Beijing – 18 October 2018

GWO

TRAINING STANDARDS FOR SAFETY

Welcome

Jakob Lau Holst, CEO, Global Wind Organisation

Mission and current members

GWO
TRAINING STANDARDS FOR SAFETY

… to strive for an injury free work environment in the global wind industry

through collaboration among the members and other stakeholder organizations

in setting world-wide safety training standards

based on industry statistics and risk evaluations.

GWO

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China Committee

Introduce GWO standards to China, incl. identify potential members

Review standards to ensure local compliance, and propose amendments

Assist GWO Audit and Compliance Committee to ensure integrity and trust in system

What we're doing in 2019

- Review current safety training standards
- Develop new standards and modules
- Develop supporting material

- WINDA – our global training records database
- Monitor Training Providers
- Governance of Certification Bodies, incl. Auditor workshops

- WINDA statistics
- Stakeholder Forums
- Webinars and www
- Publications

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Recommended core safety modules

- First Aid
- Manual Handling
- Fire awareness
- Working at heights

Recommended core technical modules

- Mechnical
- Electrical
- Hydraulic

Optional task specific modules

- Advanced Rescue
- Enhanced first Aid
- Blade repair
- Sea Survival

GLOBAL WIND ORGANISATION

Advanced Rescue Training

Uwe Sarrazin
GWO Training Committee
Head of Global Education & Learning
GE Renewable Energy

Beijing, CWP 2018

GWO Working Group members

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Broad representation of GWO members:

Ørsted

SIEMENS Gamesa
RENEWABLE ENERGY

Vestas

MHI VESTAS OFFSHORE WIND

imagination at work

Why Advanced Rescue?

- Turbines are becoming increasingly large and remote. As a consequence:
  - Working in remote areas will create longer response times by professional emergency response teams.
  - Professional responders won’t always have the resources readily available to climb a turbine and perform a rescue.

- The training elevates rescuer self-reliance and enables successful transport of a colleague who cannot self-evacuate, to an assembly point where professional emergency responders can provide care.
- The training aims to control the risks associated with rescue operations, ensuring a more efficient rescue operation from a wind turbine.

Advanced Rescue Training

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Purpose

The aim of ART course is to enable the delegates to perform casualty rescue operations using standard wind turbine industry rescue and fall protection equipment, and predefined rescue methods and techniques, exceeding those of GWO Working at Height.

Objectives

On completion of training, a delegate shall be able to:

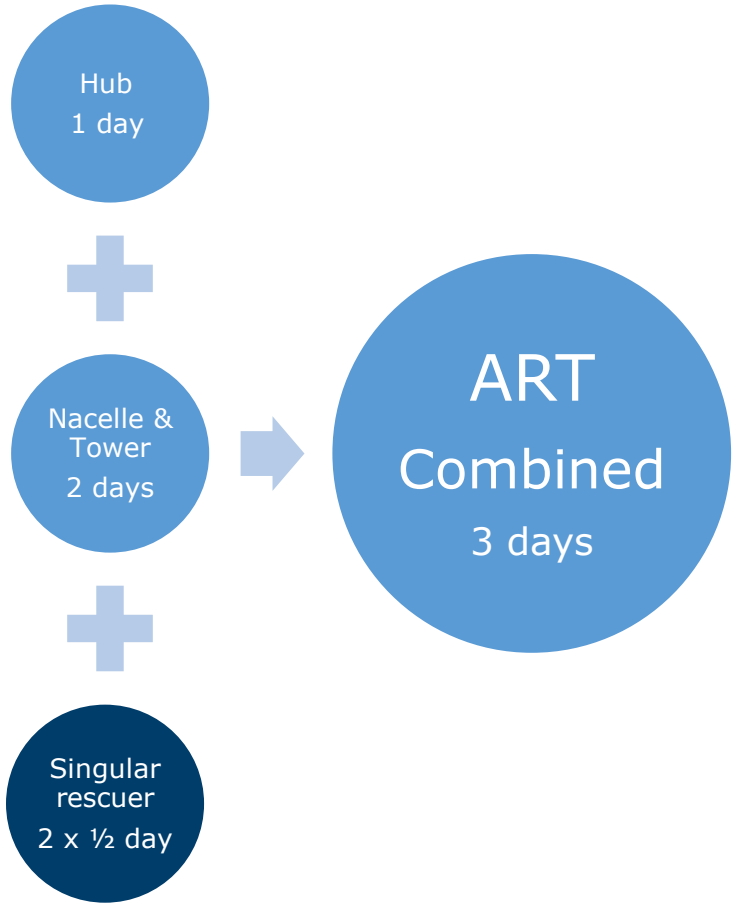
- Assess and determine rescue strategy for various rescue scenarios
- Perform rescue operations, in/on a WTG, using safe and suitable (certified or structural) anchor points, lifting angles, deviation, and edge protection for the rescue equipment
- Perform rescue operations using personal fall protection equipment on the casualty

