module, by following the principles of and covering:
  - 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
- 14.2.3 Demonstrate how to prepare the equipment for use, including correct usage of anchor points
- 14.2.4 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

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14.2.5 Explain the potential task placed upon the delegate in their own organisation on course completion, requiring them to familiarise themselves with other rescue / evacuation products

## ELEMENT 14.3 - SAFE AND CORRECT EVACUATION

### Training Staff shall:

- 14.3.1 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 carabiner on the rescue device) and 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 his 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 the 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 / evacuaiton device rope while getting into position for descent (e.g. getting out of the hatch)
  - j. Transferring full body weight to the rescue / evacuation device rope before descent (e.g. while sitting in the open hatch and putting tension on the rope)
  - k. Evacuating to ground level
  - I. Disconnecting the evacuation device

## ELEMENT 14.4 - SAFE BEHAVIOR

Training Staff shall:

14.4.1 Explain safe behaviour in connection with evacuation

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Delegates shall:

- 14.4.2 Demonstrate the ability to perform a passive mode and active mode setup evacuation from height (as demonstrated during this lesson) using full PPE and a random evacuation device (demonstrated during this module)
- 14.4.3 Demonstrate the ability to disconnect the device after reaching the ground level.
- 14.4.4 Demonstrate the ability to use techniques like attaching equipment to their harness to reduce the risk of dropped objects

#### Lesson 14 Notes

- During the evacuation scenarios the delegates 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
- 2) An instructor shall be at the height chosen to descend from
- 3) Instructor(s) and Delegates shall be secured to an anchor point while waiting to descend (this can be achieved by correct use of the fall arrest lanyard)
- 4) When Delegates are demonstrating the evacuation, a safety line that is connected to the Delegate's harness shall be used. This will be set up and controlled by the instructor and be secured to a separate anchor point than that of the evacuation device
- 5) Although not a requirement of this standard, Delegates may repeat the evacuation exercises should sufficient time be available

## Lesson 15 - WORKSHOP - RISKS/HAZARDS & SUSPENSION TRAUMA

30 min.

The aim of this lesson is to enable the Delegates to identify risks and hazards in a WTG environment including suspension trauma and how to prevent them.

To successfully complete this BST Module, Delegates must be able to:

- 1) Demonstrate the ability to work safely at height in a wind turbine like environment
- 2) Demonstrate that they can discuss and explain multiple perspectives acquired through group discussions
- Explain the cause of suspension trauma, explain ways to prevent it and demonstrate how to reduce the risks if suspension trauma is suspected in a casualty

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### ELEMENT 15.1 - USING THE BST WORKING AT HEIGHTS WITH MANUAL HANDLING COURSE

Delegates shall:

- 15.1.1 Practice and demonstrate the ability to apply the skills learned during the BST Working at Heights with Manual Handling course in a wind turbine like environment
- 15.1.2 Discuss and explain multiple perspectives acquired through group discussions

## **ELEMENT 15.2 - SUSPENSION TRAUMA**

Training Staff shall:

- 15.2.1 Explain how Suspension trauma affects the human body
- 15.2.2 Explain how to mitigate suspension trauma using trauma straps (if fitted to the harness) or using a work positioning lanyard
- 15.2.3 Demonstrate how to position and treat a conscious and unconscious casualty who is suspected to be suffering from suspension trauma
- **Note:** The class will be divided into three groups of four Delegates, maximum. The Delegates 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.

## Lesson 16 - PPE REVIEW

### 10 min.

The aim of this lesson is to give the Delegates the opportunity to discuss the individual parts of the PPE equipment and use of the PPE in their own words.

This lesson is intended to be a recap at the beginning of day 2.

To successfully complete this BST Module, Delegates shall be able to:

1) Recall the individual parts of the PPE equipment and correct pre-use inspection and use of the PPE

## ELEMENT 16.1 - THE INDIVIDUAL PARTS OF THE PPE EQUIPMENT

Delegates shall:

16.1.1 Recall the individual parts of the PPE equipment and instruction in pre-use inspection and use

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## Lesson 17 - RESCUE DEVICES AND RIGGING SETUP

20 min.

The aim of this lesson is to enable the Delegates to utilize a rescue device in a wind turbine environment.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Explain the individual parts of the rescue equipment (L2 Knowledge)
- 2) Explain correct usage of rescue devices, anchor points and slings, including various rigging configurations on a ladder system (L2 Knowledge)

## ELEMENT 17.1 - THE INDIVIDUAL PARTS OF DIFFERENT RESCUE DEVICES

Training Staff shall:

- 17.1.1 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 utilize the integrated friction device (e.g. pig tail/bull horn) to divert the rope
  - c. How to rig the device with deflection applying a friction 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)
- 17.1.2 Stress the generic approach in the parts of a rescue device focusing on similarities and differences in design, functionality and operation between different products
- 17.1.3 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

#### ELEMENT 17.2 - CORRECT USE OF RESCUE DEVICES & SLINGS

Training Staff shall:

- 17.2.1 Explain that pre-use inspection of the evacuation device may be omitted only if it is permitted by the manufacturer's manual and the manufacturer criteria.
- 17.2.2 Demonstrate how to perform pre-use inspection of the rescue device products required/chosen to instruct this Module, by the following principals and covering:
  - a. Markings and labels

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- 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. Karabiners/connectors operate, and lock as intended and cannot disconnect completely
- h. Rope securing mechanism works properly
- i. Observe product operating temperature range
- 17.2.3 Demonstrate how to rig the device onto a ladder stile and reinforced rung utilizing slings, on one side and in a centre position of the ladder system aiming to enable moving parts of the device to run freely
- 17.2.4 Explain and demonstrate the principles of lifting angle, angle factor and edge protection
- 17.2.5 Demonstrate how to rig the device in passive mode setup, and active (inverted) mode setup with deflection applying a friction karabiner
- 17.2.6 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
- 17.2.7 Explain the potential task placed upon the Delegate in his own organisation on course completion, requiring him to familiarise himself with other safety equipment products

## Lesson 18 - 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 delegates are briefed in the control measures employed in the practical training area and to warm up prior to performing rescue exercises.

**Note:** This lesson is repeated from lesson 9. The intention is for the delegates to practice and develop good habits of warming up before work.



### ELEMENT 18.1 - CONTROL MEASURES AND WARM UP

The instructor shall:

- 18.1.1 Explain further control measures for the specific training facilities and training to avoid injury during the training.
- 18.1.2 Verify that the delegates can explain the principles of operation of the PPE and equipment to be used during practical training sessions.
- 18.1.3 Ensure that any hazardous energy sources which may affect the delegates during the practical training sessions are isolated and locked out and that the status of the isolations has been communicated to the delegates.
- 18.1.4 Lead a warm-up session of the major muscle groups of the body and the ankles, wrists and back.
- 18.1.5 Verify that each delegate who is working at height (either as a casualty or a rescuer) during the following practical exercises is always attached to a backup line prior to and at all times whilst working at height. GWO recommends that a SRL is used as a backup line.

Delegates shall:

- 18.1.6 Take part in the warm-up session of the major muscle groups, ankles, wrists and back.
- 18.1.7 Perform a pre-use inspection of their personal fall protection equipment.
- 18.1.8 Perform a 'buddy-check' of another delegates personal fall protection equipment

## Lesson 19 - RESCUE EXERCISES

355 min.

