



GLOBAL WIND
ORGANISATION

Working at Heights

Summary of changes in GWO Standards

Publication date 2 May 2023





1. Introduction

This summary covers changes to GWO Working at Heights Module (WaH) contained in the GWO Basic safety Training Standard (BST) and other modules developed from the BST WaH Module. The need for the update stems from a number of concerns that were raised pertaining to instructions and information originating from the GWO BST WaH. The applicable standards for these changes were released on the 2nd of May 2023.

2. Summary of the Changes

The following changes derive from an GWO's Working Group of subject matter experts. These changes apply to varying degrees to the GWO Basic Safety Training, Wind Limited Access, Advanced Rescue and Lift Training Standards, and their refreshers. Codes for the affected standards are BST/ BSTR /BSTR-P /Lift /WLA /ART /ARTR.

3. Outline of the Changes

See matrix (on following page) for specific applicability

1. The term “backup” has been replaced by the term “additional fall protection”. This is to improve understanding and prevent unintended learning transfer.
2. The ALARP term has been replaced with an instruction requiring the instructor to reduce both the risk and hazards associated with a fall from heights using the Hierarchy of Controls.
3. The instructor is now required to attach additional fall protection (backup) to participants, during training exercises for the BST and WLA. Previously it was the participants responsibility to correctly attach additional fall protection during training. For the BST-R, ART and ART-R the instructor is required physically verify that additional fall protection is attached.
4. Lesson 8 on Self Retracting Lifelines has been re-written to focus on SRLs and their application to actual work in wind turbines, rather than their use as additional fall protection (backup).
5. In the lesson on vertical fall arrest systems specific instructions about how to use a slider have been replaced with a generic instruction and reference to the manufacture's user manual.
6. In the lesson on vertical fall arrest systems instructions for conducting a hang/load test has been replaced with a generic instruction and reference to the manufacture's user manual.
7. The equipment list has been updated, both the numbering and the terminology used, including the separation of rescue devices for lifting and for descending. The original equipment list was out of date, both in terms of the EN, ANSI, GB numbering and the terminology used.



4. Where the changes have been applied?

The table below contains an outline of the standards and changes. A description of all changes follows in section five.

Change Number (see previous page)	Standards Affected
1	BST, BST-R, WLA, ART, ART-R
2	BST, BST-R, WLA, ART, ART-R
3	BST, BST-R, WLA, ART, ART-R
4	BST, WLA
5	BST, WLA
6	BST, WLA
7	BST, BST-R, WLA, ART, ART-R, Lift

5 Detailed description of the changes

Below is a detailed description of the changes showing both the original text and the new text. Referencing and numbers given are as found in BST WaH ONLY. Specific reference in other standards may differ.

Always consult individual standard change logs for specific changes and number references.

Original text	New Text	Applicable to: Standard(s)
None - Add to the terms and definitions	<p>Additional fall protection: Describes the use of an independent, additional suitable fall protection system in conjunction with a primary fall protection system. Typically, used during training to provide fall protection to participants as they learn to use fall protection equipment. Additional fall protection may sometimes be referred to as a “backup”.</p> <p>The additional fall protection system should be chosen in such a way that it will not hinder the exercise. Preferably this additional fall protection is not even noticeable by the participant.</p>	<p>BST BSTR WLA ART ART-R</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
10.4 EQUIPMENT FOR WORKING AT HEIGHTS MODULE	10.4 EQUIPMENT FOR WORKING AT HEIGHTS MODULE	<p>BST BST-R WLA ART</p>