Modular set-up

<u>Hub rescue</u>
- Blade to hub to ground
- Outside evacuation (including measures to mitigate interfering elements)

<u>Nacelle, Tower, Basement rescue</u>
- Enclosed space to ground (under gearbox, inside and/or behind generator, under the floor, incl. zip line in nacelle)
- Transformer room to nacelle
- Basement to ground floor (manually operated rescue up)
- Inside and outside evacuation (including measures to mitigate interfering elements)
- Rescue up e.g for helicopter extraction

<u>Single rescue</u>
- Mindset
- Rescue strategy, planning and techniques for alone rescuer



Modules of ART

Main modules

Hub, Spinner + Inside Blade Rescue

Duration: 1 day
Validity: 2 years

Nacelle, Tower + Basement Rescue

Duration: 2 days
Validity: 2 years

***Add-on modules**

Single Rescuer Hub, Spinner + Inside Blade Rescue

Duration: 0,5 Day
Validity: No expiry

Single Rescuer Nacelle, Tower + Basement Rescue

Duration: 0,5 Day
Validity: No expiry

Combined ART

Duration: 3 days
Validity: 2 years

Modules of ART Refresher

Repeat
Hub, Spinner + Inside Blade Rescue

Duration: 1 day
Validity: 2 years

Nacelle, Tower + Basement Rescue Refresher incl. WaH refresher

Duration: 2 days
Validity: 2 years

Combined ART Refresher incl. WaH refresher

Duration: 3 days
Validity: 2 years

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*Additional non-mandatory modules for technicians working in teams of two who may not be able to organize work to have a third trained person close by.

Entry prerequisites for main modules: Valid GWO BST Working at Heights, First Aid and Manual Handling certificates required

Training Providers and Pilot tests

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Contribution and feedback from:

MAERSK TRAINING

ISEC

windhunter academy
training and study camp

3M

Pilot tests conducted by:

Falck Hub, Nacelle & Tower module

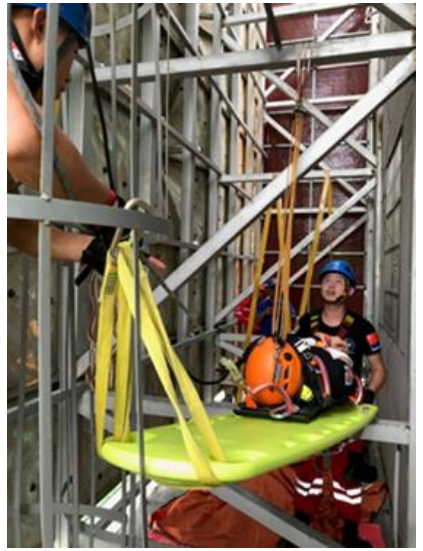
Tesicnor Hub, Nacelle & Tower module

SIEMENS Gamesa ART combined including single rescuer modules

SKYLOTEC Refresher: Nacelle & Tower incl. WaHR

Introduction

1. Advanced Rescue in general
2. GWO pilot test: ART Refresher inc. WaHR – 2 days
3. Demonstration of Advanced Rescue principals, techniques and equipment