The aim of this lesson is to give the Delegates the opportunity to approach rescue situations in wind turbines, to do a safe and correct rescue in wind turbines while using correct rescue devices and anchor points and to show correct behaviour on ladders with PPE. Furthermore, it will give the delegates the opportunity to practice the elements of working at height whilst performing rescue exercises.

To successfully complete this BST Module, Delegates shall be able to:

- Demonstrate the ability to safely approach rescue situations in wind turbines (L3 – Attitude & skill)
- 2) Demonstrate the ability to safely and correctly perform a rescue in a wind turbine environment (L3 Skill)
- 3) Demonstrate the ability to safely and correctly use rescue devices (L3 Skill)
- 4) Demonstrate the ability to safely and correctly use anchorage points (L3 Skill)

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5) Demonstrate safe and correct behaviour on ladder with PPE (L3 – Attitude & skill)

## ELEMENT 19.1 - RESCUE SITUATIONS IN WIND TURBINES

Training Staff shall:

19.1.1 Explain and demonstrate how to safely approach rescue situations in wind turbines

## ELEMENT 19.2 - SAFE AND CORRECT RESCUE

Training Staff shall:

- 19.2.1 Explain and demonstrate how to conduct a safe and correct rescue in a wind turbine environment and First Aid relating to rescue. The exercises shall include:
  - a. Handling a conscious/ unconscious Casualty
  - b. Suspension trauma prevention
  - c. Connecting the 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

## ELEMENT 19.3 - CORRECT BEHAVIOUR ON THE LADDER WITH PPE

Training Staff shall:

19.3.1 Explain and demonstrate the correct behaviour on ladder with PPE

Delegates shall:

- 19.3.2 Demonstrate 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 behavior on ladder with PPE
- 19.3.3 Demonstrate 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)

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with the rescue equipment in a passive setup, preferably utilizing 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 delegates shall at all times during the exercises demonstrate the ability to reduce the risk of dropped objects

During exercise 19.3.3.c. The delegate 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 13.7)

#### Lesson 19 Notes

- During the rescue scenarios the delegates 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.
- 2) It is recommended to have the delegates familiarise themselves with the rescue equipment whilst one rescue exercise is conducted and observe one rescue exercise.
- 3) During the rescue scenarios the delegate acting as rescuer must correctly use their work positioning lanyard to secure themselves leaving their hands free to work with the equipment and casualty
- 4) During the rescue scenarios, a rescue dummy can be used to simulate a Casualty
- 5) The instructor will notify the Delegate whether the Casualty is conscious or unconscious. Delegates may demonstrate the recovery position/seated position once the dummy has been lowered to a safe area
- 6) All appropriate PPE shall be worn during these exercises
- 7) 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 20 - EVALUATION

## 15 min.

The aim of this lesson is to summarize the Module and give the Delegates the opportunity to conduct an open-minded review of the training and the instructor.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

1) Active participation in the evaluation

## ELEMENT 20.1 - SUMMARY

## Training Staff shall:

20.1.1 Summarize the BST Module and give the Delegates final feedback

## ELEMENT 20.2 - EVALUATION

Delegates shall:

20.2.1 Conduct a written evaluation

#### Training Staff shall:

20.2.2 Give necessary feedback on the written evaluations

## ELEMENT 20.3 - TRAINING RECORDS

#### Training Staff shall:

20.3.1 Ensure that all Delegates are registered with a personal Delegate profile in WINDA and have provided their WINDA ID prior to completing the training course.



## 13.7 Delegate performance assessment

Assessment of learning outcomes:

Delegates will be assessed according to the learning outcomes stated in Section 13.6 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 Delegate shall participate and demonstrate:

#### **Correct Manual Handling throughout, including:**

- 1) Reducing manual handling using suitable handling aids where possible
- Planning of manual handling tasks using the T.I.L.E. Principle and a MAC tool considering the load weight, maximum reaching distance and aggravating factors

#### **Correct manual handling techniques**

1) 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:

- 1) User inspection and test
- 2) Use of correct anchor points
- 3) Correct behaviour on ladder with PPE

#### Correct rescue methods, including:

- 1) 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 utilizing a rope clamp for rescue
- 2) Rescue of an **unconscious** Casualty hanging by a fall arrest lanyard (inside of the ladder) with the rescue equipment in an active setup
- 3) 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 delegate performance assessment form (example provided as Annex 1). The Trainer keeps the delegate performance assessment forms until the completion/ evaluation of the BST Module.

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Training Providers shall have a documented procedure in place for dealing with Delegates not meeting the stated learning outcomes. If a Delegate fails to meet the demands, they shall attend a new BST Working at Height Module.



# 14 MODULE 6 – BST SEA SURVIVAL

## 14.1 Aims and objectives of the BST Sea Survival Module

The aims of this BST Sea Survival course are, by theoretical and practical training to give the participants the basic knowledge and skills to act safely and take the correct preventive actions in all aspects of offshore operations from shore to installation vessel or WTG and vice versa, both during normal operation and in an emergency in an offshore wind energy environment.

This BST Sea Survival Module shall ensure that:

- 1) The Delegates can demonstrate the needed awareness of the site organisation and relevant legislation to ensure that the candidates are aware of the roles, responsibilities and rules that apply to offshore wind farms.
- 2) The Delegates can demonstrate the needed knowledge to understand the importance of correct clothing and conduct in an offshore wind farm environment. Further to enable skills of detecting and treating stages of cold shock, hypothermia and drowning related to exposures to the human body in an offshore wind environment.
- 3) The Delegates can demonstrate the needed knowledge and skills to recognise the advantages and limitations of personal LSA and PPE and usage in a correct and safe manner.
- 4) The Delegates can demonstrate the needed knowledge related to GMDSS (Global Maritime Distress and Safety Systems) and SAR (Search and Rescue).
- 5) The Delegates can demonstrate the needed skills individually and collective to enhance the chance of survival in an emergency at sea.
- 6) The Delegates can demonstrate the needed knowledge to recognise the hazards and risks of transfer and take the correct preventive measures into account by following procedures and use the available LSA and PPE in a correct and safe manner.
- 7) The Delegates can demonstrate the needed knowledge to ensure safe conduct on installations, vessels and WTG's during normal operations and in case of emergencies and evacuation.
- 8) The Delegates can demonstrate the needed skills to conduct safe transfer of themselves and equipment between dock and vessel and WTG and vessel. Furthermore, to give the Delegates skills to assist in MOB situations.
- 9) The Delegates can reflect on and process their learning outcome and key takeaways from the module, aiming to achieve a high learning transfer from the module to his/her way of work. Additionally, the aim is to give the Delegates the opportunity to conduct an open-minded written and oral formative evaluation of the training.

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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 G+ "Working at height in the offshore wind industry" and "Safe management of small service vessels used in the offshore wind industry".

## 14.2 Duration of the BST Sea Survival Module

The total contact time for completing this sea survival module is estimated to be 6 hours and 40 minutes. This is based on the time estimate given in the module timetable.

The training provider must not exceed the times per day given in table 14-2 below.

The training provider must ensure that sufficient time is allowed for delegates with prior experience to share their experiences related to sea survival in a way that is constructive for the entire class.

	Maximum duration per day
Contact time	8 hours
Total training day	10 hours

Table 14-2 - 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).

## 14.3 Instructor to Delegate Ratio

The ratio shown indicates the maximum number of Delegates that shall attend the course.

