GLOBAL WIND ORGANISATION

Lift Commission, Inspection, Installation and Maintenance Training Standard

V0 0

Pre-publication draft

For information only

Publication date: xxx, xxxx

1 List of Abbreviations

GWO	Global Wind Organisation
WINDA	GWO training record database
WTG	Wind Turbine Generator
PPE	Personal Protective Equipment
LCIIM	Lift Commission, Inspection, Installation and Maintenance
FAD	Fall arrest device

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.
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.
Pre-Use Inspection	An inspection of the lift and the lift environment prior to use (may also be referred to as daily inspection).
Human Factors	Human factors are an established science that uses many disciplines (like anatomy, physiology, physics, and biomechanics) to understand how people perform under different circumstances and environments.
Toolbox Talk	A job site safety briefing covering the risks and hazards of the task being performed.
Operating personnel	Any person or persons who are responsible for the operation.
Operator	The operator is the organisation (or person) who causes the product to be used.
Option	An option is the choice of a particular additional installation or equipment for the product. It is possible that the product which you are operating is fitted with none or only a few of these options.
Accident prevention regulations	The local accident prevention regulations and general safety regulations apply to the use of this product in addition to those described in this manual.
Illustrations	Illustrations are provided for basic understanding and can differ from the actual lift model.
Maneuver Panel	Control Panel where all operations of the lift can be executed
Bowden Cable	Device interrupting the release of the manual brake, when obstacles are detected, when no-power-descent is performed.
Fall Arrest device	Safety brake systems. Safety catch device. Secondary brake.
Lessons Questionnaire	Instructors' tool to test the participants learning outcome. The questions must aim at the content and taxonomic level in the relevant learning objectives, and should be challenging participants on their professional level

3 CHANGE LOG – REVISION

Amendment Date	1 October 2021	Approved by & date	Click or tap here to enter text.
Version	Ver. 0	Description of changes	

The following changes are made in relation to version 0 :

New section 7: Formative post-element evaluations.

Section 8 (former 7) Aim changed from: . . . "finalise installation after pre-assembly, inspect the lift prior to commissioning and perform maintenance" to ". . . install, inspect the lift prior to commissioning and perform maintenance"

New element added: Element 8.3 LCIIM module Instructor's qualification is added: LCIIM module Instructor's qualification: As an addition to the GWO Training Providers Requirements, a competent LCIIM module instructor must be certified by a competent train-the-trainer, who is acknowledged as such by a lift manufacturer

Element 6.5: New learning objective. "The participant can describe the safety inspection labels on the ladder according to relevant manual (Knowledge, basic level)"

Element 7.1: Learning objective 73 deleted. "The participants can perform replacement and adjustment of the Top obstruction device limit switch (Skills, intermediate level)"

Update of annex 1: New requirements for lift:

"Traveling distance must allow for test, inspection and work on relevant top- and bottom obstruction devices and other relevant safety devices, mechanical devices and rescue systems as stated in the relevant lift manual"

Note deleted: "Traveling distance must allow for testing relevant top- and bottom obstruction devices and other relevant safety devices, mechanical devices and rescue systems"

Training facility deleted "Pictures and show and tell technical part from other lift brands and types"

PPE equipment deleted "Harness incl. safety lines, etc. (recommended bringing own) have a backup of different sizes. Helmet. Safety goggles. Gloves (different sizes)"

The following changes are made in relation to version 0.3:

Element 7.2 Rephrased to: GWO Lift User training or similar brand specific user training is a prerequisite to participate in the Lift Commission, Inspection, Installation and Maintenance Module training. Basic technical experience and knowledge– primarily mechanical and electrical - is necessary to be able to get full benefit out of the training.

Element 6.2. New Learning objective: The participants can perform inspection of labels on wire ropes (skills, intermediate level)

Element 13.7: Elements on Load Capacity System are moved from 15.3 to 13.7.

Element 17.1: Alternative evaluation activity added

The following changes are made in relation of the version 0.2 These changes are related to Rack and Pinion driven lift systems.

New element 4.4 – Upper and lower hatches. Learning objective:
The participants can describe how to function test Operation of switches on upper and lower hatches (Knowledge, basic level)

Element 5.1 New Learning objective and learning activities added:
The participants show interest in checking that the Start-up and Maintenance certification adhesive signs are current and completed with correct dates (Ability, basic level)

New Element 6.1 Introductions to Lift guiding systems

Element 6.3 New Learning objectives and learning activities added: The participants can describe how to check guide wheels (Knowledge, basic level)

Element 6.5 New Learning objectives and learning activities added: The participants can describe how to do visual inspection of the omega flanges of the ties to step of ladder are not cracked or broken in the folds (Knowledge, basic level)

Element 6.5 New Learning objectives and learning activities added: The participants can recognise that upper and lower braking skates are clean and firmly connected to the ladder (Knowledge, basic level)

New Element 9.3 Upper and lower hatches. Learning objectives:
The participants can describe how to do visual inspection of the placement of the pins in the axes of the upper and lower hatches (Knowledge, basic level)
The participants can describe how to inspect the operation of the magnet system or latch on the upper hatch (Knowledge, basic level)
The participants show interest in ensuring, that the handle strings of the upper and lower hatches are properly installed and have the correct length (Ability, basic level)

Element 10.1 – section 10.1.1 – Added: . . . Maneuver panels in and outside lifts as well as at the lift base of the WTG and at the nacelle

New Element 10.3 Emergency Rescue System. Learning objectives: The participants can describe how to function test the Emergency Rescue System (Knowledge, basic level)

Element 11.1 New Learning objective and learning activities added:
The participants can describe how to do visual inspection of the Upper And lower attack pinion (Knowledge, basic level)

Element 12.3 New Learning objective and learning activities added:
The participants can explain how to do visual inspection of the upper and lower counter rollers (Knowledge, intermediate level

Element 12.7 New Learning objectives and learning activities added:
The participants can describe how to check the rack (Knowledge, basic level)
The participants show interest in seeking guidance in the relevant manual in case of detecting excessive wear on the rack (Ability, basic level)

Element 12.8 New Learning objective and learning activities added:
The participants can describe how to grease the rack and the pinion (Knowledge, basic level)
The participants can describe how to function test the operation of the rack proximity detector (Knowledge, basic level)

Element 12.9 New Learning objectives and learning activities added:
The participants can describe how to grease the rack and the pinion (Knowledge, basic level)

The participants can describe how to function test the operation of the rack proximity detector (Knowledge, basic level)

Element 13.4.1 cc – added: How to do check the operation of motor break at top- and bottom drive unit

Element 13.5 New Learning objective and learning activities added:
The participants can describe how to do visual inspection for oil leaks in the upper and the lower gear box (Knowledge, basic level)

Element 13.6 New Learning objectives and learning activities added: The participants can describe how to do visual inspection of centrifugal and electro/mechanical brakes (Knowledge, basic level)
The participants can perform function test on the electro/mechanical brakes and the centrifugal brakes and measurement of their diameter (R&P) (Skills, basic level)

4 SCOPE

This standard has been developed in response to the demand for recognisable training in the use of lifts in the industry. It has been prepared in cooperation with the members of GWO based on specific risk assessments, data from incident and accident statistics pertaining to the use, inspection, installation, and maintenance of lifts in wind turbine generators.

This standard describes the requirements for inspection, installation and maintenance of lift training that are recommended by the members of the GWO.

The members of the GWO recognise trained persons as competent within the use, inspection, installation, and maintenance of lift in the wind industry and accept the trained person as possessing the required knowledge to inspect, install, maintain, use, and evacuate a lift in a WTG where they as duty-holders are accountable for safety. Training is verified through the GWO database WINDA.

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

NOTE: On release of this Training, the training module will be part of the GWO Lift Training Standard

5 General Requirement to GWO Lift Commission, Inspection, Installation and Maintenance training

Upon completion of the GWO Lift Commission, Inspection, Installation and Maintenance Training (LCIIM), participants will be aware of the risks and hazards encountered when doing commissioning, inspection, installation, and maintenance of lifts within the wind industry. Furthermore, they will be able to control and mitigate those risks and hazards. The GWO Lift Commission, Inspection, Installation and Maintenance Training Module will also equip participants with the ability to take responsibility and appropriately respond in the event of a hazardous situation and to increase their safety through proper use of personal protective equipment, emergency equipment, procedures, and safe craftsmanship.

Inspecting, installing, and doing maintaining work on lifts in a WTG is dependent of at all times using the relevant manual and technical instructions.

5.1 Overview

The GWO Lift Commission, Inspection, Installation and Maintenance training module is a mix of theoretical and practical elements focusing on developing the needed knowledge, skills, and abilities for a wind technician to work on, to operate and to evacuate a lift in a WTG.

The training has a generic focus in relation to different lift types and brands, and the initiative to seek guidance in relevant manuals and directives when needed is a fundamental part of the learning objectives for this training.

5.2 Target group

Personnel working on WTGs within the wind industry by commissioning, inspecting, installing, and doing maintaining work on lifts in a WTG.

5.3 Aims and objectives

Training in accordance with this standard will enable participants to take responsibility to support and care for themselves and others while doing commissioning, inspection, installing, and maintaining work on a lift in the wind industry by possessing the required knowledge, skills, and ability to conduct assigned tasks and operations safely and efficiently. A prerequisite for being able to do this is that the relevant manual and guiding is used at all times.

5.4 Duration of Lift Commission, Inspection, Installation and Maintenance Modules

Modules	Duration
Lift Commission, Inspection, Installation and Maintenance – theory	14:00 hours / Two days training

Table 5-4 - Duration of the GWO Lift Commission, Inspection, Installation and Maintenance Modules

	Maximum duration per day

Contact time	8 hours
Total training day	10 hours

Table 5-4.2 - Maximum durations for training days

5.5 Validity period

The Lift Commission, Inspection, Installation and Maintenance Training is an enduring qualification and therefore a validity period does not apply to this training. This assumes that the participant is actively working with lifts.

5.6 Course Codes

Module	Course Code
Lift Commission, Inspection, Installation and Maintenance Training Module	LCIIM

Table 5-6 - GWO Lift Commission, Inspection, Installation and Maintenance Module course codes

5.7 Participant prerequisites for the Lift Commission, Inspection, Installation and Maintenance training

All personnel participating in the Lift Commission, Inspection, Installation and Maintenance training shall be medically fit and capable of fully participating. Specifically, the participants must be made aware of the risks and hazards related to completing this course.

Training providers shall have a procedure that requires participants to sign a statement stating that they are medically fit to participate in the training course and that they do not suffer from any medical illness that will prevent them from fully participating in the training course or subject them to hazard or risk or are under the influence of any impeding substances like narcotics or alcohol. Annex 2 of the Requirements for Training Providers: "Medical Self-Assessment Form" shall be used if no other equivalent procedure is in place.

Participants' signatures testifying to their medical fitness shall be collected prior to the start of the GWO Lift Commission, Inspection, Installation and Maintenance training module.