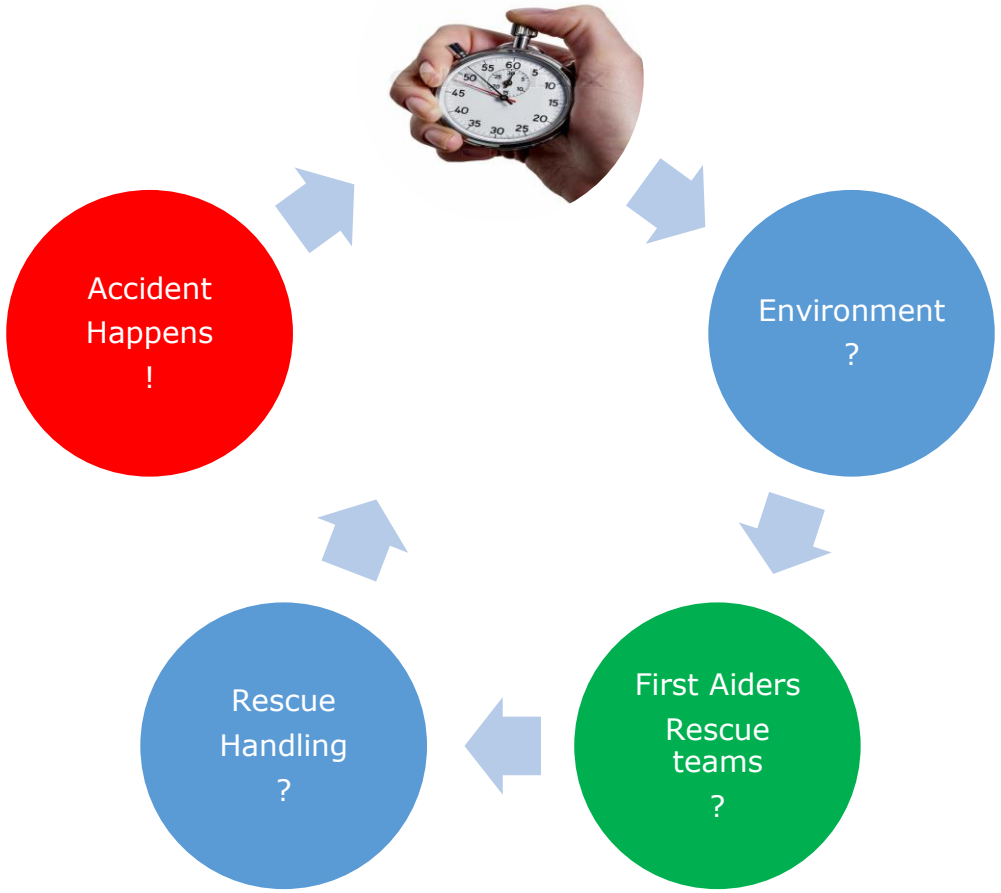
Advanced Rescue General

1. Several industries
2. Higher demand of rescue plans/procedures/equipment and training
3. Positive focus
4. Important focus
5. Demand for equipment and training setup

Advanced Rescue General

ACCIDENT !

- Environment
- Qualifications of the people present
- Rescue equipment available



Pilot Training: ART Refresher
SKYLOTEC Vertical Rescue college Germany

- Positive pilot test course for 2 days
- Master instructor as lead
- Participants SKYLOTEC employees
- Positive dialog, discussions, evaluations and outcome

Advanced Rescue Refresher

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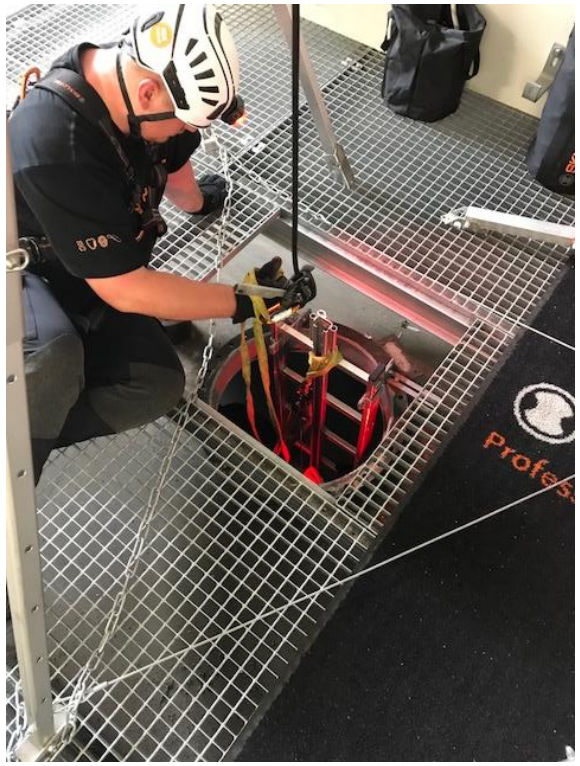