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

Module	Session	Instructor to Delegate Ratio
BST Soc Survival	Theory	1:12
	Practical	1:4

Table 13-3 - GWO Sea Survival Module instructor to delegate ratio

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## 14.4 Equipment for Sea Survival module

The equipment required for training as listed in Annex 3 must be available and must fulfil national legal requirements as listed in table A3-5 in annex 3 where applicable.

## 14.5 BST Sea Survival Module time table

The order in which the elements of this BST training Module are delivered may vary.

Within the module timetables, approximate duration of each of the lessons are given. The training provider may choose to deliver elements of the training according to other timetables, if 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.

Lesson		Element		Approx. Duration
1	Introduction	1.1 1.2	Safety instructions and emergency procedures Facilities	
		1.5	Aim & objectives and agenda	
		1.4	Motivation	
		1.6	Ongoing assessment	
		L	TOTAL	20 min.
2	Legislation	2.1 2.2	Global legislation National legislation	
			TOTAL	5 min.
3	Exposure, Cold Shock, Hypothermia and Drowning	3.1 3.2 3.3 3.4	Exposure Cold Shock Hypothermia Drowning	
			TOTAL	15 min.
4	Life Saving Appliances and PPE	4.1 4.2	Personal LSA and PPE Collective LSA	
		Γ	TOTAL	10 min.
5	SAR and GMDSS	5.1 5.2 5.3	SAR GMDSS and transponders Actions to enhance detection	

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TOTAL				
6	Practical Sea Survival	6.1	Correct donning and use of LSA and PPE	
		6.2	Risks related to evacuation and release into water	
		6.3	Single and double emergency descent	
		6.4	Correct usage of life raft	
		6.5	Helicopter rescue from water	
		6.6	Summary by exercise	
			TOTAL	120 min.
7	Safe transfer	7.1	Safety introduction onboard transfer vessel	
		7.2	Hazards related to different types of transfers	
		7.3	Safe handling of equipment and storage	
TOTAL				20 min.
8	8 Installations, vessels and WTGS	8.1	Safety on board	
		8.2	Contingency plans	
	TOTAL			5 min.
9	Transfer Practical	9.1	Safe transfer between dock and vessel	
		9.2	Safe transfer between vessel and WTG	
		9.3	MOB procedures and equipment on installation, vessel or WTG	
TOTAL 180 mi				
10	Evaluation	10.1	Reflection session	
		10.2	Formative evaluation	
TOTAL				
GRAND TOTAL				

Table 13-5 - GWO Sea Survival Module timetable

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## 14.6 Detailed description of BST Sea Survival Module

The learning outcomes specified for the BST Sea Survival Module are:

## Lesson 1 - INTRODUCTION

20 min.

The aim of this lesson is to introduce the Delegates to the course, each other, the facilities and what is expected of them during the course.

To successfully complete this lesson of the Sea Survival Module, Delegates must be able to:

- 1) Explain the safety rules and emergency procedures of the training facilities
- 2) Locate emergency exits and equipment, and relevant training facilities
- 3) Recognize who the instructor and other Delegates are
- 4) Describe the main aim and main learning objectives
- 5) Explain the on-going assessment according to delegates assessment form
- 6) State own expectations for the course

## ELEMENT 1.1 - SAFETY INTRODUCTIONS AND EMERGENCY PROCEDURES

Training Staff shall **explain**:

- 1.1.1 Safety instructions according to internal procedures
- 1.1.2 Emergency procedures and emergency exits in the areas where the Delegates can be expected to be located during the **course**

## ELEMENT 1.2 - FACILITIES

#### Training Staff shall **give**:

1.2.1 A general description of the on-site facilities (Administration, dining area, restrooms, etc.)

## ELEMENT 1.3 - INSTRUCTOR & DELEGATE PRESENTATION

Training Staff shall:

- 1.3.1 Ensure that all Delegates are registered with a personal Delegate profile in WINDA and have provided their WINDA ID prior to completing the training course.
- 1.3.2 Give a short introduction, including their backgrounds as instructors

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Delegates shall:

- 1.3.3 Give a short introduction, including their job function, onshore/offshore experience, time of employment in the wind industry, and expected primary geographic work location, etc.
- 1.3.4 Present his/her own expectations for the course

## ELEMENT 1.4 - AIM & OBJECTIVES AND AGENDA

Training staff shall **explain**:

1.4.1 The overall aim & objectives and agenda of this Sea Survival Module, highlighting the rescue team coordinator functionality

## ELEMENT 1.5 - MOTIVATION

Training Staff shall **explain**:

- 1.5.1 Why advanced rescue preparedness and skills are relevant
- 1.5.2 The importance of personal involvement in the course
- 1.5.3 How the Delegates will be challenged, and why

## ELEMENT 1.6 - ONGOING ASSESSMENT

Training Staff shall **explain**:

- 1.6.1 The reasons for the on-going **assessment**
- 1.6.2 The GWO Delegate Assessment Form and its use
- 1.6.3 What is expected of the Delegates

## Lesson 2 - LEGISLATION

5 min.

The aim of this lesson is to give the Delegates the needed awareness of the site organisation and relevant legislation to ensure that the candidates are aware of the roles, responsibilities and rules that apply to offshore wind farms.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Outline the site organization and the various units on a site (L2 Knowledge)
- 2) Identify global legislation relevant to sea survival (L2 Knowledge)
- 3) Give examples of national legislation relevant to sea survival (L2 Knowledge)

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## ELEMENT 2.1 - GLOBAL LEGISLATION

Training Staff shall explain:

- 2.1.1 Site organization and types of units on a site
- 2.1.2 Applicable legislation
- 2.1.3 Legal responsibilities

## ELEMENT 2.2 - NATIONAL LEGISLATION

#### Training Staff shall explain:

2.2.1 The importance of knowing the applicable country specific legislation

## Lesson 3 - EXPOSURE, COLD SHOCK, HYPOTHERMIA AND DROWNING

15 min.

The aim of this lesson is to provide Delegates with the needed knowledge to understand the importance of correct clothing and conduct in an offshore wind farm environment. Further to enable skills of detecting and treating various stages of cold shock, hypothermia and drowning related to various exposures to the human body in an offshore wind environment.

To successfully complete this BST Module, Delegates are expected to:

- 1) Explain the human body's reaction to the exposure to different offshore environments and what precautions to take (L2 Knowledge)
- Describe bodily consequences of cold shock and how to prevent it (L2 Knowledge)
- 3) Explain how to detect the symptoms of drowning, including correct First Aid procedures (L2 Knowledge)
- 4) Explain how to detect the symptoms of hypothermia and how to administer correct First Aid (L2 Knowledge)

#### ELEMENT 3.1 - EXPOSURE

Training Staff shall explain:

3.1.1 Different types of exposures and relevant precautions



## ELEMENT 3.2 - COLD SHOCK

Training Staff shall **explain:** 

- 3.2.1 The bodily reaction related to Cold Shock
- 3.2.2 The various symptoms and how to behave in relation to Cold Shock

### **ELEMENT 3.3 - HYPOTHERMIA**

#### Training Staff shall **explain** and **demonstrate**:

3.3.1 The various stages of hypothermia and the symptoms and the correct First Aid treatment for each stage

#### Delegates shall **explain**:

3.3.2 Explain how to detect the symptoms of hypothermia and how to administer correct First Aid

## ELEMENT 3.4 - DROWNING

#### Training Staff shall **explain**:

- 3.4.1 Symptoms and correct First Aid treatment for drowning
- 3.4.2 Secondary drowning