<p>The equipment required for training as listed in Annex 1 must be available and must fulfil national legal requirements as listed in table A4-1 in Annex 1 where applicable.</p> <p>A generic approach to teaching safety equipment is applied to this module aiming to avoid potential product specific additional training on completion of this module, which may be required by the participant's organisation e.g. prior to site or work.</p> <p>The generic approach is achieved by teaching a variety of safety equipment products within each safety equipment category (e.g., guided type fall arresters). This enables the participants to conduct pre-use inspection and to use other safety equipment products compared to those taught during this module (based on the manufacturer's user manual) but without additional formal training.</p> <p>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.</p> <p>GWO recommends.....()</p>	<p>The equipment required for training as listed in Annex 1 must be available and must fulfil national legal requirements as listed in table A4-1 in Annex 1 where applicable.</p> <p>A generic approach to teaching safety equipment is applied to this module aiming to avoid potential product specific additional training on completion of this module, which may be required by the participant's organisation e.g. prior to site or work.</p> <p>The generic approach is achieved by teaching a variety of safety equipment products within each safety equipment category (e.g., guided type fall arresters). This enables the participants to conduct pre-use inspection and to use other safety equipment products compared to those taught during this module (based on the manufacturer's user manual).</p> <p>Additional fall protection must always be used during training activities at height.</p> <p>The training provider shall introduce control measures that lower the risks and hazards associated with a fall from height to an acceptable level, following the Hierarchy of Controls in their risk assessment.</p> <p>GWO recommends.....()</p>	<p>ART-R</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
<p>9.1.5 Verify that each participant who is working at height during the following practical exercises (either as a casualty or a rescuer) is always attached to a backup line prior to (and at all times) while working at height. GWO recommends that a SRL is used as a backup line</p>	<p>It is the instructor's responsibility to always attach additional fall protection to each participant who is working at height (including both casualty and rescuer). GWO recommends that a SRL is used as additional fall protection.</p>	<p>BST, WLA</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
<p>9.1.5 Verify that each participant who is working at height during the following practical exercises (either as a casualty or</p>	<p>It is the instructor's responsibility to physically verify that each participant who is working at height (including both casualty</p>	<p>BST-R, ART, ART-R</p>



<p>a rescuer) is always attached to a backup line prior to (and at all times) while working at height. GWO recommends that a SRL is used as a backup line</p>	<p>and rescuer) is always attached to additional fall protection. GWO recommends that a SRL is used as additional fall protection.</p>	<p>Here the participants are qualified to use the equipment therefore the option of having them attach additional fall protection is an option- the instructor still must verify.</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
<p>Lesson 8 (Working at Heights & MH Combined) SELF RETRACTING LIFELINES 10 min.</p> <p>The aim of this lesson is to enable the participants 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 participants' knowledge about self-retracting lifelines enabling them to use these devices correctly and safely if they encounter them in a wind turbine environment.</p> <p>After having successfully completed this lesson, the participants can:</p> <p>50) Take responsibility for correctly using a backup line to reduce the risk of injury resulting from a fall from height (Ability, intermediate level)</p> <p>51) Take responsibility for correctly and safely using self-retracting lifelines in a wind turbine environment (Ability, intermediate level)</p> <p>ELEMENT 8.1 - TYPES OF BACKUP SYSTEMS Learning objective:</p>	<p>The aim of this lesson is to enable the participants to use self-retracting lifelines as fall protection system during actual work in a wind turbine.</p> <p>After having successfully completed this lesson, the participants can:</p> <p>50) Take responsibility for correctly and safely using self-retracting lifelines as fall protection system in a wind turbine (Ability, intermediate level)</p> <p>ELEMENT 8.1 – Fall Protection Systems during actual work in Wind Turbine</p> <p>Learning objective:</p> <p>The participants can explain the use of an SRL as a fall protection system during actual work in a wind turbine (Knowledge, intermediate level)</p> <p>The instructor shall:</p> <p>8.1.1 Provide examples of when an SRL may be used as fall protection system during actual work at height in a wind turbine</p> <p>8.1.2 Explain that additional fall protection systems are commonly required as a measure to prevent injury during training activities and that an additional fall</p>	<p>BST WLA</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>