5.8 Physical demands

The GWO Lift Commission, Inspection, Installation and Maintenance Training Module may potentially be physically demanding.

If there is any doubt regarding the medical fitness of any participant, the training provider shall stop training with the participant 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 participants other than those required to meet this standard.

5.9 Training Equipment

The training provider shall ensure that the staff, facilities, and equipment are in place to support the training of the participants.

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

6 UNDERSTAND GWO LEARNING OBJECTIVES AND TAXONOMY

6.1 Learning objectives

Learning objectives describe what the participant should know and be able to do when the training is completed.

The learning objectives in a training are based on the mitigating precautions analysed in the risk assessment. They are the foundation of the learning activities, the course contents and what the participant performance assessment must be based upon.

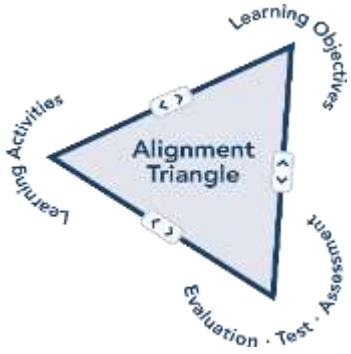

Figure 6-1 Alignment figure

Coherence between the learning objectives, the learning activities and the assessment is essential.

The purpose of this alignment is twofold:

1. To conduct learning activities that are directly focused on reaching the learning objectives.

2. That assessment of how well the learning objectives are met is done in close coherence with what the participant has practised during the learning activities and in a comparable environment.

Defining learning objectives in relation to all training elements ensures the alignment between objectives, activities, and on-going participants assessment. More guidance about learning activities and evaluation can be found in the GWO Taxonomy Framework, annex to requirements for Training Providers.

To be able to focus training on building up the necessary abilities, the learning objectives are described according to the GWO taxonomy in the three domains: Knowledge, Skills and Ability.

Ability is what is performed and presented during real-life exercises as well as in the real work situation and is the sum of personal experiences, knowledge, skills, and ability.

6.2 The GWO Taxonomy Framework

The structure of the GWO Taxonomy is based on the three learning domains: Knowledge, Skills, and Ability. Learning objectives are also defined at three taxonomic levels: 1) Basic, 2) Intermediate, and 3) Advanced level.

The taxonomy levels in the learning objectives are defined by a reasonable number of precise and explained action verbs (highlighted below). These action verbs are presented in a progression of increasing complexity – beginning on the basic level, where the participant can name, recognise or describe a tool or a procedure, and ending at the advanced level, where the participant can act responsibly, evaluate performance, assess decisions and supervise fellow workers.

The taxonomy and the presentation of action verbs in the progressive order imply that the previous taxonomic competences are already achieved.

Learning objectives in this standard are followed by an indication of the domain and taxonomy level in brackets (e.g., Skills, intermediate level). The taxonomic domains and levels are presented in the figure below.

	Knowledge	Skills	Ability
Advanced level	The participants understand a topic in a holistic way, where risks, advantages and disadvantages are considered and form the background for reflected assessments or decisions for action. Action verbs are: Assess, explore, and choose.	The participants can experiment and refine their skills as well as select and evaluate on the performance and reactions in relevant situations.	The participants can adapt and act responsibly in new ways, pay attention to the safety of fellow workers and propose development of safety procedures. The participants can supervise or manage colleagues' work effort.
Intermediate level	The participants can explain how things are done and how a piece of equipment or a tool is used. The participants can discuss a matter in professional terms and language.	The participants can perform a given task, apply safety procedures or a tool, and distinguish between relevant and less relevant situations in which to apply a skill.	The participants can act independently, are able to identify connections and risks in work-related situations and can take initiative and take responsibility for feasible mitigating actions on the job.
Basic level	The participants can describe a topic, name its constituent parts, or simply recognise it. Basic knowledge is observed by a one-dimensional objective: "I can tell a fact".	The participants can copy and repeat a procedure or an action, that has been presented.	The participants can act independently or under supervision in familiar work situations. Action verbs are: Show interest and solve

Figure 6-2, The GWO Taxonomy – condensed (from the GWO Taxonomy, annex to requirements for Training Providers)

6.3 Summing up on the learning objectives

A specific action verb indicates a taxonomic level that specifies learning activities for the participant to reach the decided learning objectives. During the learning activity the participant shall practie doing what the action verb indicates.

In addition, the participant's ability to meet the learning objectives may be evaluate by the instructor comparing the participant's performance in action (as well as the evaluation at the end of a module or a training) against the action verbs and the learning objective.

7 FORMATIVE POST ELEMENT EVALUATIONS

The participants must conduct an individual theory questionnaire on each element, where this is indicated in the relevant element. These questionnaires serve both as a re-cap for the participants on the theoretical topics of the elements, and they are the instructors' tool to evaluate the participants' theoretical learning outcome and understanding. Questions must be aimed at the element's content and posed at the taxonomic level in the relevant learning objectives. They should also challenge the participants according to their professional experience level.

The theory questionnaire can consist of multiple-choice or descriptive-answer questions, depending in complexity of the taxonomy level of the learning objectives concerned, that they are testing

The questionnaires must be conducted in accordance with the following criteria:

1) There shall be at least one question for each element in the module.
2) There shall be a time limit of maximum 1½ minutes per question.
3) The tests must be done individually.
4) Where a participant does not understand the meaning of a question or a multiple-choice option, the instructor must facilitate the participant to understand the meaning of the question or the multiple-choice options.
5) Participants may use:
    a. Training material.
    b. Handouts.
    c. Own notes.

Correct answers must be shared at the end of the test to allow the participants to check and evaluate their answers. To enhance learning, it is recommended letting peer participants evaluate each other's answers.

GLOBAL WIND ORGANISATION

Lift commission, Inspection, Installation and Maintenance Module

8 Lift Commission, Inspection, Installation and Maintenance Module

8.1 Aims of the Lift Commission, Inspection, Installation and Maintenance Module

The aim of this module is: to enable the lift technician to: install, inspect the lift prior to commissioning and perform maintenance; to take correct measures to acquire assistance; and perform simple adjustments or replacement of parts in a WTG lift.

Fundamental for the training is the wind technician's attention to, and awareness of, always following and seeking guidance from the relevant lift manuals and instructions.

8.2 Course participants prerequisites for the Lift Commission, Inspection, Installation and Maintenance Module

GWO Lift User training or similar brand specific user training is a prerequisite to participate in the Lift Commission, Inspection, Installation and Maintenance Module training.

Basic technical experience and knowledge – primarily mechanical and electrical - is necessary to be able to get full benefit from the training.

8.3 LCIIM module Instructor's qualification

As an addition to the GWO Requirements for Training Providers, a competent LCIIM module instructor must be certified by a competent train-the-trainer, who is acknowledged as such by a lift manufacturer.

8.4 Duration of the Lift Commission, Inspection, Installation and Maintenance Module

The total contact time for completing this Lift Commission, Inspection, Installation and Maintenance Training Module is estimated to be 14 hours. This is based on the time estimates given in table 8-3 below.

The training provider must not exceed the times given for each day.

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

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

Table 8-1 - Maximum durations for training day

Note: Contact time includes carrying out all learning activities and activities directly related to these. The total training day includes contact time, meals and breaks and travel between training sites (where applicable).

8.5 Digital training

When the training is conducted digitally, duration of the training will be variable due to e.g., the individual participant's learning rate or the type of media used.

8.6 Instructor to Participants Ratio

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

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

Module	Session	Instructor to Participant Ratio
Lift Commission, Inspection, Installation and Maintenance Module	Theory	1:12
	Practical	1:6

Table 8-2 - GWO Lift Commission, Inspection, Installation and Maintenance module Instructor to participant ratio

8.7 Lift Commission, Inspection, Installation and Maintenance Module Timetable

This section gives approximate duration of each of the lessons and elements. The training provider may choose to deliver elements of the training according to other timetables, provided that the total duration is not reduced, the duration of practical elements is not reduced in length, and that all learning objectives are met.

Theoretical elements should be applied during the practical exercises and skills training whenever feasible. The approximate duration is calculated based on 6 participants attending.

Lesson		Element		Approx. Duration
1	Introduction to the training	1.1	Safety instructions and emergency procedures	
		1.2	Facilities	
		1.3	Introduction	
		1.4	Scope and main learning objectives	
		1.5	Ongoing assessments	
		1.6	Motivation	

		1.7	Human factors	
		1.8	Personal Protective Equipment	
			Total	30 min.
2	Legislation and documentation	2.1	Lift manufacturers' manuals and guides	
		2.2	Local and national legislation	
			Total	15 min.
3	Safety when working on a lift in a WTG	3.1	Hazardous energy	
		3.2	Work areas in the WTG	
			Total	25 min.
4	Gates and fences	4.1	Outside the lift	
		4.2	Gate lock systems	
		4.3	Guard locking control	
		4.4	Upper and lower hatches	
			Total	45 min.
5	Cabin and its attachment parts	5.1	The cabin – in general	
		5.2	Fasteners and anchor points	
		5.3	Service light and emergency light	
			Total	55 min.
6	Cabin guide unit	6.1	Introduction to lift guiding systems	
		6.2	Guide ropes	
		6.3	Guide wheels	
		6.4	Roller guide unit	
		6.5	Guide ladder inspection	
			Total	117min.
7	Top obstruction device	7.1	Top obstruction device function	

		7.2	Top obstruction flashing light	
		7.3	Top obstruction in top position	
			Total	45 min.
8	Bottom obstruction device	8.1	Bottom obstruction device function	
		8.2	Bowden cable	
		8.3	Bottom obstruction flashing light	
		8.4	Bottom obstruction device stop in the lowest position	
			Total	72 min.
9	Lift door lock / electrical inter-lock	9.1	Function test of the door lock	
		9.2	Emergency unlocking	
		9.3	Upper and lower hatches	
			Total	20 min.
10	Lift operation/manoeuvre panel (LOP)	10.1	The lift operation/ manoeuvre panel	
		10.2	Operation hour counter	
		10.3	Emergency rescue system	
			Total	20 min.
11	Suspension/crossbeam	11.1	Suspension/crossbeam	
		11.2	Rope end attachments	
		11.3	Bolts and bolts connections	
		11.4	Upper and lower attack pinion	
			Total	35 min.
12	Drive and safety wire rope	12.1	Drive ropes, in general	
		12.2	Tension weights	
		12.3	Grounding rotating unit	
		12.4	Rope ends	

		12.5	Counter rollers	
		12.6	Rope clamps	
		12.7	Rope attachments and bondings	
		12.8	Rope protection	
		12.9	Inspection of the rack	
		12.10	Grease the rack	
			Total	140 min.
13	Traction hoist	13.1	Traction hoist device	
		13.2	Operation hour counter	
		13.3	Labels and type plates in traction hoist	
		13.4	Drive unit	
		13.5	Upper and lower gearbox	
		13.6	Electro-mechanical and centrifugal brakes	
		13.7	Load capacity system	
			Total	73 min.
14	Wire rope redirection inside the cabin	14.1		
			Total	12 min.
15	Fall arrest device (FAD)	15.1	Labels and type plates	
		15.2	General condition	
			Total	62 min.
16	Supply cable	16.1	Feed-in of supply cable	
		16.2	Strain relief	
		16.3	Cable bin	
			Total	20 min.
17	Test and training review	17.1	Theory test	

		17.2	Training review	
		17.3	Feedback session	
		17.4	Participant performance assessment	
			Total	50 min.
			GRAND TOTAL min.	13 hours 56

Table 8-3 - GWO Lift Commission, Inspection, Installation and Maintenance Module timetable

8.8 Detailed description of the Lift Commission, Inspection, Installation and Maintenance Module

Lesson 1 - INTRODUCTION TO THE TRAINING

30 min.