## Lesson 4 - LIFE SAVING APPLIANCES AND PPE

#### 10 min.

The aim of this lesson is to give the Delegates the needed knowledge and skills to recognise the advantages and limitations of personal LSA and PPE and usage in a correct and safe manner.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Define advantages and limitations of personal LSA and PPE related to the industry (L1 Knowledge)
- Identify different types of suits anti exposure (transfer suit) and immersion suits (Vessel evacuation) (L2 – Knowledge)
- 3) Classify advantages and limitations of LSA related to the industry (L2 Knowledge)



## ELEMENT 4.1 - PERSONAL LSA AND PPE

#### Training Staff shall **explain** and **demonstrate**:

- 4.1.1 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)
- 4.1.2 The correct use of the different personal LSA and PPE and importance of familiarization of the equipment
- 4.1.3 Correct pre-use check, maintenance and storage of personal LSA and PPE

#### ELEMENT 4.2 - COLLECTIVE LSA

#### Training Staff shall **explain:**

**4.2.1** Advantages and limitations of the different collective LSA, related to the industry – Life rafts, life boats and Marine evacuation systems (MES)

## Lesson 5 - SAR AND GMDSS

#### 10 min.

The aim of this lesson is to give the Delegates the needed knowledge related to GMDSS (Global Maritime Distress and Safety Systems) and SAR (Search and Rescue).

This will enable the candidates to understand and act accordingly to enhance their efficiency and response time of the SAR operation and thereby their own evacuation and rescue.

To successfully complete this BST Module, Delegates shall be able to demonstrate:

- 1) Knowledge of the SAR operations (L2 Knowledge)
- 2) Understanding the GMDSS and transponders (L2 Knowledge)
- 3) Actions to enhance detection (L2 Knowledge)

#### ELEMENT 5.1 - SAR

Training Staff shall explain:

5.1.1 SAR operations

#### ELEMENT 5.2 - GMDSS AND TRANSPONDERS

#### Training Staff shall explain and demonstrate

5.2.1 GMDSS including transponders and locators

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- a. Emergency Positioning Indicating Radio Beacon (EPIRB)
- b. Search and Rescue Transponder (SART)
- c. Personal Locating Beacon (PLB)

## Delegates shall **demonstrate**:

5.2.2 Knowledge about the different transponder's types and usage

ELEMENT 5.3 - ACTIONS TO ENHANCE DETECTION

## Training Staff shall **explain** and **demonstrate**

5.3.1 Actions to enhance detection

## Delegates shall **demonstrate**:

5.3.2 The ability to describe the different actions to enhance detection

## Lesson 6 - PRACTICAL SEA SURVIVAL

#### 120 min.

The aim of this lesson is to give the Delegates the needed skills to enhance the chance of individual and collective survival in an emergency at sea.

To successfully complete this BST Module, Delegates shall be able to:

- 1) Demonstrate correct donning and use of LSA and PPE (by doing so be able to perform an effective buddy check) (L3 Skill)
- Demonstrate knowledge of risks related to evacuation and release into water (current, wave and swell and how to apply sea survival techniques) (L2 – Knowledge)
- 3) Demonstrate a safe single and double evacuation from a mock WTG by descending into the water detaching from the evacuation system (L3 Skill)
- 4) Demonstrate the correct use of a life raft to enhance the chances of survival in an emergency at sea (L3 Skill)
- 5) Explain correct behavior related to own rescue from water to helicopter without assistance from helicopter rescue swimmer (L2 Knowledge)
- 6) Demonstrate the needed skills to survive an emergency at sea both by own means and in cooperation with others (L3 Skill)



## ELEMENT 6.1 - CORRECT DONNING AND USE OF LSA AND PPE

#### Training Staff shall **explain** and **demonstrate**:

- 6.1.1 Characteristics of LSA and PPE
- 6.1.2 Correct donning of LSA and PPE, including immersion and transfer suits while focussing of the implications of failing to do so correctly
- 6.1.3 The purpose and procedure for Buddy check
- 6.1.4 The potential exposures when using LSA and PPE in a WTG environment

#### Delegates shall **demonstrate:**

- 6.1.5 Correct donning and use of personal LSA and PPE, including suit, life jackets and harness
- 6.1.6 Buddy check
- 6.1.7 Different exposures

## ELEMENT 6.2 - RISKS RELATED TO EVACUATION AND RELEASE INTO WATER

#### Training Staff shall **explain** and **demonstrate**:

- 6.2.1 Risks related to the evacuation and release in water currents, waves and swell and how to apply sea survival techniques. Including different types of evacuation, by use of equipment or manual evacuation (jump, ladder etc.)
- 6.2.2 Controlled entry into the water from a height
- 6.2.3 Heat Escape Lessening Posture (H.E.L.P.)
- 6.2.4 Individual swimming techniques
- 6.2.5 Collective swimming techniques
- 6.2.6 Collective techniques to prevent hypothermia
- 6.2.7 Bodily reaction related to Cold Shock and the related symptoms
- 6.2.8 The stages of hypothermia and the symptoms and the correct First Aid treatment

#### Delegates shall **demonstrate**:

- 6.2.9 The ability to enter the water from a height in a controlled manner
- 6.2.10 Risks related to the evacuation and release in water currents, waves and swell and how to apply sea survival techniques
- 6.2.11 H.E.L.P.
- 6.2.12 Individual swimming techniques
- 6.2.13 Collective swimming techniques

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- 6.2.14 Collective techniques to prevent hypothermia
- 6.2.15 Techniques to enhance chances of being spotted

Formal assessment of knowledge (see Section 14.7)

## ELEMENT 6.3 - SINGLE AND DOUBLE EMERGENCY DESCENT

## Training Staff shall **explain** and **demonstrate**:

- 6.3.1 Single and double evacuation from WTG by descent into the water including:
- 6.3.2 Pre-use inspection
- 6.3.3 Correct fitting of harness
- 6.3.4 Attachment
- 6.3.5 Descent into water (single and double evacuation)
- 6.3.6 Inflation of lifejacket
- 6.3.7 Detachment in the water (various types of accessories for each detachment quick release, restraint lanyards etc.) (covering risks of panic, bodily malfunction, accessibility due to body positioning and equipment restraints)

#### Delegates shall demonstrate:

- 6.3.8 Evacuation from WTG by descent into the water including:
- 6.3.9 Pre-use inspection
- 6.3.10 Correct fitting of harness
- 6.3.11 Attachment
- 6.3.12 Descent into water (single and double evacuation)
- 6.3.13 Inflation of lifejacket
- 6.3.14 Detachment in the water (various types of accessories for each detachment quick release, restraint lanyards etc.) (covering risks of panic, bodily malfunction, accessibility due to body positioning and equipment restraints)

## ELEMENT 6.4 - CORRECT USAGE OF LIFE RAFT

#### Training Staff shall **explain** and **demonstrate**:

- 6.4.1 Inflation of a life raft
- 6.4.2 Methods of entering a life raft
- 6.4.3 Immediate and further actions in a life raft
- 6.4.4 The equipment in life rafts
- 6.4.5 Righting a capsized life raft