<p>The participants can explain the different types of existing backup systems, their usage, their length, and the difference between wire and strap (Knowledge, intermediate level)</p> <p>The instructor shall.</p> <p>8.1.1 Explain that backup systems are required during training and that they might not necessarily be in place in a wind turbine</p> <p>8.1.2 Explain the different types of backup systems; how they are used, their size and length, how wire and strap differ</p> <p>The participants shall:</p> <p>8.1.3 Ask questions and engage in discussion on the different types of backup systems</p>	<p>protection system is commonly not required in actual wind turbines, particularly not for emergency situations such as evacuation and rescue</p> <p>8.1.3 Explain the different types of SRL fall protection systems typically used for training activities and used in wind turbines for actual work; why and how they are used, their limitations and fall clearance, the length of the lifeline</p> <p>The participants shall:</p> <p>8.1.4 Ask questions and engage in discussion about the importance of using fall protection systems in training and actual wind turbines</p> <p>8.1.5 Explain the difference between fall protection systems used in training verses in actual wind turbines</p>	
<p>8.2 DIFFERENT ALLOWED MAXIMUM ANGLES</p> <p>Learning objective:</p> <p>The participants can explain the different maximum angles that are allowed (Knowledge, intermediate level)</p> <p>The instructor shall:</p> <p>8.2.1 Explain the different maximum angles that are allowed according to the manufacturers</p> <p>The participants shall:</p> <p>8.2.2 Ask relevant questions when in doubt</p>	<p>8.2 DIFFERENT ALLOWED MAXIMUM ANGLES</p> <p>Learning objective:</p> <p>The participants can explain the different maximum angles that are allowed when using an SRL according to manufacture specifications (Knowledge, intermediate level)</p> <p>The instructor shall:</p> <p>8.2.1 Describe the different maximum angles that are allowed according to equipment manufacture's user manual</p> <p>8.2.x Explain how the maximum angle is calculated based on the angle of the lifeline in use compared to; either the SRL housing or the SRL attachment point (anchor point) – according to equipment manufacture's user manual</p>	<p>BST</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>



	<p>The participants shall:</p> <p>8.2.2 Provide an explanation for the different maximum angles allowed when using an SRL and how this is calculated</p>	
<p>ELEMENT 8.4 - APPROVED ANCHOR POINTS FOR BACKUP SYSTEMS</p> <p>Learning objective:</p> <p>The participants can explain the different places a backup line is allowed to be secured</p> <p>(Knowledge, intermediate level)</p> <p>The instructor shall:</p> <p>8.4.1 Explain approved anchor points for backup systems</p> <p>The participants shall:</p> <p>8.4.2 Ask questions when in doubt</p>	<p>ELEMENT 8.4 - APPROVED ANCHOR POINTS FOR SRL FALL PROTECTION SYSTEMS</p> <p>Learning objective:</p> <p>The participants can explain the different types of approved anchor points that an SRL is allowed to be secured to (Knowledge, intermediate level)</p> <p>The instructor shall:</p> <p>8.4.1 describe how to identify and use approved anchor points for the attachment of SRLs</p> <p>The participants shall:</p> <p>8.4.2 Explain how to identify and use different approved anchor points when attaching an SRL</p>	<p>Applicable to:</p> <p>BST</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
<p>ELEMENT 8.5 - THE IMPORTANCE OF USING BACKUP SYSTEMS</p> <p>Learning objective:</p> <p>The participants can explain the importance of using backup lines during training</p> <p>(Knowledge, intermediate level)</p> <p>The instructor shall:</p> <p>8.5.1 Explain the importance of using backup systems for exercises</p> <p>The participants shall:</p> <p>8.5.2 Engage in discussing the importance of using backup systems for exercises</p>	<p>Delete – covered in 8.1</p>	<p>Applicable to:</p> <p>BST</p> <p>WLA</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
<p>ELEMENT 8.6 - PRE-USE INSPECTION</p> <p>Learning objective:</p>	<p>ELEMENT 8.6 - PRE-USE INSPECTION</p> <p>Learning objective:</p>	<p>Applicable to:</p> <p>BST</p>