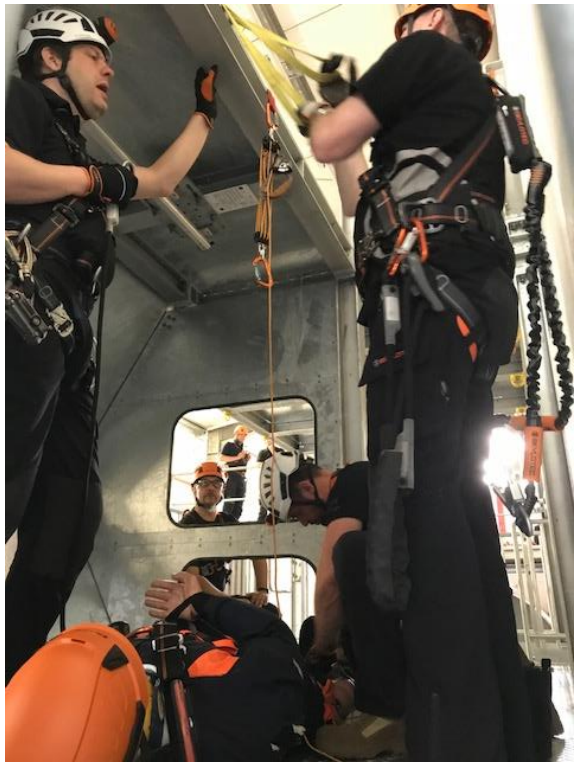

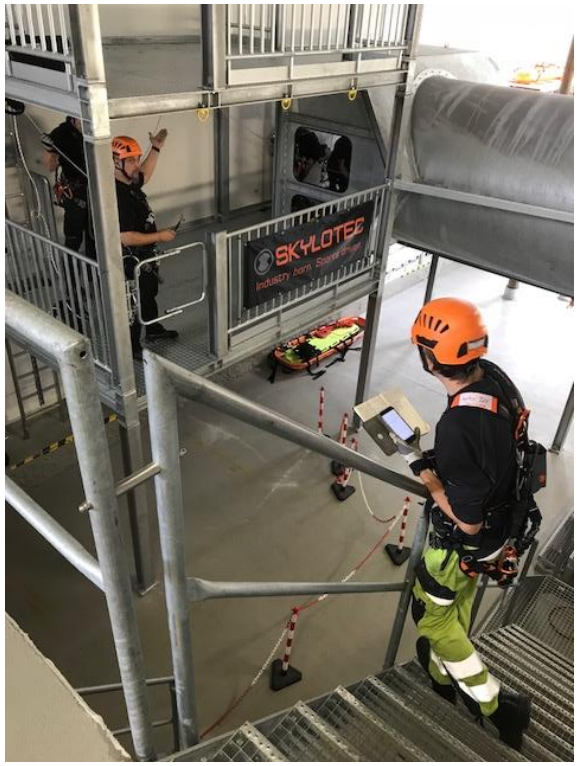

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Coming soon at a Training facility near you

- **ART release October 1, 2018**
- **ART webinar October 10th**

Enhanced First Aid (EFA) Training Standard

Uwe Sarrazin
GWO Training Committee
Head of Global Education & Learning
GE Renewable Energy

Why Enhanced First Aid?

- Wind turbines are placed in increasingly remote areas, away from established medical facilities – both offshore and onshore
- This can increase the time interval between the placing of an emergency/distress call and the arrival of professional emergency responders
- The GWO Enhanced First Aid (EFA) Standard has been developed so that wind turbine technicians have an additional level of first aid training focused on stabilising and keeping a casualty alive until they are rescued

Enhanced First Aid Training

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Purpose

The Enhanced First training combines elements from the GWO First Aid and Enhanced First Aid - qualifying technicians with skills and knowledge to stabilize a casualty in the event of an accident/life threatening trauma/ illness and allowing the transfer of the casualty from a remote location to a place of safety and sustained medical attention e.g. hospital.