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- 6.4.6 The stages of hypothermia and the symptoms and the correct First Aid treatment for each stage
- 6.4.7 GMDSS including transponders and locators
- 6.4.8 Emergency Positioning Indicating Radio Beacon (EPIRB)
- 6.4.9 Search and Rescue Transponder (SART)
- 6.4.10 Personal Locating Beacon (PLB)
- 6.4.11 Actions to enhance detection

## Delegates shall **demonstrate**:

- 6.4.12 Ability to enter a life raft
- 6.4.13 The ability to right a capsized life raft
- 6.4.14 Knowledge of immediate and further actions in a life raft
- 6.4.15 The ability to find and handle the equipment in a life raft
- 6.4.16 The correct First Aid treatment for hypothermia

Formal assessment of knowledge (see Section 14.7)

## ELEMENT 6.5 - HELICOPTER RESCUE FROM WATER

## Training Staff shall **explain** and **demonstrate**:

- 6.5.1 The fitting of a helicopter lifting sling, subsequent lifting and (simulated) entry into a rescue helicopter including:
  - a. Single lift
  - b. Body posture
  - c. Aircraft entry

## ELEMENT 6.6 - SUMMARY BY EXERCISE

#### Training Staff shall **explain:**

6.6.1 Safety procedures and briefing of the exercise to ensure that the delegates understand that they are to demonstrate the skills covered in Lesson 6 practical sea survival

Delegates shall **demonstrate** the following in one cohesive scenario:

- 6.6.2 Controlled entry into the water from a height
- 6.6.3 Individual swimming techniques
- 6.6.4 Correct use of collective techniques to prevent hypothermia

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- 6.6.5 Collective swimming techniques
- 6.6.6 Entry into a life raft
- 6.6.7 Immediate actions in a life raft
- 6.6.8 Recovery of a nearby casualty in the water
- 6.6.9 Helicopter hoist 1 delegate from life raft

Formal assessment of knowledge (see Section 14.7)

## Lesson 7 - SAFE TRANSFER

## 20 min.

The aim of this lesson is to give the Delegates the needed knowledge to recognise the hazards and risks of transfer and take the correct preventive measures into account by following procedures and use the available LSA and PPE in a correct and safe manner.

To successfully complete this BST Module, Delegates shall be able to **demonstrate**:

- Knowledge of the importance of the safety introduction onboard transfer vessels (L2 – Knowledge)
- Understanding of hazards related to the different types of transfers and how to mitigate these hazards in each situation (dynamic/static – static/dynamic, dynamic/dynamic) (L2 – Knowledge)
- 3) Understanding of the safe handling of equipment and storage (L2 Knowledge)

## ELEMENT 7.1 - SAFETY INTRODUCTION ONBOARD TRANSFER VESSEL

## Training Staff shall explain:

- 7.1.1 The content and importance of the safety briefing
- 7.1.2 Vessel conduct on board

## Delegates shall **discuss**:

- 7.1.3 The importance of the safety briefing and its content
- 7.1.4 How correct conduct on board can reduce hazards and risks

## ELEMENT 7.2 - HAZARDS RELATED TO THE DIFFERENT TYPES OF TRANSFERS

## Training Staff shall **explain**:

7.2.1 The hazards related to the different types of transfers and how to mitigate these hazards in each situation (dynamic/static – static/dynamic, dynamic/dynamic)

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Delegates shall **demonstrate** knowledge of:

- 7.2.2 Different types of transfers and how to mitigate the different hazards
- 7.2.3 Different types of transfer principles/types

## ELEMENT 7.3 - TRANSFER VESSELS

#### Training Staff shall **explain:**

- 7.3.1 The different types of transfer vessels commonly used by the WTG
- 7.3.2 Various types of vessels the delegate may engage in a Sea Survival situation

#### Delegates shall **demonstrate** knowledge of:

7.3.3 Different types of transfer vehicles commonly used by the WTG industry

## ELEMENT 7.4 - SAFE TRANSFERS FROM VESSEL TO WTG

#### Training Staff shall **explain:**

- 7.4.1 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
- \* Based on the "G+ Offshore Wind Health and Safety Association, Good Practice Guideline: Working at height at the offshore wind industry", section "4.4 Transfer By Stepping Over Between Vessels And Offshore Structures", and in particular sections:
  - 4.4.3 Protection against falling: SRL on boat landing ladder
  - 4.4.2.2. Roles of Supervisors, Vessel Captain, Deckhand and Passengers

#### Delegates shall **discuss**:

7.4.2 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

#### Training Staff shall **explain:**

- 7.5.1 Safe transfer from dock to vessel
- 7.5.2 Safe transfer from vessel to vessel

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The delegates shall **demonstrate** knowledge of:

7.5.3 How to safely transfer from dock to vessel and vessel to vessel

## ELEMENT 7.6 - SAFE HANDLING OF EQUIPMENT AND STORAGE

Training Staff shall **explain:** 

7.6.1 Safe handling of equipment and storage

## Delegates shall **discuss**:

- 7.6.2 The implications of failing to handle equipment safely
- 7.6.3 The responsibilities of storing equipment correctly

## Lesson 8 - INSTALLATIONS, VESSELS AND WTGS

5 min.

The aim of this lesson is to give the Delegates the needed knowledge to ensure safe conduct on installations, vessels and WTG's during normal operations and in case of emergencies and evacuation.

To successfully complete this BST Module, Delegates shall be able to **demonstrate**:

- 1) Understanding of the importance of general safety on board (L2 Knowledge)
- Understanding of contingency plans on installations, vessels and WTG (L2 Knowledge)

## ELEMENT 8.1 - SAFETY ON BOARD

Training Staff shall **explain** and **demonstrate**:

8.1.1 General safety on board installations, vessels and WTGs

Delegates shall **discuss**:

8.1.2 How can failing to adhere to general safety on board installations, vessels and WTGs lead sea survival situations

## ELEMENT 8.2 - CONTINGENCY PLANS

Training Staff shall **explain** and **demonstrate**:

8.2.1 Contingency plans on installations, vessels and WTGs

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## Delegates shall **demonstrate** knowledge of:

8.2.2 Where to find the applicable contingency plan on installations, vessels and WTG (i.e. fire/MOB/Abandon ship)

## Lesson 9 - TRANSFER PRACTICAL

## 180 min.

The aim of this lesson is to give the Delegates the needed skills to conduct safe transfer of themselves and equipment between dock and vessel and WTG and vessel. Furthermore, to give the Delegates skills to assist in MOB situations.