<p>The participants can perform a pre-use inspection of a self-retractable lifeline (SRL) (Skills, intermediate level)</p> <p>The instructor shall:</p> <p>8.6.1 Demonstrate how to perform pre-use inspection of the SRL product required/chosen to instruct this module, by the following principles that cover:</p> <ul style="list-style-type: none"> markings and labels operating weight and temperature range equipment is within period of formal inspections integrity, damage, corrosion, saltwater exposure, and significant wear of: block including bolts and locking rivets (entire cable/webbing) and connectors all moving parts work correctly with no excessive play carabiners/connectors operate (and lock) as intended and cannot disconnect completely fall indicator brake function (twice) observe correct alignment (max. angle between block and cable/webbing) observe product fall clearance (max. arrest distance) observe product operating temperature range observe manufacturer's user manual for specific or additional requirements <p>8.6.2 Stress the generic approach to pre-use inspection of a self-retractable lifeline (SRL)</p> <p>focusing on similarities and differences in design, functionality, and operation between different products</p>	<p>The participants can perform a pre-use inspection of a self-retractable lifeline (SRL) (Skills, intermediate level)</p> <p>The instructor shall:</p> <p>8.6.1 Demonstrate how to perform pre-use inspection of the SRL product required/chosen to instruct this module, by the following principles that cover:</p> <ul style="list-style-type: none"> markings and labels observe product operating weight and temperature range equipment is within period of formal inspections integrity, damage, corrosion, saltwater exposure, and significant wear of: block including bolts and locking rivets (entire cable/webbing) and connectors all moving parts work correctly with no excessive play carabiners/connectors operate (and lock) as intended and cannot disconnect completely fall indicator brake function (twice) observe correct alignment (max. angle between block and cable/webbing) observe product fall clearance (max. arrest distance) observe manufacturer's user manual for specific or additional requirements differences in pre-use inspections depending on whether the device is pre-installed or not, according to manufacturer specifications <p>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</p> <p>8.6.3 Explain that the participant is always required to familiarise themselves with the</p>	<p><i>Always consult individual standard change logs for specific changes and number references.</i></p>
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<p>8.6.3 Explain the potential task placed upon the participant (in their own organisation at course completion) requiring them to familiarise themselves with other safety equipment products</p> <p>8.6.4 Provide constructive feedback on the participants' performance during the practice</p> <p>The participants shall:</p> <p>8.6.5 Practise how to perform pre-use inspection of the SRL product required/chosen to instruct this module</p>	<p>specific SRL product prior to use e.g., by reading the equipment instruction manual</p> <p>8.6.4 Facilitate practical exercises for participants to practise and demonstrate a pre-use inspection of an SRL</p> <p>8.6.5 Provide constructive feedback on the participants' performance during practical exercises</p> <p>The participants shall:</p> <p>8.6.5 Practise and demonstrate how to perform pre-use inspection on the SRL product required/chosen to instruct this module</p>	
<p>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 principles that cover:</p> <p>identify which vertical fall arrest system the guided type fall arrester matches with, including matching cable size markings and labels</p> <p>operating weight and temperature range equipment is within period of formal inspections</p> <p>integrity, damage, corrosion, saltwater exposure and significant wear of: fall arrester, cam, energy absorber and carabiners</p> <p>all moving parts work correctly, with no excessive play</p> <p>spring fitted buttons engage promptly when released</p> <p>locking and catch mechanisms lock/release as intended</p> <p>identify symbol/instructions for 'up' orientation (pointing towards the sky when climbing up/down)</p> <p>gravity stop functionality works as intended</p>	<p>5.2.2 Demonstrate how to perform pre-use inspection of the guided type fall arrest products chosen/required to instruct this module, by the following principles that cover:</p> <p>identify which vertical fall arrest system the guided type fall arrester matches with, including matching cable size markings and labels</p> <p>operating weight and temperature range equipment is within period of formal inspections</p> <p>integrity, damage, corrosion, saltwater exposure and significant wear of: fall arrester, cam, energy absorber and carabiners</p> <p>all moving parts work correctly, with no excessive play</p> <p>spring fitted buttons engage promptly when released</p> <p>locking and catch mechanisms lock/release as intended</p> <p>identify symbol/indication for correct orientation in use</p> <p>gravity stop functionality works as intended</p> <p>fall indicator</p>	<p>Applicable to: BST</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>