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

After having successfully completed lesson 1 of the Lift Commission, Inspection, Installation and Maintenance Module, the participants can:

1) Recognise what is expected of them throughout the module (Knowledge, basic level).
2) Name and point out local emergency procedures and facilities (Knowledge, basic level).
3) Discuss the relevant human factors and explain the implications thereof (Knowledge, intermediate level).
4) Explain the use of correct PPE (Knowledge, intermediate level).

ELEMENT 1.1 - SAFETY INSTRUCTIONS AND EMERGENCY PROCEDURES

Learning objective:

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

The instructor shall:

1.1.1 Explain and ask involving questions aiming at:

a. Safety instructions according to internal procedures.
b. Emergency procedures and emergency exits in the areas where the participants can be expected to be located during the course.

c. Site-specific chemical safety rules and instructions.

The participants shall:

1.1.2 Engage in answering questions on local safety and emergency procedures.

ELEMENT 1.2 - FACILITIES

Learning objective:

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

The instructor shall:

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

1.2.2 Alternative activity: walk the tour and point out facilities.

The participants shall:

1.2.3 Note relevant facilities and ask questions when in doubt.

ELEMENT 1.3 - INTRODUCTION

Learning objective:

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

The instructor shall:

1.3.1 Explain and ask involving questions aiming at the programme of the Lift Commission, Inspection, Installation and Maintenance Training Module, including breaks and mealtimes.

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

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

The participants shall:

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

ELEMENT 1.4 - SCOPE AND MAIN LEARNING OBJECTIVES

Learning objective:

8) The participants can recognise the scope and main objectives of the Lift Commission, Inspection, Installation and Maintenance Training Module (Knowledge, basic level).

The instructor shall:

1.4.1 Present the scope and main learning objectives of the Lift Commission, Inspection, Installation and Maintenance Training Module.

1.4.2 Involve participants with questions on understanding and individual experiences on the use of lifts.

The participant shall:

1.4.3 Engage in answering questions and share experiences on the use of lifts in WTG.

ELEMENT 1.5 - ONGOING ASSESSMENTS (PARTICIPANT ASSESSMENT FORM)

Learning objective:

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

The instructor shall:

1.5.1 Explain the reasons for the ongoing assessment.

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

The participants shall:

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

ELEMENT 1.6 - MOTIVATION

Learning objective:

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

The instructor shall:

1.6.1 Explain and lead a discussion on:

a. The importance of personal involvement in the course.

b. The definition of and the need for lift understandings and abilities.

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

The participants shall:

1.6.2 Engage themselves in discussions and share experiences on the use, installation, and maintenance of lifts in WTGs.

Note: When participants succeed (by trying out on their own, bringing their relevant experience into play and applying learning points from the instructor's feedback) they develop both a positive attitude and a responsibility towards the subject and how they perform in the work situation.

ELEMENT 1.7 - HUMAN FACTORS

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

Learning objectives:

11) The participants can describe the relevant human factors, and the implications of this (Knowledge, basic level).

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

The instructor shall:

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

1.7.2 Lead a discussion about the role of the individual in improving human behaviours and how this can improve the safety of offshore operations.

1.7.3 Ensure that learning objectives aiming at the ability domain are trained for in the practical exercises.

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

Facts and human factor criteria:

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

a. Attention and perception.
b. Group behaviour and peer pressure.
c. Weather conditions.
d. Weather delays.
e. Noise levels.
f. Site layout and housekeeping.
g. Fitness and health.
h. Domestic and work-related stress.
i. Workload (both overload and underload).

j. Fatigue.

k. Time pressure and deadlines.

l. Alcohol, medication, and substance abuse.

The participants shall:

1.7.5 Engage in discussions and share experiences of how human factors influence accidents in the use of lifts, engage in and reflect on received feedback and take responsibility on their own performance and development during the training.

Note: The participants performance (from a human factors perspective) must be part of the feedback whenever feasible during the training.

ELEMENT 1.8 - PERSONAL PROTECTIVE EQUIPMENT

Learning objectives:

13) The participant can describe the need for correct PPE (Knowledge, basic level).

14) The participant can recognise and describe the correct use of PPE (Knowledge, basic level).

15) The participant will show interest and awareness of exposure to chemical lubrication products and take responsibility for acting correct (Ability, basic level).

The instructor shall:

1.8.1 Ask questions on the participants' knowledge on the relevant PPE equipment, including: helmet, safety shoes, safety glasses, gloves, high visibility clothing (harness and fall-arrest may be presented).

1.8.2 Lead a discussion on exposure to chemical lubrication products and mitigating actions.

The participants shall:

1.8.3 Engage in instructor's questions and share experiences on the use of PPE and the exposure to chemical lubrication products.

Note: PPE is expected knowledge, and the learning activity should only be conducted when necessary.

Lesson 2 - LEGISLATION AND DOCUMENTATION

15 min.

The aim of this lesson is to emphasise the need to (at all times) locate, seek guidance in, and use the relevant lift manuals and directives, and to enable the participant to comply with national legislation and company regulations and any brand specific recommendations when using and working on a lift in WTGs.

After having successfully completed lesson 2 of the Lift Commission, Inspection, Installation and Maintenance Module, the participants can:

16) On their own, take initiative and take responsibility to follow lift manufacturers manuals, regulations, and legislations as well as relevant national and international legislation (Ability, intermediate level).

ELEMENT 2.1 - LIFT MANUFACTURERS' MANUALS AND GUIDES

Learning objectives:

17) The participants can describe where and how to find relevant documentation (manuals, risk-assessment, inspections- and installation forms etc.) (Knowledge, basic level).

18) The participants can solve routine tasks in relation to the inspection, installation, and maintenance of lifts in a WTG (Ability, basic level).

19) The participants can take responsibility and, will on their own, take initiative to seek help or guidance when needed (Ability, intermediate level).

20) The participants can act independently, take initiative, and always take responsibility in applying relevant lift manuals and instructions when inspecting, installing, and maintaining lifts in a WTG (Ability, intermediate level).

The instructor shall:

2.1.1 Present examples on relevant manuals or guides from different lift brands and lift types.

2.1.2 Facilitate a discussion on where to find and how to use such relevant manuals and guides.

2.1.3 Emphasis the necessity of always consulting relevant lift manuals and guides.

The participants shall:

2.1.4 Engage in discussion and share experiences on finding and applying manuals and guides in relation to the inspecting, installing, and maintaining of lifts in WTGs.

ELEMENT 2.2 - LOCAL AND NATIONAL LEGISLATION

Learning objective:

21) The participants will take responsibility and on their own initiative search for relevant legislation issues on site (Ability, intermediate level).

The instructor shall:

2.2.1 Present examples on where local and national legislation can be obtained.

2.2.2 Ask for the participants experiences on finding and applying legislation.

The participants shall:

2.2.3 Share their experiences on where local and national legislation can be obtained.

Note: The use of relevant and type-specific manuals and application of legislation and regulations must be applied during any practical training whenever relevant and feasible.

Lesson 3 - SAFETY WHEN WORKING ON A LIFT IN A WTG

25 min.

The aim of this lesson is to enable the participants to take necessary safety precautions when inspecting, installing, and maintaining lifts in a WTG in accordance with the relevant manual and directives.

After having successfully completed lesson 3 of the Lift Commission, Inspection, Installation and Maintenance Module, the participants can:

22) Solve routine safety tasks in relation to inspections, installation and maintaining of lifts in a WTG responsibly and will use their initiative to seek help or guidance when needed (Ability, basic level).

ELEMENT 3.1 - HAZARDOUS ENERGY

Learning objectives:

23) The participants can take responsibility of ensuring that the lift is in a controlled hazardous energy state (Ability, intermediate level).

24) The participants can take responsibility to de-energise the system and will use their own initiative to seek guidance in the relevant lift manuals (Ability, intermediate level).

The instructor shall:

3.1.1 Present and demonstrate examples of how to ensure that a lift is in a controlled hazardous energy state.

3.1.2 Lead or facilitate discussion on risks and mitigating options in relation to a controlled hazardous energy state.

The participants shall:

3.1.3 Engage in discussions and share experiences on hazardous energy states in WTGs.

ELEMENT 3.2 - WORK AREAS IN THE WTG

Learning objectives:

25) The participants can recognise working areas with restricted space when handling items manually (Knowledge, basic level).

26) The participants will show interest and awareness of slippery surfaces and proper housekeeping in the lift area (Ability, basic level).

27) The participant will show interest and awareness of hazards from moving and stationary parts in the WTG (Ability, basic level).

The instructor shall:

3.2.1 Present examples of restricted spaces, slippery surfaces, and proper housekeeping.

3.2.2 Lead or facilitate discussion and ask for participants' experiences on restricted spaces, slippery surfaces, and proper housekeeping in relation to lifts in WTGs.

The participants shall:

3.2.3 Engage in discussions and share experiences on the topic.

3.2.4 Conduct a short questionnaire test to recap on the theory and safety issues from lesson 3.

3.2.5 Check own answers and solutions from the shown fact list on completion of the test.

Note: The ability to take necessary safety precautions when using and working on lifts in a WTG must be practised during all practical training elements when relevant.

Lesson 4 - GATES AND FENCES

45 min.

The aim of this lesson is to enable the participants to inspect and ensure the free movement of the gates and fences in the WTG.

After having successfully completed lesson 4 of the Lift Commission, Inspection, Installation and Maintenance Module, the participants can:

28) Explain the free movement of mechanical parts in gates and fences outside a lift (Knowledge, intermediate level).

ELEMENT 4.1 - OUTSIDE THE LIFT

Learning objectives:

29) The participants can recognise and examine the free movement of mechanical parts in lift gates and fences (Knowledge, basic level).

30) The participants can explain for how to repair or replace mechanical parts in lift gates and fences when needed (Knowledge, intermediate level).

The instructor shall:

4.1.1 Present and demonstrate examples of movement of mechanical parts in lift gates and fences.

4.1.2 Lead or facilitate discussion on the element topic.

The participants shall:

4.1.3 Engage in discussions and share experiences on movement of mechanical parts in lift gates and fences.

ELEMENT 4.2 - GATE LOCK SYSTEMS

Learning objectives:

31) The participants can perform a function test on a gate lock switch: condition, cabling (Skills, intermediate level).