To successfully complete this BST Module, Delegates shall be able to **demonstrate**:

- 1) Safe transfer of oneself and equipment between dock and vessel (L3 Skill)
- 2) Safe transfer of oneself and equipment between vessel and WTG (with and without a quick connector) (L3 Skill)
- Skills to assist act accordingly in case of falling over board, using various MOB procedures and equipment on installation, vessel or WTG individually and by assisted method (L3 – Skill)

## ELEMENT 9.1 - SAFE TRANSFER BETWEEN DOCK AND VESSEL

#### Training Staff shall **explain** and **demonstrate**:

- 9.1.1 Safe transfer of self and equipment between dock and vessel
- 9.1.2 Safe handling of equipment and storage onboard

#### Delegates shall **demonstrate**:

- 9.1.3 Safe transfer of self and equipment between dock and vessel
- 9.1.4 How to handle equipment safely and store correctly when applicable

## ELEMENT 9.2 - SAFE TRANSFER BETWEEN VESSEL AND WTG

#### Training Staff shall **explain** and **demonstrate**:

- 9.2.1 The importance of identifying hazards (swells, marine growth, waves, equipment failure) relating to the transfer, including the right to say stop/refuse to transfer
- 9.2.2 Safe transfer of self between vessel and WTG using:
  - a. SRL with quick connector
  - b. SRL without connector

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- c. Twin fall arrest lanyards
- 9.2.3 The importance of observing and learning from the other delegates doing the transfer exercises
- 9.2.4 Practical and constructive feedback to the delegates during the exercises

### Delegates shall **demonstrate:**

- 9.2.5 Two transfers\* of self of each type listed below pr. delegate:
  - a. SRL with quick connector
  - b. SRL without connector
  - c. Twin fall arrest lanyards
- Based on the "G+ Offshore Wind Health and Safety Association, Good Practice Guideline: Working at height at the offshore wind industry", section;
  - 4.4.3 Protection against falling: SRL on boat landing ladder
  - 9.2.6 Pre-use inspection of PPE (quick connector included) prior to commencing transfer process
  - 9.2.7 Keep one hand on handrail when moving about vessel
  - 9.2.8 Advance from the designated transfer waiting area to the vessels transfer position upon the command "ADVANCE" from the Deckhand
  - 9.2.9 To hold on to the vessel for safety and prepare his quick connector
  - 9.2.10 To connect his quick connector to the attachment point of the SRL when the Deckhand calls out the command "TRANSFER" and presents the SRL attachment point to him
  - 9.2.11 To step across to the WTG ladder and climb immediately after connecting to the SRL, with the SRL loose retrieval line over his shoulder
  - 9.2.12 To immediately disconnect from the SRL on the command "ABORT TRANSFER" from the Deckhand
  - 9.2.13 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
  - 9.2.14 Verify with the Deckhand that transfer can commence by giving the command "READY FOR TRANSFER", before transfer from WTG to vessel (egress) commences
  - 9.2.15 Inspects the SRL brake function and fall indicator prior to the transfer from WTG to vessel
  - 9.2.16 To connect to the SRL and start your transfer from WTG to vessel immediately
  - 9.2.17 To identify the Deckhand's count down during climbing from the 5th ladder rung above the CTV deck "FIVE, FOUR, THREE, TWO, ONE"

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- 9.2.18 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
- 9.2.19 Immediately release of the quick connector from the SRL as soon as he touches the vessel with his 2nd foot
- 9.2.20 Immediately climb upwards to a safe position upon the Deckhand's command "ABORT" during his descent, and resume his descent upon the Deckhand's command "READY" or "DOWN"
- 9.2.21 Application of the above-mentioned principals during transfer without quick connector and with twin fall arrest lanyards
- 9.2.22 Loud and clear communication
- 9.2.23 The ability to react to instructions and hazards during the transfers

## ELEMENT 9.3 - MOB PROCEDURES AND EQUIPMENT ON INSTALLATION, VESSEL OR WTG

## Training Staff shall **explain** and **demonstrate**:

- 9.3.1 MOB procedures on installation, vessel or WTG, including what to do if one falls over board or sees a person falling over board
- 9.3.2 Different types of recovery equipment and methods of use including: Recovery from water by own assistance, assisted recovery from water in cooperation between casualty and rescuer, and by means of cradle and rescue net

#### Delegates shall **demonstrate:**

- 9.3.3 MOB procedures
- 9.3.4 Recovery from water by own assistance
- 9.3.5 Assisted recovery from water
- 9.3.6 Recovery from water by means of cradle and rescue net

Formal assessment of knowledge (see Section 14.7)



## Lesson 10 - EVALUATION

## 15 min.

The aim of this lesson is to enable the Delegates 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 his/her way of work. Additionally, the aim is to give the Delegates the opportunity to conduct an open-minded written and oral formative evaluation of the training.

To successfully complete this lesson of the Sea Survival Module, Delegates must:

- 1) Show commitment to avoid incidents requiring a rescue operation
- 2) Participate in the formative evaluation of the module in a constructive manner

## ELEMENT 10.1 - REFLECTION SESSION

## Training Staff shall:

- 10.1.1 Give the Delegates final feedback on the formal Delegate performance assessment and inform them whether they have passed (failed Delegates must be informed individually prior to the reflection session)
- 10.1.2 Help the Delegate to do a summative self-evaluation, i.e. mentally overview and assort what is learned, identify key takeaways and bridge the gap between what is learned during the module and applying it in his/her way of work. This can be achieved e.g. by an individual reflection session, question session and/or class discussion
- 10.1.3 Re-present the overall aims and objectives of the course for the Delegates' comparison on their learning outcome and meeting of their previously stated expectations of the course
- 10.1.4 Give an overall feedback and feed forward on the Delegates' learning outcome
- 10.1.5 Encourage the Delegates to examine and grow awareness of what specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualize and enhance learning transfer) and to discuss with colleagues advanced rescue methods and techniques under the local specific conditions identified after course completion

## ELEMENT 10.2 - FORMATIVE EVALUATION

#### Delegates shall:

10.2.1 Conduct an online or written formative evaluation of the module, as a minimum.

Training Staff shall:

#### 10.2.2 Respond on relevant elements of any oral feedback from the Delegates.

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## 14.7 Delegate Performance Assessment

Assessment of learning outcomes:

Delegates will be assessed according to the learning outcomes stated in Section 1.6 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 Delegate shall participate and demonstrate as detailed in:

- 1) Section 1.6 Elements 6.1, 6.2, 6.3 and 6.4 (recommended these elements are combined into one cohesive scenario as described in element 6.6)
- 2) Section 1.6 Elements 9.1, 9.2, and 9.3

The formal evaluation of knowledge of above scenarios shall be in accordance with the Control Measures Form (template provided as Annex 1). The Trainer keeps the Control Measures Forms until the completion/ evaluation of the BST Module.).

Training Providers shall have a documented procedure in place for dealing with Delegates not meeting the stated learning outcomes. If a Delegate fails to meet the demands, they shall attend a new BST Sea Survival Module.


# ANNEX 1 - DELEGATE PERFORMANCE ASSESSMENT FORM

Delegate full name as in passport	
Delegate WINDA ID	
Course module	
Date of completion	

Scenario Organisation	Violation of Assessment Measures		n of Ient Is	0-2 passed 3 failed	Instructor Remarks
Aware of personal and group safety at all times					
Organises and utilises correct equipment for given scenario					
Organises individuals and groups as required					
Scenario Management					
Establishes and maintains control of the exercise scenario at all times					
Fully participates in the exercise scenario					
Follows instructions when required					
Demonstrates correct and safe Manual Handling in exercise scenario					
Knowledge and Understanding					
Applies subject knowledge correctly in given scenario					
Demonstrates understanding of subject					
Total Ma	rks :	0-9 10-27	Pass Fail		PASS:
Instructor Name (in CAPITAL letters)					
Instructor Signature					
Training provider					

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# ANNEX 2 - MEDICAL SELF-ASSESSMENT FORM

YOUR PERSONAL HEALTH IS YOUR OWN RESPONSIBILITY. YOUR TRAINING PROVIDER SHALL NOT BE HELD RESPONSIBLE FOR ANY ILLNESS WHATSOEVER DURING OR AFTER THE TRAINING.

I hereby confirm that I have read and understood the listed risks and potentially lifethreatening medical conditions and that I am physically and medically fit to participate in GWO Training.