<p>fall indicator</p> <p>carabiners/connecting elements operate (and lock) as intended, cannot disconnect completely and have not been extended/shortened</p> <p>which attachment point on harness to connect to</p> <p>observe manufacturer's user manual for specific or additional requirements.</p> <p>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</p> <p>5.2.4 Explain the potential task placed upon the participant in their own organisation on course completion, requiring them to familiarise themselves with other safety equipment products</p> <p>5.2.5 Facilitate practice for the participants before the practical exercises lesson</p> <p>5.2.6 Provide constructive feedback on the participants' performance during the practice</p> <p>The participants shall:</p> <p>5.2.7 Practise 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)</p>	<p>carabiners/connecting elements operate (and lock) as intended, cannot disconnect completely and have not been extended/shortened</p> <p>which attachment point on harness to connect to</p> <p>observe manufacturer's user manual for specific or additional requirements.</p> <p>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</p> <p>5.2.4 Explain that the participant is always required to familiarize themselves with the specific guided type fall arrester product prior to use e.g., by reading the equipment instruction manuals and to familiarise themselves with the specific guided type fall arrester (glider/slider) prior to use</p> <p>5.2.5 Facilitate practise for the participants before the practical exercises lesson</p> <p>5.2.6 Provide constructive feedback on the participants' performance during the practise</p> <p>The participants shall:</p> <p>5.2.7 Practise and demonstrate the ability to perform a pre-use inspection of a vertical fall arrest system including matching fall arrest glider/slider (demonstrated during this module)</p>	
<p>ELEMENT 5.3 - CORRECT ATTACHMENT AND DETACHMENT</p> <p>Learning objectives:</p> <p>31) The participants can perform the correctly attachment of a random vertical fall arrest</p>	<p>ELEMENT 5.3 - CORRECT ATTACHMENT AND DETACHMENT</p> <p>Learning objectives:</p> <p>31) The participants can perform the correct attachment of any vertical fall arrest glider/slider to the matching rail/wire (Skills, intermediate level)</p>	<p>Applicable to:</p> <p>BST</p> <p>WLA</p> <p><i>Always consult individual standard change logs for specific</i></p>