32) The participants can perform an adjustment of a gate lock switch (Skills, intermediate level).

The instructor shall:

4.2.1 Present and demonstrate examples of different gate lock systems.

4.2.2 Lead or facilitate discussion on the element topic.

4.2.3 Facilitate practical training on testing the functioning of gate lock switches.

The participants shall:

4.2.4 Engage in discussions, share experiences, and practise the function testing of a gate lock switch.

ELEMENT 4.3 - GUARD LOCKING CONTROL

Learning objectives:

33) The participants can perform an installation of a guard locking control box on the bottom platform fence (Skills, intermediate level).

34) The participants can perform an installation of a guard locking switch and its actuator on the fence door using supplied hardware (Skills, intermediate level).

35) The participants can perform an installation of a lift detection switch on its bracket on the bottom fence and connect to the socket on a guard locking control box (Skills, intermediate level).

36) The participants can perform a connection of a power cable power inlet plug to a guard locking control box outlet (Skills, intermediate level).

The instructor shall:

4.3.1 Present and demonstrate examples of different guard locking control boxes.

4.3.2 Lead a discussion and facilitate the practical training on guard locking control boxes.

The participants shall:

4.3.3 Engage in discussions, share experiences, and practise installation of guard locking control boxes.

ELEMENT 4.4 - UPPER AND LOWER HATCHES

Learning objective:

37) The participants can describe how to function test the operation of switches on upper and lower hatches (Knowledge, basic level).

The instructor shall:

4.4.1 Demonstrate how to function test the operation of switches on upper and lower hatches.

4.4.2 Facilitate the practical training on how to function test the operation of switches on upper and lower hatches.

The participants shall:

4.4.3 Engage in discussions, share experiences, and practise how to function test the operation of switches on upper and lower hatches.

4.4.4 Conduct a short questionnaire test to recap the theory and safety issues from lesson 4.

4.4.5 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 5 - CABIN AND ITS ATTACHMENT PARTS

55 min.

The aim of this lesson is to enable the participants to inspect and ensure the flawless condition of the lift cabin.

After having successfully completed lesson 5 of the Lift Commission, Inspection, Installation and Maintenance Module:

38) The participants can explain how to do a visual inspection of the general condition of a lift (Knowledge, intermediate level).

ELEMENT 5.1 - THE CABIN – IN GENERAL

Learning objectives:

39) The participants can explain how to do a visual inspection of a viewing windows in a lift (Knowledge, intermediate level).

40) The participants show interest in checking that adhesive signs for the start-up and maintenance certification are current, completed and have the correct dates (Ability, basic level).

The instructor shall:

5.1.1 Present and demonstrate examples of viewing windows in a lift.

5.1.2 Lead or facilitate discussion on viewing windows in a lift and their potential faults.

The participants shall:

5.1.3 Engage in discussions and share experiences on viewing windows in a lift.

ELEMENT 5.2 - FASTENERS AND ANCHOR POINTS

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Learning objectives:

41) The participants can perform an installation of all fasteners (screws and bolts) in a lift (Skills, intermediate level).

42) The participants can explain how to do visual inspection all fasteners (screws and bolts) in a lift (Knowledge, intermediate level).

43) The participants can explain how to do visual inspection of PPE anchors in a lift (Knowledge, intermediate level).

44) The participants can describe how to apply labelling (showing pictograms of PPE anchors) in a lift (when other language labels are needed) (Knowledge, basic level).

45) The participants can describe how to inspect labelling (showing pictograms of PPE anchors) in a lift (Knowledge, basic level).

46) The participants can describe the proper condition of yellow coating of PPE anchors (Knowledge, basic level).

47) The participants will on their own take initiative in repairing yellow coating of PPE anchors, when needed (Ability, intermediate level).

The instructor shall:

5.2.1 Present fasteners and anchor points in a lift and supplement with examples from different lift types.

5.2.2 Initiate group discussions and ask for conclusive reflections.

5.2.3 Facilitate installation of fasteners practice.

The participants shall:

5.2.4 Share experiences and engage in group discussions on the purposes and challenges on fasteners and anchor points in lift cabins.

5.2.5 Practise how to install fasteners (5.2.3 and 5.2.4 may be conducted simultaneously – one group discussing and one group practising).

ELEMENT 5.3 - SERVICE LIGHT AND EMERGENCY LIGHT

Learning objectives:

48) The participants can perform an installation and connection of the service light and emergency light in a lift (Skills, intermediate level).

49) The participants can explain how to do an inspection of the service light and emergency light in a lift (Knowledge, intermediate level).

The instructor shall:

5.3.1 Present and demonstrate examples of how to inspect and install the service light and emergency light in a lift.

5.3.2 Lead a discussion on challenges of inspecting service lights and emergency lights in a lift.

5.3.3 Facilitate installations practice.

The participants shall:

5.3.4 Engage in discussions and share experiences on service lights and emergency lights in lifts.

5.3.5 Practise how to inspect and install service lights and emergency lights in lifts.

5.3.6 Conduct a short questionnaire test to recap the theory and safety issues from lesson 5.

5.3.7 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 6 - CABIN GUIDE UNIT

117 min.

The aim of this lesson is to enable the participants to install, maintain and inspect the guiding system responsibly and re-install in accordance with and following instructions in the relevant manuals and inspection lists.

After successfully having completed lesson 6 of the Lift Commission, Inspection, Installation and Maintenance Module:

50) The participants can explain how to do a visual inspection of the cabin guide units (with rollers) in a lift (Skills, intermediate level).

51) The participants will take initiative and take the responsibility to change guide rope, cabin guide unit, and roller guide unit when needed (Ability, intermediate level).

ELEMENT 6.1 - INTRODUCTION TO LIFT GUIDING SYSTEMS

Learning objective:

52) The participants can explain the characteristics of different lift guiding systems (Knowledge, intermediate level).

The instructor shall:

6.1.1 Introduce the lesson by presenting examples of guiding systems:

a. Wire guided.

b. Ladder guided.

c. Rack and pinion.

6.1.2 Lead or facilitate discussion on lift guiding systems principles.

The participants shall:

6.1.3 Engage in discussions and share experiences of different lift guiding systems.

ELEMENT 6.2 - GUIDE ROPES

Learning objectives:

53) The participants can perform an installation of the cabin guide units (with rollers) in the lift (Skills, intermediate level).

54) The participants can perform an installation of the guide ropes, including the coiling-up or cut (Skills, intermediate level).

55) The participants can perform an inspection of labels on wire ropes (skills, intermediate level).

56) The participants can explain how to do a visual inspection of the guide ropes according to ISO 4309 (Knowledge, intermediate level).

57) The participants can examine guide ropes and recognise when these are in flawless condition e.g. Ø 12 at the lowest landing (Knowledge, basic level).

58) The participants can perform a rope tension inspection of the guide ropes (Skills, intermediate level).

59) The participants can take initiative and take responsibility to adjust guide ropes tension to the specified value (Ability, intermediate level).

60) The participants can explain how to do a visual inspection of the coiling-up of rope ends (Knowledge, intermediate level.

61) The participants can perform an installation of the wire rope fixings and an adjustment of the wire ropes at the landings (Skills, intermediate level).

62) The participants can explain how to do a visual inspection of the wire rope fixings at the landings (Knowledge, intermediate level).

The instructor shall:

6.2.1 Present examples of guide ropes and cabin guide units.

6.2.2 Facilitate practical training on guide ropes:

a. Installation and adjustment.
b. Fixing and adjustment.
c. Inspection (condition and tension).

6.2.3 Provide individual feedback to participants on their performance.

The participants shall:

6.2.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 6.3 - GUIDE WHEELS

Learning objective:

63) The participants can describe how to check:

a. guide wheel (upper front right and upper rear right).
b. guide wheel (upper front left and upper rear left).
c. guide wheel (lower front right and lower rear left).
d. guide wheel (lower front left and lower rear left).

The instructor shall:

6.3.1 Present examples of guide wheels and demonstrate how to check the guide wheels.

6.3.2 Ensure participants understandings by having the participants describe how to check the guide wheels.

The participants shall:

6.3.3 Follow the presentations and afterwards describe how to check guide wheels to the instructor or to fellow participant.

ELEMENT 6.4 - ROLLER GUIDE UNIT

Learning objectives:

64) The participants can perform an installation of a roller guide unit (Skills, intermediate level).

65) The participants can explain how to do a visual inspection a roller guide unit (Knowledge, intermediate level).

66) The participants can examine a roller guide unit and recognise when these are in flawless condition (Knowledge, basic level).

67) The participants will take initiative and take responsibility to change the roller guide unit when needed in accordance with the relevant manual (Ability, intermediate level).

The instructor shall:

6.4.1 Present examples of roller guide units.

6.4.2 Facilitate practical training on installing and inspecting roller guide units.

6.4.3 Provide individual feedback to participants on their performance.

The participants shall:

6.4.4 Engage in discussions and share experiences on installing and inspecting roller guide units.

6.4.5 Receive and reflect on feedback.

ELEMENT 6.5 - GUIDE LADDER INSPECTION

Learning objectives:

68) The participant can describe the safety inspection labels on the ladder according to relevant manuals (Knowledge, basic level).

69) The participants can describe how to do a visual inspection of the assembly between ladder sections and attachment points according to relevant manuals (Knowledge, basic level).

70) The participants can describe how to do a visual inspection of the omega flanges (of the ties to step of ladder) are not cracked, or broken, in the folds according to relevant manuals (Knowledge, basic level).

71) The participants can recognise that upper and lower braking skates are clean and firmly connected to the ladder according to relevant manuals (Knowledge, basic level).

The instructor shall:

6.5.1 Present visual examples of assemblies between ladder sections and attachment points and skaters connections.

6.5.2 Lead or facilitate discussion on safety related risks on assemblies and flanges.

The participants shall:

6.5.3 Engage in discussions and share experiences on omega flanges and assemblies between ladder sections and attachment points.

6.5.4 Conduct a short questionnaire test to recap the theory and safety issues from lesson 6.

6.5.5 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 7 - TOP OBSTRUCTION DEVICE

45 min.

The aim of this lesson is to enable the participants to inspect and ensure the top obstruction functionality in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 7 of the Lift Commission, Inspection, Installation and Maintenance Module:

72) The participants can on own initiative take responsibility for function-testing and ensuring the functionality of the top obstruction device with sub-elements (Ability, intermediate level).

ELEMENT 7.1 - TOP OBSTRUCTION DEVICE FUNCTION

Learning objectives:

73) The participants can perform a function test of the top obstruction device and limit switches (Skills, intermediate level).

74) The participants can perform a replacement and adjustment of the top obstruction device limit switch (Skills, intermediate level).