Objectives

On completion of training, a Delegate shall be able to:

- Lead in the delivery of basic first aid to save life
- Demonstrate incident and casualty management
- Demonstrate immediate emergency lifesaving first aid
- Conduct telemedical consultation and medical/rescue assistance providing a concise and relevant report of the casualties condition

Different levels of FA skills

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Company First Aider	Enhanced First Aider	Paramedic/Rescue Service Professional
• Laymen • Basic First Aid training (simpel FA skills) • Not allowed to dispense medication	• Laymen • Enhanced First Aid training • Possible to administer analgesics (medical telecommunication and according to company reg.) • Advanced First Aid equipment	• Professional • Licenced and registered to administer medication

Teleconsultation with all parties involved by emergency-call physician via medical telecommunication, offering advice, monitoring and support of enhanced First Aid measures

EFA and EFAR Training Elements

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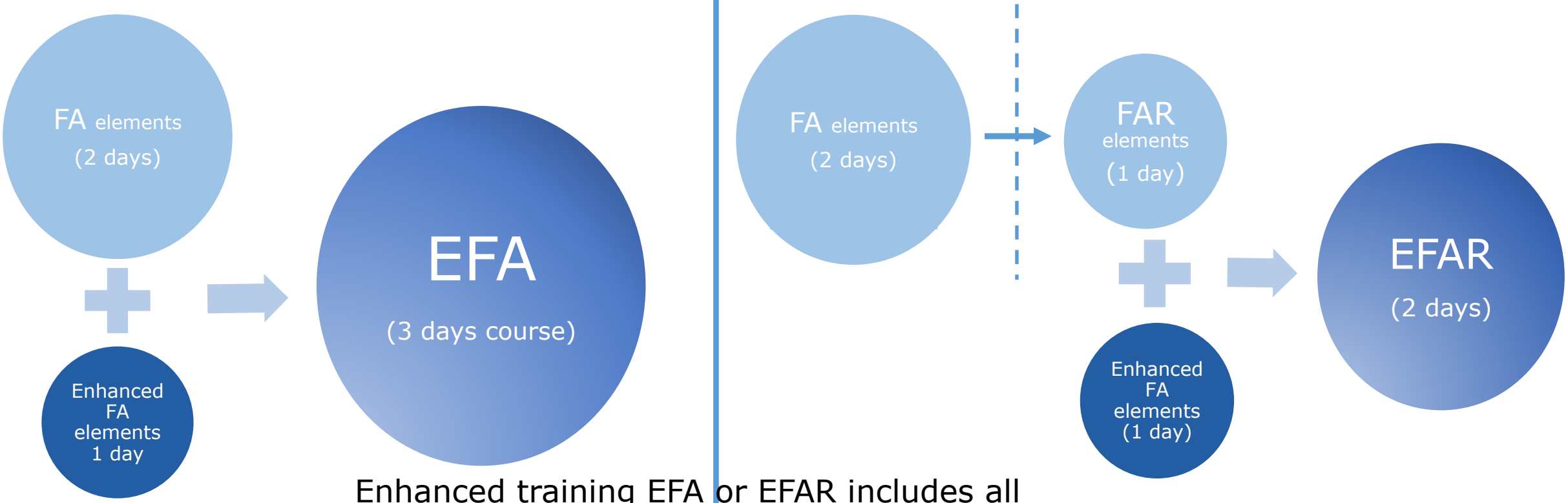
EFA for participant without basic FA certificate

EFAR for participant with valid basic FA (or FAR) certificate



Enhanced training EFA or EFAR includes all elements of the Basic First Aid training

EFA guideline

Recommendations on:

- When to implement the EFA training
- Medical teleconsultation support system as a basic principle
- Advanced first aid equipment
- Drills and Exercises

Training Providers and Pilot tests

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Active member of the EFA working group:

AIS TRAINING

ISC TRAINING & ASSEMBLY GMBH
In cooperation with AFZ Rostock GmbH

Conducted pilot test

Feedback and contribution to the development of EFA standard

MAERSK TRAINING

Falck

Conducted pilot test

RESCUE CENTER DENMARK

Conducted pilot test

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Coming soon at a Training facility near you