I hereby confirm that there is no factor that will inhibit or affect my participation in GWO Training. I agree to follow all instructions from the appointed Instructor for the duration of the GWO Training. Should there be any doubt regarding my medical fitness, the training provider will stop the training and seek a physician's advice.

Namo as in passport			
Name as in passport			
Delegate WINDA ID			
Course module			
Signature and date			
The following conditions could pose a risk, when you participate in GWO training			
	diagodawa		
Asthma or other respiratory disorders			
Epilepsy, blackouts or other fits			
Angina or other heart complaints			
<ul> <li>Vertigo or inner ear problems (difficulty with balance)</li> </ul>			
<ul> <li>Claustrophobia/Acrophobia (fear of enclosed area/height)</li> </ul>			
<ul> <li>Blood pressure disorder</li> </ul>			
Diabetes			
Diddetes			
Pacemaker or implanted defibrillator			
<ul> <li>Arthritis, osteoarthritis or other muscular/ skeletal disorders affecting mobility</li> </ul>			
<ul> <li>Known allergies (E.g. bee,</li> </ul>	<ul> <li>Known allergies (E.g. bee, wasps or spider stings / bites)</li> </ul>		
Recent surgery	Recent surgery		
<ul> <li>Any other medical conditio climbing or physical impac</li> </ul>	<ul> <li>Any other medical condition or medication dependency that could affect climbing or physical impact of climbing</li> </ul>		

**Note:** This form is an example of a medical self assessment form. The training provider must modify this form and the medical conditions listed therein to satisfy legislation and requirements applicable to the geographic location of the training centre.

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# ANNEX 3 - EQUIPMENT LIST

The following pages contain the lists of equipment required for delivering each of the modules contained within this training standard. Any equipment used by the training provider and delegates during the delivery of training under this standard must satisfy or exceed the requirements of the equipment standards for the time being in force in the country where the training is taking place.

Where training takes place in a country where there are no equipment standards for the equipment being used, then the equipment used by the training provider and the delegates during the delivery of training under this standard shall satisfy or exceed the requirements of the European (EN) standards.

**Note:** All equipment shall be maintained and where appropriate, inspected and tested in accordance with current national standards/legislation and manufacturers' recommendations.



## 1. BST FIRST AID

The following equipment is required during the entire duration of the BST First Aid Training to meet the needs of the BST First Aid Training Module:

- 1) Torso anatomy dummy
- 2) Airway model
- 3) Resuscitation dummies adult
- 4) First Aid equipment
- 5) First Aid bag
- 6) Make up kit for First Aid scenarios
- 7) AED Trainers
- 8) Blankets

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 purposes
- 3) A load that weighs no more than 30 Kg (66.14 lbs) and is unwieldy:
  - a. difficult to grasp, difficult to grip, with contents likely to move or shift (e.g. a rescue dummy)
- 4) Other lifting props for Manual Handling:
  - a. weighing maximum 15 Kg (33.07 lbs)
- 5) Personal Protective equipment.

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 AWARNESS

The following equipment is required to meet the 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

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 HEIGHT

The following equipment is required to instruct the BST Working at Heights with 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 Training Provider must select the most relevant products according to his geographic location and target audience.

- 1) Full Body Harness:
  - a. At least 2 different products
- 2) Work restraint lanyards
  - a. At least 2 different adjustable products
- 3) Fixed length fall arrest lanyards with an energy absorber:
  - a. 1 flexible Y-type;
  - b. 1 fixed adjustable Y- or I-type.
  - c. Recommended but not required: 1 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 in EN795 type B, anchor devices)
  - 8) Karabiner with mandatory automatic closing and locking system
  - 9) Evacuation / Rescue devices:
    - a. 1 emergency descent and 1 rescue device, or,
    - b. 2 different rescue devices

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- 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 whilst 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 6.75 m (22.15') 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 and includes factors like the height of the person and harness stretch, to account for these variables this is set to 2.00 m.

Using the value for HH (2.00 m), the maximum allowed values for LL (2.00 m) & DD (1.75 m), and the minimum allowed value for C (1.00 m), we get,

$$RD = LL + DD + HH + C$$

and,

$$RD = 2.00 \ m + 1.75 \ m + 2.00 \ m + 1.00 \ m,$$

therefore,

$$RD = 6.75 m.$$

Therefore, the GWO recommends that the anchor points used during the evacuation exercises are placed a minimum of 6.75 m (22.15') above the ground or any structure which a person may come into contact with, in the event of a fall.

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Any equipment used during this GWO training module shall meet or exceed the minimum requirements of the national standards listed in table A3-3. 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 Or EN 813	ANSI Z359.3 ANSI Z359.11 OSHA 1926.28	GB 6095 GB/T 6096	BS EN 361 Or BS EN 813
Work Restraint Lanyards	EN 358	ANSI Z359.1-2 OSHA 1910.28 OSHA 1910.29 1926 Subpart M		BS EN 358
Fixed length Fall arrest lanyards	EN 355	ANSI Z359.3 OSHA 1910.28 OSHA 1910.29 1926 Subpart E	GB 24543	BS EN 355
Helmets	EN 397+A1	OSHA 1910.1333 OSHA 1926.28	GB 2811 GB/T 2812	BS EN 397+A1
Vertical fall arrest systems	EN 353-1+A1 EN 353-2 EN 1891 EN 892		GB 24542 GB/T 24537	BS EN 353-1+A1 BS EN 353-2 BS EN 1891 BS EN 892
SRL	EN 360	ANSI Z359.1-2 OSHA 1910.28 OSHA 1910.29 1926 Subpart M	GB 24544	BS EN 360
Anchor Points	EN 795		GB 30862	BS EN 795
Slings	EN 566		GB/T 30587 GB/T 20118	BS EN 566
Karabiners	EN 362		GB/T 23469	BS EN 362
Evacuation / Rescue devices	EN 341 and EN 1496	ANSI Z359.4		BS EN 341 and BS EN 1496
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 A3-31 - 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) Rigid lifejackets
- 2) Inflatable lifejackets
- 3) Survival suits
- 4) Helmets
- 5) Inflatable life raft with equipment
- 6) Helicopter rescue sling
- 7) Cradle
- 8) Rescue net
- 9) Rescue device
- 10) Safety harnesses
- 11) Twin fall arrest lanyards
- 12) SRL
- 13) PPE
- 14) 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 listed in table A3-4. 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							
Rigid							
Inflatable			GD/1 32227				
Survival Suits			GB/T 9953				
Helmets	EN 397+A1	OSHA 1910.1333 OSHA 1926.28	GB 2811 GB/T 2812	BS EN 397+A1			
Rescue / Evacuation devices	EN 341 and EN 1496	ANSI Z359.4		BS EN 341 and BS EN 1496			
Full body Harness	EN 361 Or EN 813	ANSI Z359.3 ANSI Z359.11 OSHA 1926.28	GB 6095 GB/T 6096	BS EN 361 Or BS EN 813			
Fixed length Fall arrest lanyards	EN 355	ANSI Z359.3 OSHA 1910.28 OSHA 1910.29 1926 Subpart E	GB 24543	BS EN 355			
SRL	EN 360		GB 24544	BS EN 360			