The instructor shall:

7.1.1 Present and demonstrate examples of different lift types of top obstruction devices and limit switches.

7.1.2 Facilitate practical training on installing and inspecting a top obstruction device and limit switch.

7.1.3 Provide feedback on the participants' performance.

7.1.4 Lead or facilitate discussion on top obstruction device functionalities.

The participants shall:

7.1.5 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 7.2 - TOP OBSTRUCTION FLASHING LIGHT

Learning objectives:

75) The participants can explain how to do function test of the top obstruction device flashing light (Knowledge, intermediate level).

76) The participants can explain how to replace the top obstruction device flashing light and bulb (Knowledge, intermediate level).

The instructor shall:

7.2.1 Present and demonstrate examples of the top obstruction device flashing light and how to replace it.

7.2.2 Lead or facilitate discussion on the top obstruction device flashing light.

The participants shall:

7.2.3 Engage in discussions and share experiences on the element topic.

ELEMENT 7.3 - TOP OBSTRUCTION IN TOP POSITION

Learning objectives:

77) The participants can perform a function test of the top obstruction device (stop in top position) (Skills, intermediate level).

78) The participants can perform an adjustment of the top obstruction device (stop in top position) (Skills, intermediate level).

The instructor shall:

7.3.1 Demonstrate how to perform a function test and adjustment of the top obstruction device (stop in top position).

7.3.2 Facilitate practical exercise on testing and adjusting the top obstruction device (stop in top position).

7.3.3 Provide feedback to the participants on their performance.

The participants shall:

7.3.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

7.3.5 Conduct a short questionnaire test to recap the theory and safety issues from lesson 7.

7.3.6 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 8 - BOTTOM OBSTRUCTION DEVICE

72 min.

The aim of this lesson is to enable the participants to test the function and ensure the functionality of the bottom obstruction device and its sub-elements in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 8 of the Lift Commission, Inspection, Installation and Maintenance Module:

79) The participants can on own initiative take responsibility of function-testing the bottom obstruction device (with sub-elements) and ensure its functionality (Ability, intermediate level).

ELEMENT 8.1 - BOTTOM OBSTRUCTION DEVICE FUNCTION

Learning objectives:

80) The participants can perform a function test of the bottom obstruction device - mechanical parts and switches (Skills, intermediate level).

81) The participants can perform a replacement or adjustment of the bottom obstruction device - mechanical parts (Skills, intermediate level).

The instructor shall:

8.1.1 Demonstrate how to perform a function test and adjustment of the bottom obstruction device - mechanical parts and switches.

8.1.2 Facilitate practical training on testing and adjusting the bottom obstruction device - mechanical parts and switches.

8.1.3 Provide feedback to the participants on their performance.

The participants shall:

8.1.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 8.2 - BOWDEN CABLE

Learning objectives:

82) The participants can perform a function test of a bottom obstruction device - Bowden cable (Skills, intermediate level).

83) The participants can perform a replacement or adjustment of a bottom obstruction device - Bowden cable (Skills, intermediate level).

The instructor shall:

8.2.1 Demonstrate how to perform a function test, replacement, and adjustment of a bottom obstruction device - Bowden cable.

8.2.2 Facilitate practical training on testing and adjusting bottom obstruction device - Bowden cable.

8.2.3 Provide feedback to the participants on their performance.

The participants shall:

8.2.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 8.3 - BOTTOM OBSTRUCTION FLASHING LIGHT

Learning objectives:

84) The participants can explain how to do function test of the bottom obstruction device - flashing light (Knowledge, intermediate level).

85) The participants can perform a replacement of the bottom obstruction device - flashing light and bulb (Skills, intermediate level).

The instructor shall:

8.3.1 Demonstrate how to perform a function test and replacement of the bottom obstruction device - flashing light and bulb.

8.3.2 Facilitate practical training on testing the flashing light and replacing the bulb.

8.3.3 Provide feedback to the participants on their performance.

The participants shall:

8.3.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 8.4 - BOTTOM OBSTRUCTION DEVICE STOP IN THE LOWEST POSITION

Learning objectives:

86) The participants can perform a function test of the bottom obstruction device (stop in the lowest position) (Skills, intermediate level).

87) The participants can perform a replacement or adjustment of the bottom obstruction device lowering limit switch (Skills, intermediate level).

88) The participants can perform an adjustment of the operational function of the bottom obstruction device (Skills, intermediate level).

89) The participants can perform an adjustment of the bottom obstruction device (stop in the lowest position) (Skills, intermediate level).

The instructor shall:

8.4.1 Demonstrate how to perform a function test, adjustment and replacement of the bottom obstruction device (stop in the lowest position).

8.4.2 Facilitate practical exercise on testing, replacing, and adjusting the bottom obstruction device (stop in the lowest position).

8.4.3 Provide feedback to the participants on their performance.

The participants shall:

8.4.4 Engage in practice, share experiences, and apply the received feedback in the following exercises.

8.4.5 Conduct a short questionnaire test to recap the theory and safety issues from lesson 8.

8.4.6 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 9 - LIFT DOOR LOCK / ELECTRICAL INTER-LOCK

20 min.

The aim of this lesson is to enable the participants to test the function of lift door lock and ensure its functionality in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 9 of the Lift Commission, Inspection, Installation and Maintenance Module:

90) The participants can on own initiative take responsibility of function-testing the Lift Door lock / electrical inter-lock according to the relevant manual and instructions (Ability, intermediate level).

ELEMENT 9.1 - FUNCTION TEST OF THE DOOR LOCK

Learning objectives:

91) The participants can take responsibility of doing function test of the door lock following guidance in the relevant manuals (Skills, intermediate level).

92) The participants can perform a function test of the lift door lock in operation (skills, intermediate level).

93) The participants can perform a replacement and repair of the electrical inter-lock according to the relevant manuals (Skills, intermediate level).

The instructor shall:

9.1.1 Demonstrate how to perform a function test and replacement of the door lock.

9.1.2 Facilitate practical training on testing and replacing the door lock and the electrical inter-lock.

9.1.3 Provide feedback to the participants on their performance during the practical training.

The participants shall:

9.1.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 9.2 - EMERGENCY UNLOCKING

Learning objective:

94) The participants can perform a function test of the emergency unlocking of the lift door lock (Skills, intermediate level).

The instructor shall:

9.2.1 Demonstrate how to perform a function test of emergency unlocking of the lift door lock.

9.2.2 Facilitate practical training on testing emergency unlocking of the lift door lock.

9.2.3 Provide feedback to the participants on their performance during the practical training.

The participants shall:

9.2.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 9.3 - UPPER AND LOWER HATCHES

Learning objectives:

95) The participants can describe how to do a visual inspection of the placement of the pins in the axes of the upper and lower hatches (Knowledge, basic level).

96) The participants can describe how to inspect the operation of the magnet system or latch on the upper hatch (Knowledge, basic level).

97) The participants show interest in ensuring, that the handle strings of the upper and lower hatches are properly installed and have the correct length (Ability, basic level).

The instructor shall:

9.3.1 Demonstrate how to perform a visual inspection of the placement of the pins in the axes of the upper and lower hatches.

9.3.2 Demonstrate how to inspect the operation of the magnet system or latch on the upper hatch.

9.3.3 Demonstrate and facilitate or lead a discussion on the installation and dimensions of the handle strings of the upper and lower hatches.

The participants shall:

9.3.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

9.3.5 Conduct a short questionnaire test to recap the theory and safety issues from lesson 9.

9.3.6 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 10 - LIFT OPERATION/MANOEUVER PANEL (LOP)

20 min.

The aim of this lesson is to enable the participants to verify and ensure that the Lift Operation/Manoeuver panel is fully operational.

After successfully having completed lesson 10 of the Lift Commission, Inspection, Installation and Maintenance Module:

98) The participants can on own initiative take responsibility of inspecting and testing the LOP (Ability, intermediate level).

ELEMENT 10.1 - THE LIFT OPERATION/MANOEUVER PANEL

Learning objectives:

99) The participants can explain how to do a visual inspection of the lift operation manoeuver panels (Knowledge, intermediate level).

100) The participants can take responsibility to carry out a function test on the manoeuver panels: emergency stop - reset/ready inside/outside - selector switch - up/down inside/outside (Ability, intermediate level).

The instructor shall:

10.1.1 Present examples of manouever panels in and outside lifts as well as at the lift base of the WTG and at the nacelle. In addition, demonstrate how to perform a function test and inspection on the panel.

10.1.2 Lead or facilitate discussion on the lift operation manoeuver panel.

The participants shall:

10.1.3 Engage in discussions and share experiences on lift operation manoeuver panels in lifts.

ELEMENT 10.2 - OPERATION HOUR COUNTER

Learning objectives:

101) The participants can explain how to do a visual inspection of the operation hour counter of the lift at the LOP (Knowledge, intermediate level).

102) The participants can explain how to do replacement of the operation hour counter of the lift at the LOP (Knowledge, intermediate level).

The instructor shall:

10.2.1 Present examples of operation hour counters in manuoever panels in lifts and demonstrate how to perform a function test and replace the hour counter.

10.2.2 Lead or facilitate discussion on the lift operation manoeuver panel and operation hour counter.

The participants shall:

10.2.3 Engage in discussions and share experiences on lift operation manoeuver panels and operation hour counters in lifts.

ELEMENT 10.3 - EMERGENCY RESCUE SYSTEM

Learning objective:

103) The participants can describe how to function test the Emergency Rescue System (Knowledge, basic level).

The instructor shall:

10.3.1 Demonstrate how to perform a function test of the Emergency Rescue System.

10.3.2 Facilitate that participant practise how to function test the Emergency Rescue System.

The participants shall:

10.3.3 Practise how to function test the Emergency Rescue System.

10.3.4 Conduct a short questionnaire test to recap the theory and safety issues from lesson 10.

10.3.5 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 11 - SUSPENSION/CROSSBEAM

35 min.

The aim of this lesson is to enable the participants to inspect the suspension/crossbeam and report errors and omissions in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 11 of the Lift Commission, Inspection, Installation and Maintenance Module:

104) The participants can take the responsibility for assessing the condition of the suspension/crossbeam, seek guidance in lift manuals and directives and decide relevant and responsible action in case of defects and damages (Ability, intermediate level).

ELEMENT 11.1 - SUSPENSION/CROSSBEAM

Learning objectives:

105) The participants can explain how to do a visual inspection of all parts for damage, cracks, corrosion (Knowledge, intermediate level).

106) The participants can explain how to do a visual inspection of all welds for damage and cracks (Knowledge, intermediate level).

The instructor shall:

11.1.1 Present examples of damage, cracks, and corrosion in connection to the suspension/crossbeam and its welds.

11.1.2 Distribute images of examples of damages, cracks and corrosion to the participants and facilitate discussions in pairs on damage, cracks and corrosion and what actions to take, if such are discovered. Each pair should discuss one image for one minute, and then swap the images amongst the participants to initiate discussions on each new image in turn.