- **EFA release October 1, 2018**
- **EFA Webinar October 10th**

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Training Standards Review

Revision process, Sea Survival

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01

Revision process

02

Consultation findings

03

BST Sea Survival

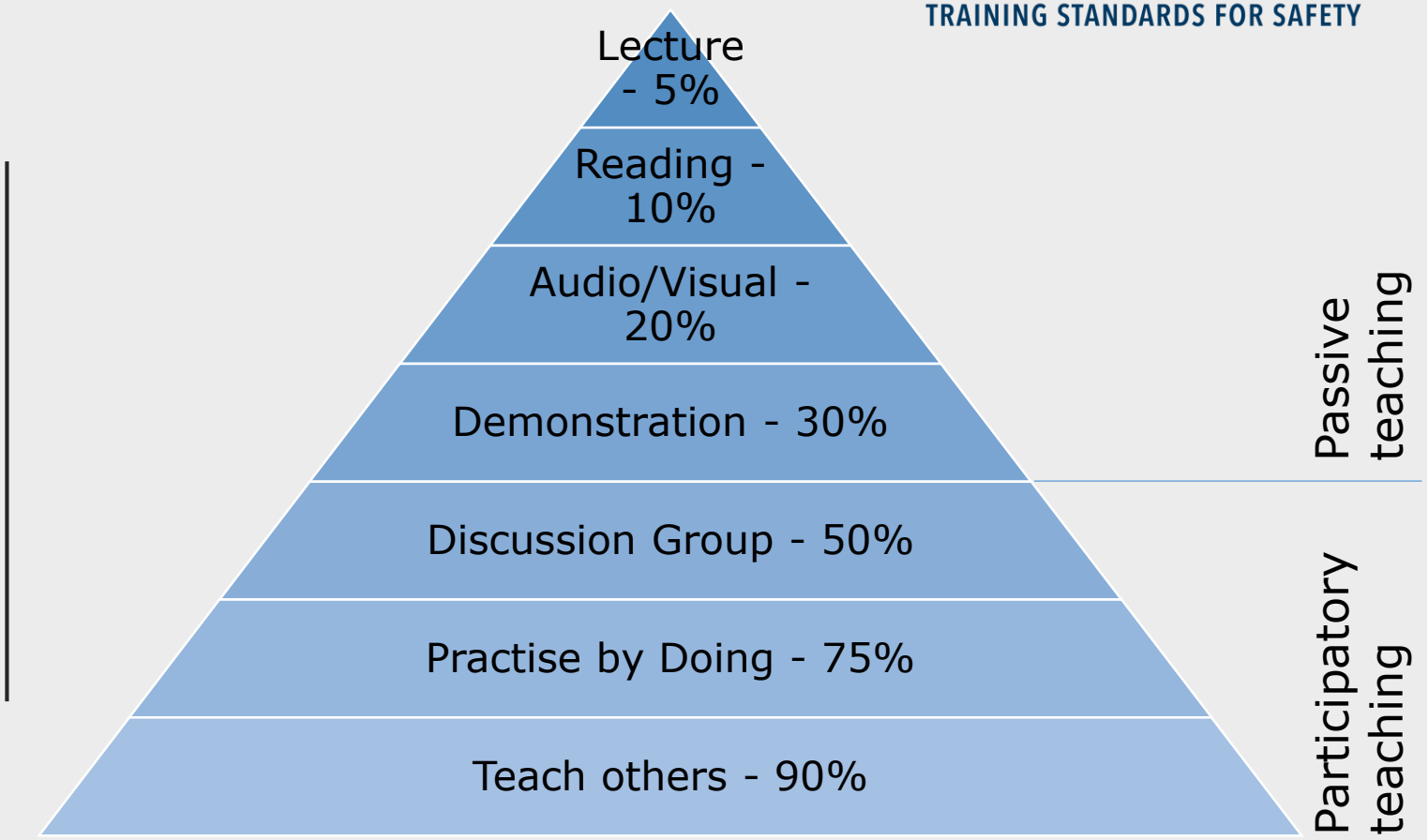
Transfer

Transfer of learning occurs when learning in one context or with one set of materials impacts on performance in another context or with other related materials (Perkins and Salomon, 2012)