Table A3-41 – Country specific equipment standards – Sea Survival



# ANNEX 4 - GUIDELINE FOR WARM-UP EXERCISES

Body part/major muscle group	Exercise	Duration/repetitions
Head	<ul><li>Head rotations:</li><li>Rotate your head clockwise and counter clockwise</li></ul>	10 repetitions (five each way)
Shoulders	<ul> <li>Shoulders rotation:</li> <li>Place your legs at shoulder-width</li> <li>Feet straight and toes facing forward</li> <li>Keep your arms straight at your sides</li> <li>Perform both shoulders rotation</li> <li>clockwise and counter clockwise</li> </ul>	10 repetitions
Arms	<ul> <li>Arm swings and big arm circles:</li> <li>Stand up straight with your feet shoulder-width apart</li> <li>Rotate your arms forward making big circles and then switch rotating backwards.</li> </ul>	<ul> <li>10 times clockwise</li> <li>10 times (counter clockwise)</li> <li>10 times (in opposite directions)</li> </ul>
Wrists	<ul><li>Wrist rotation:</li><li>Perform wrists rotation in both directions</li></ul>	10 repetitions for each wrist
Torso	<ul> <li>Torso swings:</li> <li>Stand with your legs straight</li> <li>Place your feet at shoulder-width</li> <li>Bend your torso forward 90 degrees</li> <li>Raise both arms straight to the outside</li> </ul>	15 repetitions to each side
Hips	<ul> <li>Hip rotation:</li> <li>Place your hands on your hips and keep your head straight</li> <li>Perform extensive hips rotation</li> </ul>	10 repetitions clockwise 10 repetitions counter clockwise.
Thighs	<ul> <li>Squats:</li> <li>Stand with your legs straight</li> <li>Place your feet at shoulder-width</li> <li>Push your hips back and slowly bend your knees.</li> <li>Keep your back straight and your eyes looking forward.</li> <li>Raise yourself back up when your knees reach a 90-degree angle</li> </ul>	15 repetitions
Ankle	<ul> <li>Ankle rotation:</li> <li>Place your feet slightly apart</li> <li>Perform rotation for each foot clockwise and counter clockwise</li> </ul>	10 repetitions (for each foot)
Back	<ul> <li>Back stretch:</li> <li>Open legs slightly and place hands on the hips</li> <li>Turn to the right and left</li> <li>Incline the back to the right and left</li> <li>Move Back forward and backward</li> </ul>	

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# ANNEX 5 - 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. The assessment chart below will assist you appraising manual handling.

While assessing manual handling, a number of additional risk factors to the lift must be considered; which, individually and especially combined, will enhance the strain on the muscular- skeletal system. These factors are the so-called aggravating factors.

Prior to delivering the Manual Handling Module, instructors should review local instructions and risks assessments for the tasks planned, including assessment of whether a given task should be solved by the Delegates by using a handling aid?

## 1. LOAD WEIGHT AND REACHING DISTANCE

The load weight compared to the reaching distance (R) indicates the gross strain on the lifting persons back.



It must be taken into consideration when the person performing the lift is carrying only a part of the load, e.g. when the load is tipped onto one end and partly resting on the ground or when the lift is performed by more than one person.

The assessment chart below guides you to evaluate and determine whether the strain on the muscular- skeletal system is harmful to health and control measures must be taken.

The reaching distance is illustrated by (R) in the diagram to the left. The diagram represents (R) as the lateral distance between the center of gravity of the load and the lifting persons lower back (the spinal column of the lumbar curve). The center of gravity of the load is usually found right between the handle points of the load.

When the load is tipped and partly resting on the ground or when the lift is performed by more than one person, the reaching distance is measured from the lifting persons lower back (the spinal column of the lumbar curve) to a line between the handle points of the load.





When assessing manual handling, the *most excessive* reaching distance during the *entire operation* must be used in the assessment chart. The most excessive reaching distance is commonly found in the initial or ending part of the lifting operation (putting down the load).

Two different reaching distances are indicated in the assessment chart:

- 1) Forearm distance (approx. 30 cm / 1 foot from the spinal column of the lumbar curve)
- 2) <sup>3</sup>/<sub>4</sub> arms distance (approx. 45 cm / 1.5 foot from the spinal column of the lumbar curve)
- **Note**: In most cases load lifting close to the body equals forearm distance. Shorter reaching distance (i.e. lifting closer to the spinal column than forearm distance) is thus only achievable when using personal moving equipment (moving straps for lifting or the like).

In the assessment chart, reaching distances above <sup>3</sup>/<sub>4</sub> arm's distance is not included since they will most likely be harmful to health, and must be evaluated separately.

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# Manual handling assessment chart (MAC tool) – evaluating the load weight compared to the reaching distance



**Red area:** Lifting within the red area is without doubt harmful to health and must be avoided. To reduce the risk of injury control measures must be taken.

**Yellow area**: Lifting within the yellow area requires a detailed evaluation of the aggravating factors. They must be considered to evaluate to what extent they enhance the

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strain on the muscular- skeletal system resulting in manual handling which is harmful to health.

When lifting within the **top most** <sup>1</sup>/<sub>3</sub> part of the yellow area, manual handling is only accepted if it is performed under optimal conditions (i.e. the entire lifting operation is performed centered in front of the body, the lift is performed between mid-thigh and elbow height, the load is intended for manual handling, each lift is followed by a two-minute rest, the load is not carried, the foothold is stable, and the climate is appropriate).

Lifting within the **middle**  $\frac{1}{3}$  part of the yellow area, the amount and degree of aggravating factors determine whether the manual handling is harmful to health – and to what extent it is harmful.

Lifting within the **bottom** <sup>1</sup>/<sub>3</sub> part of the yellow area, it usually requires several aggravating factors for the manual handling to be harmful to health. In some cases, one single aggravating factor, e.g. the working posture, may cause lifting within the bottom <sup>1</sup>/<sub>3</sub> part of the yellow area to be harmful to health.

**Green area:** Lifting within the green area is usually not harmful to health based on the load weight and reaching distance.

There may be additional risk factors, which are individually harmful, causing the manual handling to be harmful to health, e.g. poor working postures, a high lifting frequency, or an excessive overall strain on the body.

## 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 muscular- skeletal system posing a risk of injury and manual handling harmful to health.

Examples of aggravating factors - categorized related to the four elements of the **T.I.L.E** principle:

#### 1) Concerning the **Task**

No suitable handling aid available, stooping/bending, twisting, stooping/bending *and* twisting, lifting below knee height or above shoulder height, carrying, pushing, pulling or precise positioning of the load, sudden movement or stop, lifting for a longer period of time, high pace of work, inadequate rest or recovery periods, asymmetric or one handed lifting, team handling1, seated or kneeling position, or lack of planning.

#### 2) Concerning the **Individual**

1 Team handling is in general not a legitimate substitution for using handling aids.

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No warm-up, capability, previous and pre-existing injuries, unusual strength or height required for the activity, specialist knowledge or training required, uneven height of team handling individuals.

3) Concerning the Load

Unwieldy, difficult to grasp, difficult to grip, sharp edges, contents likely to move or shift, hot or cold.

4) Concerning the Environment

Transport route or floors uneven, slippery, unstable or with obstacles or steps, variations in floor levels, stairs, space constraints, draft, hot, cold or humid conditions, poor lighting, poor ventilation, rain, gusty winds, clothing or PPE that restricts movement, vibrating environment before manual handling.

5) Source of reference

This annex is based upon the legal requirements and guidelines of the Danish and UK EHS authorities and legislation on manual handling.

**Note:** Local legal requirements must always be adhered to when performing manual handling.

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