The participants shall:

11.1.3 Engage in pairs in discussions inspired by distributed images and share their experiences on damages, cracks and corrosion in connection to the suspension/crossbeam and its welds.

ELEMENT 11.2 - ROPE END ATTACHMENTS

Learning objective:

107) The participants can explain how to do a visual inspection of the rope end attachment (Knowledge, intermediate level).

The instructor shall:

11.2.1 Present examples of rope end attachments.

11.2.2 Lead or facilitate discussion on rope ends attachments.

The participants shall:

11.2.3 Engage in discussions and share experiences on rope ends attachments.

ELEMENT 11.3 - BOLTS AND BOLTS CONNECTIONS

Learning objective:

108) The participants can explain how to do a visual inspection of all bolts and bolt connections for completeness and tightness (Knowledge, intermediate level).

The instructor shall:

11.3.1 Present and demonstrate examples of how to do a visual inspection of all bolts and bolt connections for completeness and tightness.

11.3.2 Lead or facilitate discussion on bolts and bolt connections completeness and tightness.

The participants shall:

11.3.3 Engage in discussions and share experiences on bolt and bolt connections completeness and tightness.

ELEMENT 11.4 - UPPER AND LOWER ATTACK PINION

Learning objective:

109) The participants can describe how to do a visual inspection of the upper and lower attack pinion (Knowledge, basic level).

The instructor shall:

11.4.1 Present and demonstrate examples of how to do a visual inspection of all bolts and bolt connections for completeness and tightness.

11.4.2 Lead or facilitate a discussion on bolts and bolt connections and their completeness and tightness.

The participants shall:

11.4.3 Engage in discussions and share experiences on bolt and bolt connections and their completeness and tightness.

11.4.4 Conduct a short questionnaire test to recap the theory and safety issues from lesson 11.

11.4.5 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 12 - DRIVE AND SAFETY WIRE ROPE AND RACK

140 min.

The aim of this lesson is to enable the participants to test and ensure the functionality of drive and safety ropes and racks in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 12 of the Lift Commission, Inspection, Installation and Maintenance Module:

110) The participants can explain how to do a visual inspection and replacement of drive and safety ropes according to ISO 4309 (Knowledge, intermediate level).

ELEMENT 12.1 - DRIVE ROPES, IN GENERAL

Learning objectives:

111) The participants can perform a replacement of drive and safety ropes according to ISO 4309 (Skills, intermediate level).

112) The participants can perform a visual inspection of the diameter of drive rope and safety rope in unloaded state at 3 points: bottom, middle & top (Skills, intermediate level).

113) The participants can explain how to do correct greasing of the drive rope sufficiently, e.g. 0.4 litres of e.g. HHS 2000 per 100 metre rope (Knowledge, intermediate level).

The instructor shall:

12.1.1 Demonstrate how to inspect and replace drive and safety ropes.

12.1.2 Facilitate practical training on inspecting and replacing drive and safety ropes.

12.1.3 Provide feedback to the participants on their performance during the practical training.

The participants shall:

12.1.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 12.2 - TENSION WEIGHTS

Learning objectives:

114) The participants can explain how to do a visual inspection on tension weights installations (Knowledge, intermediate level).

115) The participants can explain how to inspect tension weights to have distance/space above (full loaded lift) or below (unloaded lift) in accordance with the relevant manuals - e.g. 250mm (Knowledge, intermediate level).

116) The participants can perform an adjustment on tension weights installations in accordance with the relevant manuals (Skills, intermediate level).

117) The participants can perform an adjustment of the tension weights to have distance/space above (full loaded lift) or below (unloaded lift) in accordance with the relevant manual e.g. 250mm (Skills, intermediate level).

The instructor shall:

12.2.1 Demonstrate how to inspect and adjust tension weights according to relevant manuals and instructions.

12.2.2 Facilitate practical training on inspecting and adjusting tension weights.

12.2.3 Provide feedback to the participants on their performance during the practical training.

The participants shall:

12.2.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 12.3 - GROUNDING ROTATING UNIT

Learning objective:

118) The participants can perform a visual inspection of the grounding rotating unit (Skills, intermediate level).

119) The participants can perform a replacement of the grounding rotating unit (Skills, intermediate level).

The instructor shall:

12.3.1 Demonstrate how to inspect and replace a grounding rotating unit.

12.3.2 Facilitate practical training on inspecting and replacing a grounding rotating unit.

12.3.3 Provide feedback to the participants on their performance during the practical training.

The participants shall:

12.3.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 12.4 - ROPE ENDS

Learning objectives:

120) The participants can explain how to do a visual inspection of coiled up rope ends (Knowledge, intermediate level).

121) The participants can recognise if cutting/shortening of rope ends is needed (Knowledge, basic level).

The instructor shall:

12.4.1 Present examples of how to visually inspect coiled up rope ends.

12.4.2 Present examples of rope ends, where shortening of rope ends is needed.

12.4.3 Lead or facilitate discussion on shortening of rope ends.

The participants shall:

12.4.4 Engage in discussions and share experiences on inspecting and shortening rope ends.

ELEMENT 12.5 - COUNTER ROLLERS

Learning objective:

122) The participants can explain how to do a visual inspection of the upper and lower counter rollers (Knowledge, intermediate level).

The instructor shall:

12.5.1 Present examples of how to do a visual inspection of upper and lower counter rollers.

12.5.2 Lead or facilitate a discussion on how to do a visual inspection (as guided in the relevant manuals) of upper and lower counter rollers and on what to do in case of irregularities.

The participants shall:

12.5.3 Engage in discussions and share experiences on upper and lower counter rollers.

ELEMENT 12.6 - ROPE CLAMPS

Learning objectives:

123) The participants can explain how to do a visual inspection of the rope clamps (Knowledge, intermediate level).

124) The participants can perform a replacement and tighten rope clamps (Skills, intermediate level).

The instructor shall:

12.6.1 Demonstrate examples of how to replace and tighten rope clamps.

12.6.2 Facilitate practical training on replacing and tightening rope clamps.

12.6.3 Provide feedback on the participants' performance.

The participants shall:

12.6.4 Engage in practical training, share experiences on the element topic and reflect on the received feedback.

ELEMENT 12.7 - ROPE ATTACHMENTS AND BONDINGS

Learning objective:

125) The participants can explain how to do a visual inspection of the rope attachment and bondings (Knowledge, intermediate level).

The instructor shall:

12.7.1 Present examples of rope attachment and bondings.

12.7.2 Lead or facilitate discussion on how to do a visual inspection of the rope attachment and bondings.

The participants shall:

12.7.3 Engage in discussions and share experiences on rope attachment and bondings in WTG.

ELEMENT 12.8 - ROPE PROTECTION

Learning objectives:

126) The participants can perform an installation and replacement of the protective tube (Skills, intermediate level).

127) The participants can explain how to visually inspect whether the protective tube is mounted (Knowledge, intermediate level).

128) The participants can explain how to do a visual inspection of the rope protections installed at the rope guides (landing feed through) (Knowledge, intermediate level).

129) The participants can perform a replacement of the rope protections installed at the rope guides (landing feed through) (Skills, intermediate level).

The instructor shall:

12.8.1 Present examples of different rope protection systems.

12.8.2 Demonstrate examples of how to install and replace different rope protection systems.

12.8.3 Facilitate practical training on how to replace rope protections.

12.8.4 Provide feedback on participants performance during the practical training.

The participants shall:

12.8.5 Engage in the practical training and reflect upon the received feedback.

12.8.6 Conduct a short questionnaire test to recap the theory and safety issues from lesson 12.

12.8.7 Check own answers and solutions from the shown fact list on completion of the test.

ELEMENT 12.9 - INSPECTION OF THE RACK

Learning objectives:

130) The participants can describe how to check the rack (Knowledge, basic level).

131) The participants can describe how to function test the operation of the rack proximity detector (Knowledge, basic level).

132) The participants show interest in seeking guidance in the relevant manuals if excessive wear on the rack is detected (Ability, basic level).

The instructor shall:

12.9.1 Present examples of wear on a rack and explain how to find guidance in the relevant maintenance manuals.

12.9.2 Lead or facilitate discussion on wear on racks, how to do a visual inspection of the rack, and what to do in case of detecting excessive wear on the rack.

The participants shall:

12.9.3 Engage in discussions and share experiences on wear on racks in WTG.

ELEMENT 12.10 - GREASE THE RACK

Learning objective:

133) The participants can describe how to grease a rack and a pinion (Knowledge, basic level).

The instructor shall:

12.10.1 Present examples of how to grease a rack and a pinion and explain how to find guidance in the relevant maintenance manuals.

The participants shall:

12.10.2 Engage in discussions and share experiences on greasing rack and pinions in WTG.

Lesson 13 - TRACTION HOIST

73 min.

The aim of this lesson is to enable the participants to take responsibility of the general condition and functionality of the traction hoist in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 13 of the Lift Commission, Inspection, Installation and Maintenance Module:

134) The participants can take responsibility of installing and visually inspecting the general condition of the traction hoist in a lift as guided in the relevant manuals (Ability, intermediate level).

135) The participants can perform a function test of the traction hoist as described in the relevant manuals (Skills, intermediate level).

ELEMENT 13.1 - THE TRACTION HOIST DEVICE

Learning objectives:

136) The participants can perform an installation of the traction hoist (Skills, intermediate level).

137) The participants can perform an installation of the wire in the traction hoist in the lift (Skills, intermediate level).

The instructor shall:

13.1.1 Demonstrate how to install a traction hoist and mount the wire in the traction hoist.

13.1.2 Facilitate practical training on installing a traction hoist and wire.

13.1.3 Provide feedback to the participants on their performance during the practical training.

The participants shall:

13.1.4 Engage in practice, share experiences, and apply the received feedback in following exercises.

ELEMENT 13.2 - OPERATION HOUR COUNTER

Learning objectives:

138) The participants can describe how to do a visual inspection of the status on operation hour counter of the hoist (Knowledge, basic level).

139) The participant can describe an inspection of the hoist operation hour counter and rectify any issues following work instruction and lift maintenance manuals (Knowledge, basic level).

The instructor shall:

13.2.1 Present examples of hoist operation hour counters.

13.2.2 Present examples of hoist operation hour counter issues, where rectifying action was needed.

13.2.3 Lead or facilitate a discussion on how to inspect hoist operation hour counters.

The participants shall:

13.2.4 Engage in discussions and share experiences on hoist operation hour counters.

ELEMENT 13.3 - LABELS AND TYPE PLATES IN TRACTION HOIST

Learning objectives:

140) The participants can explain how to install labels (in case of country specific labels) (Knowledge, intermediate level).

141) The participants can explain how to do visual inspection of labels and type plates (Knowledge, intermediate level).

The instructor shall (with reference to lift manuals and instructions):

13.3.1 Present examples of labels and type plates.

13.3.2 Demonstrate how to install labels.

13.3.3 Lead or facilitate discussion on how and what to inspect in relation to labels and type plates.

The participants shall:

13.3.4 Engage in discussions and share experiences on how to apply labels as well as how and what to inspect in relation to labels and type plates.