<p>glider/slider to the matching rail/wire (Skills, intermediate level)</p> <p>32) The participants can perform the correctly attachment of a random fall arrest glider/slider to the matching rail/wire (Skills, intermediate level)</p> <p>The instructor shall:</p> <p>5.3.1 Demonstrate how to attach and detach the glider/slider to the rail/wire of various vertical fall arrest systems</p> <p>5.3.2 Explain that the symbol/instructions for 'up' orientation of fall arrester must always point to the sky and does not indicate the climbing direction</p> <p>The participants shall:</p> <p>5.3.3 Practise the ability to correctly attach/detach a random glider/slider to the rail/wire of a matching vertical fall arrest system (prior to the practical exercises lesson of the working at heights module)</p>	<p>The instructor shall:</p> <p>5.3.1 Demonstrate how to attach and detach the glider/slider to the rail/wire of various vertical fall arrest systems</p> <p>5.3.2 Explain that the symbol/indication for correct orientation in use of a given guided type fall arrester may not indicate the climbing direction, and that the equipment should always be used according to equipment manufacture's user manual</p> <p>The participants shall:</p> <p>5.3.3 Practise and demonstrate the ability to correctly attach/detach a random glider/slider to the rail/wire of a matching vertical fall arrest system (prior to the practical exercises lesson of the working at heights module)</p>	<p><i>changes and number references.</i></p>
<p>ELEMENT 5.4 - CORRECT USE</p> <p>Learning objective:</p> <p>33) The participants can perform safely and correctly use a vertical fall arrest system while working at height (Skills, intermediate level)</p> <p>The instructor shall:</p> <p>5.4.1 Demonstrate how to correctly use a vertical fall arrest system</p> <p>The participants shall:</p> <p>5.4.2 Practise the ability to correctly use a random vertical fall arrest system, including testing if the fall arrester operates and locks as intended. From this point of the training onward it is advised</p>	<p>ELEMENT 5.4 - CORRECT USE</p> <p>Learning objective:</p> <p>33) The participants can perform safely and correctly use a vertical fall arrest system while working at height (Skills, intermediate level)</p> <p>The instructor shall:</p> <p>5.4.1 Demonstrate how to correctly use a vertical fall arrest system, including testing prior commencing climbing if the fall arrester operates and locks correctly according to equipment manufacture's user manual</p> <p>The participants shall:</p> <p>5.4.2 Practise and demonstrate the ability to correctly use a vertical fall arrest system,</p>	<p>Applicable to:</p> <p>BST</p> <p>WLA</p> <p><i>Always consult individual standard change logs for specific changes and number references.</i></p>



to always do a 'hang-test/load test' attachment to the system before commencing climbing up/down)	including testing prior to commencing climbing if the fall arrester operates and locks correctly according to equipment manufacture's user manual	
Equipment list	See below	Applicable to: BST, BSTR, BSTR-P, WLA, LIFT, ART, ART-R <i>Always consult individual standard change logs for specific changes and number references.</i>

Revised Equipment List

Please note that the Sea Survival equipment list has also been aligned with this updated list.

Country Specific Equipment Standards				
Equipment	Europe	North America	China	United Kingdom
Full Body Harness	EN 361+358	ANSI/ASSP Z359.11	GB 6095 +GB 6095 W/GB 6095 Q	BS EN 361+358
Fall restraint lanyards	EN 358	ANSI/ASSP Z359.3	GB 24543 W/GB 24543 Q	BS EN 358
Fall arrest lanyard including energy absorber	EN 354 and/or EN 355	ANSI/ASSP Z359.13	GB 24543 Z+GB/T 24538	BS EN 354 and/or BS EN 355
Industrial safety helmet with a chinstrap that is released with a force of no less than 150 N and no more than 250 N	EN 397 +A1	ANSI Z89.1 Type I	GB 2811	BS EN 397 +A1
Vertical fall arrest system on a rigid anchor line	EN 353-1	ANSI/ASSP Z359.15	GB 24542/GB 24537/GB 24543 Z/GB 30862+GB/T 24538/GB 24544	BS EN 353-1
Self-Retracting Lifelines (Retractable type fall arresters)	EN 360	ANSI/ASSP Z359.14	GB 24544	BS EN 360
Anchor points	EN795	ANSI/ASSP Z359.18	GB 30862	BS EN795



Slings	EN 354 + 795	ANSI/ASSP Z359.12	GB 24543 Z+GB 30862	BS EN 354 + 795
Connectors (Carabiners)	EN 362	ANSI/ASSP Z359.12	GB/T 23469	BS EN 362
Static ropes	EN 1891	ANSI/ASSP Z459.1 NFPA 1983	GB/T 23268.2	BS EN 1891
Rescue devices with lifting capacity	EN 1496	ANSI/ASSP Z359.4	-	BS EN 1496
Devices for emergency descent	EN 341	ANSI/ASSP Z359.4	GB/T 38230 A or GB/T 38230 B or GB/T 38230 C	BS EN 341

Table – Updated equipment list