ELEMENT 13.4 - DRIVE UNIT, A. MECHANICAL

Learning objectives:

142) The participants can perform a removal and installation of the hoist following the relevant manuals (Skills, intermediate level).

143) The participants can explain how to lubricate traction sheave gears (Knowledge, intermediate level).

144) The participants can perform a visual inspection of an attachment to the lift (Skills, intermediate level).

145) The participants can perform a wear test of the centrifugal brake (speed test, downwards velocity during emergency descent) e.g. with 2 persons max. 26 m/min (Skills, intermediate level).

146) The participants can describe how to do a visual inspection for leaks on drive unit and report according to the relevant lift manuals or instruction (Knowledge, basic level).

The instructor shall:

13.4.1 Demonstrate examples of:

a. How to remove and install a hoist.
b. How to lubricate the gear.
c. How to inspect the attachment to the lift.
d. How to do a wear test of centrifugal brake.
e. How to check the operation of motor break at top- and bottom drive unit.
f. How to do a speed test during emergency descent.
g. How to do a visual inspection for leaks on drive unit and report in case of leaks.

13.4.2 Facilitate practical training on:

a. How to remove and install a hoist.
b. How to lubricate the gear.
c. How to do a wear test of centrifugal brake.
d. How to do a speed test during emergency descent.

Note: The practical training may be conducted as rotation training, where the participants practise the individual topics in pairs – changing topic every 5 minutes (or any duration fitting the learning plan).

The participants shall:

13.4.3 Engage in the practical training, share experiences on hoist and drive units, and apply the received feedback in following learning activities.

ELEMENT 13.5 - DRIVE UNIT, B. ELECTRICAL

Learning objectives:

147) The participants can explain how to do a visual inspection of the wiring (El) to drive unit (Knowledge, intermediate level).

148) The participants can perform an installation and replacement of the wiring (El) to drive a unit in accordance with the relevant manual (Skills, intermediate level).

The instructor shall:

13.5.1 Present examples of wiring (El) to drive units.

13.5.2 Demonstrate how to install and replace wiring (El) to a drive unit.

13.5.3 Facilitate practical training on how to install and replace wiring (El) to drive a unit and provide feedback on participants performance.

13.5.4 Lead or facilitate discussion on safety when inspecting, installing, and replacing wiring (El) to a drive unit.

The participants shall:

13.5.5 Engage in the practical training and following discussions, share experiences on wiring (El) to a drive unit, and reflect on the received feedback.

ELEMENT 13.6 - UPPER AND LOWER GEARBOX

Learning objective:

149) The participants can describe how to do a visual inspection for oil leaks in the upper and lower gear box (Knowledge, basic level).

The instructor shall:

13.6.1 Present examples of how to inspect the upper, and lower, gear box.

13.6.2 Present examples of oil leaks in the upper, and lower, gear box.

13.6.3 Lead or facilitate discussion on how to react if oil leaks in the upper, or lower gear box are detected.

The participants shall:

13.6.4 Engage in discussions and share experiences on function and conditions of the upper, and lower gear box.

ELEMENT 13.7 - ELECTRO-MECHANICAL AND CENTRIFUGAL BRAKES

Learning objectives:

150) The participants can describe how to do a visual inspection of centrifugal and electro-mechanical brakes (Knowledge, basic level).

151) The participants can perform a function test on the electro-mechanical brakes and the centrifugal brakes and measurement of their diameter (R&P) (Skills, intermediate level).

The instructor shall:

13.7.1 Present examples of how to inspect the electro-mechanical brakes and the centrifugal brakes.

13.7.2 Lead or facilitate discussion on inspections of the electro-mechanical brakes and the centrifugal brakes react if oil leaks in the upper or the lower gear box are detected.

The participants shall:

13.7.3 Engage in discussions and share experiences on function and conditions of the upper, and lower gear box.

ELEMENT 13.8 - LOAD CAPACITY SYSTEM

152) The participants can perform function test on the load capacity system as described in the relevant manuals (Skills, intermediate level).

153) The participants can perform adjustment of the load capacity system (Skills, intermediate level).

The instructor shall:

13.8.1 Present key points in relation to inspection and installation of the load capacity system in different lift types.

13.8.2 Demonstrate how to inspect, install, and adjust different kinds of load capacity systems.

13.8.3 Facilitate practical training on inspection, installation, and adjustment of different kinds of load capacity systems, and provide feedback to the participants on their performance.

13.8.4 Lead or facilitate discussion on differences between different load capacity systems in different lift types.

The participants shall:

13.8.5 Participate in discussions and share experiences on lift load capacity systems

13.8.6 Conduct a questionnaire test to recap the theory and safety issues from lesson 13.

13.8.7 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 14 - WIRE ROPE REDIRECTION INSIDE THE CABIN

12 min.

The aim of this lesson is to enable the participants to inspect and ensure that the redirection pulleys are in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 14 of the Lift Commission, Inspection, Installation and Maintenance Module:

154) The participants can explain how to inspect redirection pulleys (Knowledge, intermediate level).

155) The participants can perform an installation of the wire into the redirection pulleys (Skills, intermediate level).

The instructor shall:

14.1.1 Present examples of wiring (El) to drive units.

14.1.2 Demonstrate how to install a wire into the redirecting pulleys.

14.1.3 Facilitate practical training on how to install a wire into the redirecting pulleys and provide feedback on participants performance.

14.1.4 Lead or facilitate discussion on how to inspect redirecting pulleys.

The participants shall:

14.1.5 Engage in the practical training and following discussions, share experiences on redirecting pulleys, and reflect on the received feedback.

Lesson 15 - FALL ARREST DEVICE (FAD)

62 min.

The aim of this lesson is to enable the participants to install, inspect and test the function of the fall arrest device (FAD) in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 15 of the Lift Commission, Inspection, Installation and Maintenance Module:

156) The participants can take responsibility for installing and function testing the fall arrest device (FAD) as described in the relevant manuals (Ability, intermediate level).

ELEMENT 15.1 - LABELS AND TYPE PLATES

Learning objectives:

157) The participants can explain how to do a visual inspection of labels and type plates (Knowledge, intermediate level).

158) The participants can explain how to apply labels (Knowledge, intermediate level).

The instructor shall (with reference to lift manuals and instructions):

15.1.1 Present examples of labels and type plates.

15.1.2 Demonstrate how to apply labels.

15.1.3 Lead or facilitate discussion on how and what to inspect in relation to labels and type plates.

The participants shall:

15.1.4 Engage in discussions and share experiences on how and what to inspect in relation to labels and type plates – and how to apply labels.

ELEMENT 15.2 - GENERAL CONDITION

Learning objectives:

159) The participants can perform an installation of a fall arrest device (Skills, intermediate level).

160) The participants can explain how to do a visual inspection of the general condition of a fall arrest device (Knowledge, intermediate level).

161) The participants can explain how to do a visual inspection of wear on intake bushing (Knowledge, intermediate level).

162) The participants can explain how to do a visual inspection of the electrical wiring (Knowledge, intermediate level).

163) The participants can explain how to do a visual inspection of the centrifugal system as described in the relevant manual (Knowledge, intermediate level).

164) The participants can describe how to install pinch- and centrifugal pulley in relation to relevant manual and directions (Knowledge, basic level).

165) The participants can perform function and Wear test of pinch- and centrifugal pulley (Skills, intermediate level).

The instructor shall:

15.2.1 Present key points in relation to the inspection of the general condition of fall arrest devices in different lift types.

15.2.2 Demonstrate how to install different types of fall arrest devices.

15.2.3 Facilitate practical training on installation of a fall arrest device and provide feedback to the participants on their performance.

15.2.4 Lead or facilitate discussion on differences between different fall arrest devices in different lift types.

The participants shall:

15.2.5 Engage in the practical training, reflect on the received feedback, and take active part in discussions and share experiences working with fall arrest devices.

Lesson 16 - SUPPLY CABLE

20 min.

The aim of this lesson is to enable the participants to install and inspect the supply cable and cable bin in accordance with the relevant manuals and inspection lists.

After successfully having completed lesson 16 of the Lift Commission, Inspection, Installation and Maintenance Module:

166) The participants can perform an installation and inspection of a supply cable and cable bin as described in the relevant manuals (Skills, intermediate level).

ELEMENT 16.1 - FEED-IN OF SUPPLY CABLE

Learning objectives:

167) The participants can explain how to do a visual inspection of the feed-in of a supply cable (Knowledge, intermediate level).

168) The participants can perform a re-installation of the feed-in of a supply cable following relevant instructions and manual (Skills, intermediate level).

The instructor shall:

16.1.1 Demonstrate how to inspect and re-install feed-in of a supply cable.

16.1.2 Facilitate practical training on re-installing feed-in of a supply cable, and provide feedback to the participants on their performance.

16.1.3 Lead or facilitate discussion on safety issues in relation to inspecting and re-installing feed-in of a supply cable.

The participants shall:

16.1.4 Engage in the practical training, reflect on the received feedback and take active part in discussions and share experiences from working with feed-in of a supply cables.

ELEMENT 16.2 - STRAIN RELIEF

Learning objectives:

169) The participants can explain how to do a function test on a strain relief in or outside the cabin (Knowledge, intermediate level).

170) The participants can perform an adjustment and replacement of a strain relief at the cabin according to the relevant manual (Skills, intermediate level).

The instructor shall:

16.2.1 Present and demonstrate examples of how to do function test, adjust and replace a strain relief at the cabin.

16.2.2 Facilitate practical training on adjusting and replacing a strain relief at the cabin.

16.2.3 Lead or facilitate discussion on safety issues in relation to strain reliefs at the cabin.

The participants shall:

16.2.4 Engage in the practical training, reflect on the received feedback, and take active part in discussions and share experiences from working with strain reliefs in or outside the cabin.

ELEMENT 16.3 - CABLE BIN

Learning objectives:

171) The participants can explain how to do a visual inspection of the cable bin condition (Knowledge, intermediate level).

172) The participants can explain how to do a visual inspection of the cable bin connection to the suspension/crossbeam (Knowledge, intermediate level).

173) The participants can explain how to tighten and replace the cable bin connection to the suspension/crossbeam (Knowledge, intermediate level).

The instructor shall:

16.3.1 Present examples of cable bin conditions.

16.3.2 Demonstrate how to tighten and replace cable bin connections to suspension/crossbeam.

16.3.3 Lead or facilitate discussion on when and how to tighten and replace cable bin connections to suspension/crossbeam.

The participants shall:

16.3.4 Engage in discussions and share experiences on cable bins.

16.3.5 Conduct a short questionnaire test to recap the theory and safety issues from lesson 16.

16.3.6 Check own answers and solutions from the shown fact list on completion of the test.

Lesson 17 - TEST AND TRAINING REVIEW

50 min.

ELEMENT 17.1 - THEORY TEST

The participants shall:

17.1.1 Conduct a questionnaire test on intermediate level questions (reference to GWO Taxonomy Framework).

17.1.2 Check own answers and solutions from the shown fact list on completion of the test.

The instructor shall:

17.1.3 Facilitate a test recapping key safety theory topic.

17.1.4 Present solutions and correct answers on completion of the test.

17.1.5 Lead a discussion on participants reflections and answers.

Alternative or supplementary practical evaluation activity: The participants affix coloured notes on lift parts for example: red notes on parts that must be inspected but not be replaced or repaired; green notes on parts that may be re-installed; blue notes on parts that must be maintained and so on. The instructor decides relevant categories. The arguments for placing the different notes may be shared and discussed in the group.

ELEMENT 17.2 - TRAINING REVIEW

The instructor shall:

17.2.1 Together with all participants, review the overall aims and learning objectives of the course so participants can compare how their learning outcome meet their, previously stated, course expectations.

The participants shall:

17.2.2 Suggestion for activity: the participants reflect on their learning outcome and key takeaways from the training program. The aim is to achieve a high learning transfer from the module to their way of working.

a. Questions and answers in class or, where suitable.

Note: The training staff may additionally conduct a local evaluation on the training and the training facility.

ELEMENT 17.3 - FEEDBACK SESSION

The instructor shall:

17.3.1 Give the participants final feedback on the formal participant performance assessment and inform them whether they have passed (failed participants must be informed individually prior to the reflection session).

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

17.3.3 Encourage the participants to examine and grow awareness of how specific elements in their own WTG type/WTG environment differ from the training scenario environment (to visualise and enhance learning transfer) and to discuss with colleagues' expectations and experiences on using a lift in WTG under the local specific conditions identified after course completion.

ELEMENT 17.4 - PARTICIPANT PERFORMANCE ASSESSMENT

Assessment of learning outcomes:

17.4.1 Participants will be assessed according to the learning objectives stated in the training module description by means of direct observation and supplementary oral questions, where appropriate.

17.4.2 The assessment shall be conducted by practical scenarios based on the WTG environment.

17.4.3 Each participant shall participate, as detailed, in the practical learning activities.

17.4.4 The formal evaluation of knowledge of above scenarios shall be in accordance with the Control Measures Form (template provided in the Requirements for Training Providers). The instructor keeps the Control Measures Forms until the completion/evaluation of the BST Module.

17.4.5 Training Providers shall have a documented procedure in place for dealing with participants not meeting the stated learning outcomes. If a participant fails to meet the demands, they shall attend a new Lift Commission, Inspection, Installation and Maintenance training.

ANNEX 1 - EQUIPMENT LIST

The equipment required for training must be available and must fulfil national legal requirements where applicable. The following tools, materials and equipment are needed for the execution of the course:

Training facility:

a) Lift, lift mock-up or lift simulator requirements in detail.
   a. Functional lift setup including:
      i. Traveling distance must allow for test, inspection and work on relevant top and bottom obstruction devices and other relevant safety devices, mechanical devices and rescue systems as stated in the relevant lift manual.
      ii. Gate/fence with original lock system. Additional mechanical and electrical lock systems must be visualised in illustrations.
      iii. Relevant operation/user manuals, maintenance manuals, installation manuals and inspection manuals.
      iv. Example of daily inspection sheet.
      v. Example of logbook.
      vi. Tools, as needed, for the daily inspection, commission inspection, pre-assembly/installation, and maintenance of lifts.

b) Show and tell parts or visuals from relevant manufacturers covering wire/rope guided, ladder guided and rack and pinion lift systems other that the functional training lift. To include:
   i. Hoist.
   ii. Electro-mechanical brakes and the centrifugal brakes.
   iii. Safety brake systems.
   iv. Obstruction systems etc.
   v. Bowden cable installation to practise adjustments.
   vi. Guiding systems (cable/wire, rack and pinion, fixed).
   vii. Communications systems.

c) Manuals covering relevant brands/types/manufacturers and lift systems.

d) Daily inspections sheet for relevant lift brand and lift systems.

e) PPE See table A3-31 (below).

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

	Country Specific Equipment Standards			
Equipment	Europe	North America	China	United Kingdom
Life Jackets				
Rigid			GB/T 32227	
Inflatable				
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

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ANNEX 2 - GUIDELINE FOR WARM-UP EXERCISES

Body part/major muscle group	Exercise	Duration/repetitions
Head	Head rotations: • Rotate your head clockwise and counter clockwise	10 repetitions (Five each way)
Shoulders	Shoulders rotation: • Place your legs at shoulder-width • Feet straight and toes facing forward • Keep your arms straight at your sides • Perform both shoulders rotation clockwise and counter clockwise	10 repetitions
Arms	Arm swings and big arm circles: • Stand up straight with your feet shoulder-width apart • Rotate your arms forward making big circles and then switch rotating backwards.	10 times clockwise 10 times () 10 times (in opposite directions)
Wrists	Wrist rotation: • Perform wrists rotation in both directions	10 repetitions for each wrist
Torso	Torso swings: • Stand with your legs straight • Place your feet at shoulder-width • Bend your torso forward 90 degrees • Raise both arms straight to the outside	15 repetitions to each side
Hips	Hip rotation: • Place your hands on your hips and keep your head straight • Perform extensive hips rotation	10 repetitions clockwise 10 repetitions counter clockwise.
Thighs	Squats: • Stand with your legs straight • Place your feet at shoulder-width • Push your hips back and slowly bend your knees. • Keep your back straight and your eyes looking forward. • Raise yourself back up when your knees reach a 90-degree angle	15 repetitions
Ankle	Ankle rotation: • Place your feet slightly apart • Perform rotation for each foot clockwise and counter clockwise	10 repetitions (for each foot)
Back	Back stretch: • Open legs slightly and place hands on the hips • Turn to the right and left • Incline the back to the right and left • Move Back forward and backward	

ANNEX 3 - MANUAL HANDLING RISK ASSESSMENT

This is an instructor guidance elaborating the concept of aggravating factors related to manual handling risk assessment.

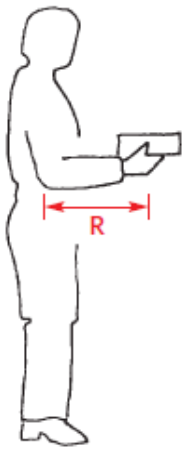
The baseline of assessing manual lifts is the load weight and the distance from the spine in the lower back (the reaching distance), respectively. The assessment chart below will assist you appraising manual handling.

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) ¾ 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 ¾ arm's distance is not included since they will most likely be harmful to health, and must be evaluated separately.

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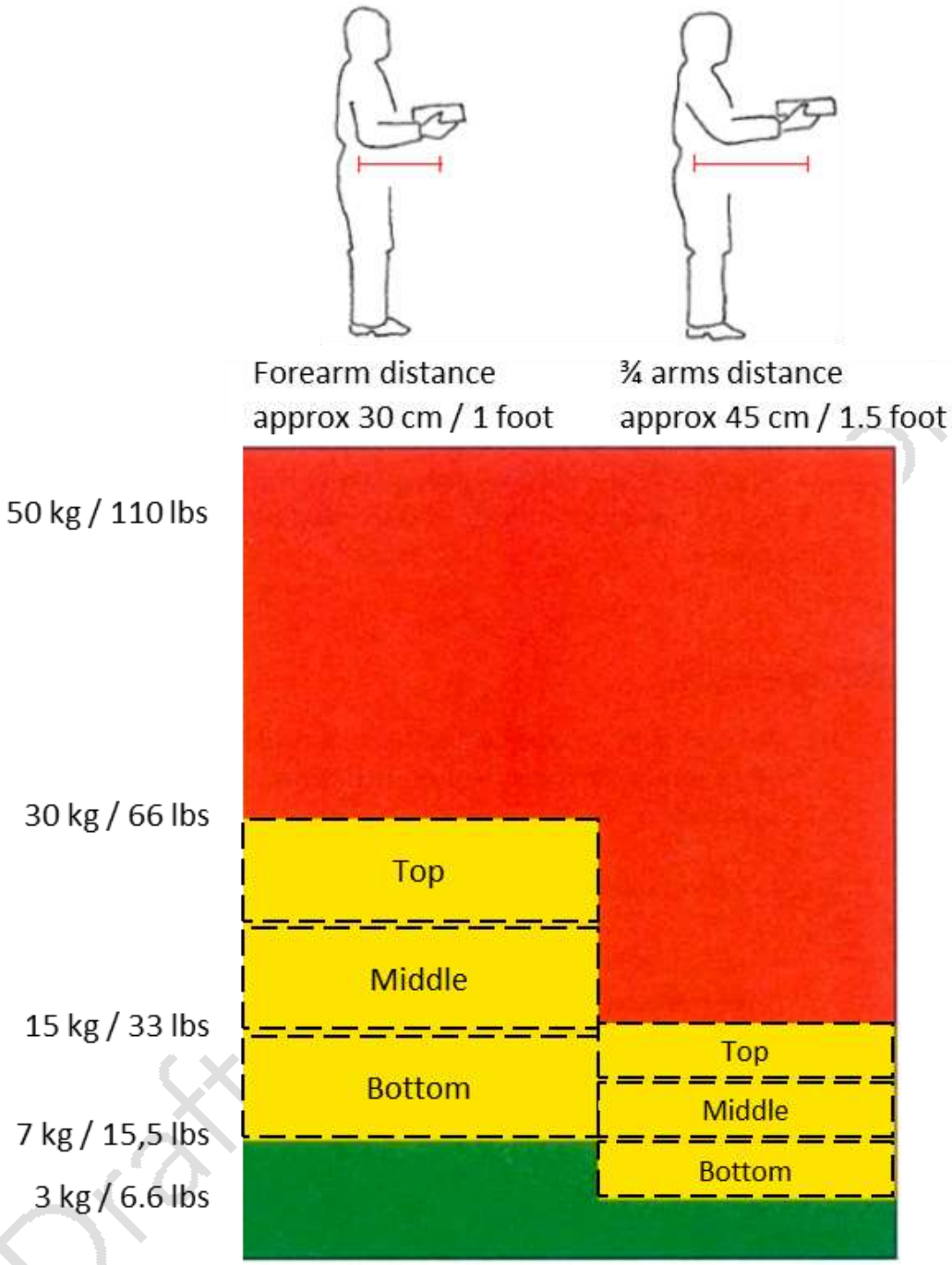
Manual handling assessment chart (MAC tool) – evaluating the load weight compared to the reaching distance



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 strain on the muscular- skeletal system resulting in manual handling which is harmful to health.

When lifting within the top most ⅓ 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 ⅓ 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 ⅓ 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 ⅓ 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 aids 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

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

1 *Team handling is in general not a legitimate substitution for using handling aids.*

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.

ANNEX 4 - VERSION HISTORY

Amendment Date		Approved by & date	
Version		Description of changes	