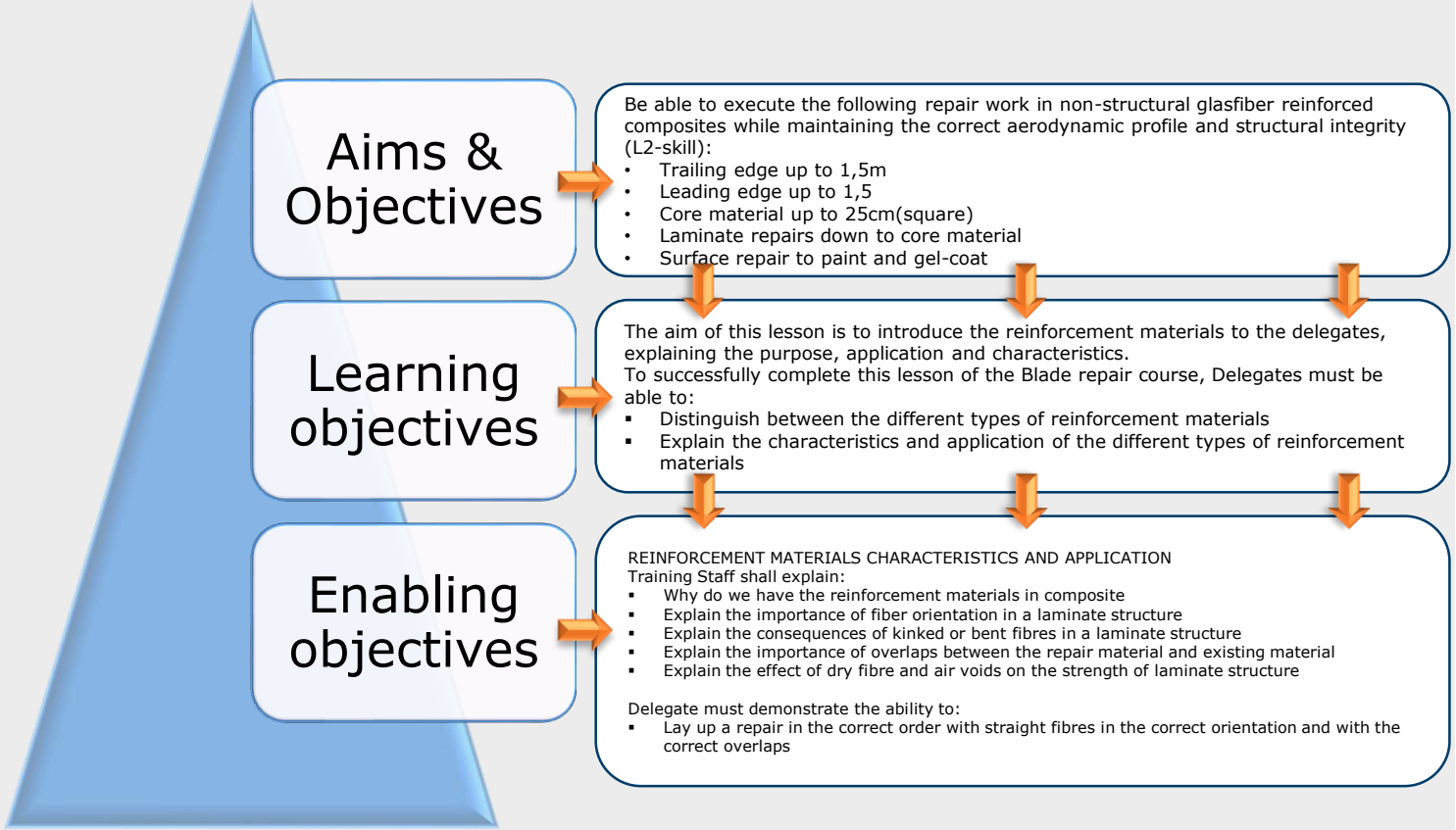
Train as you work:

- Transferable
  - Hazards ➔ Risks ➔ Mitigation
  - Environment
  - Tools

Learning retention rate



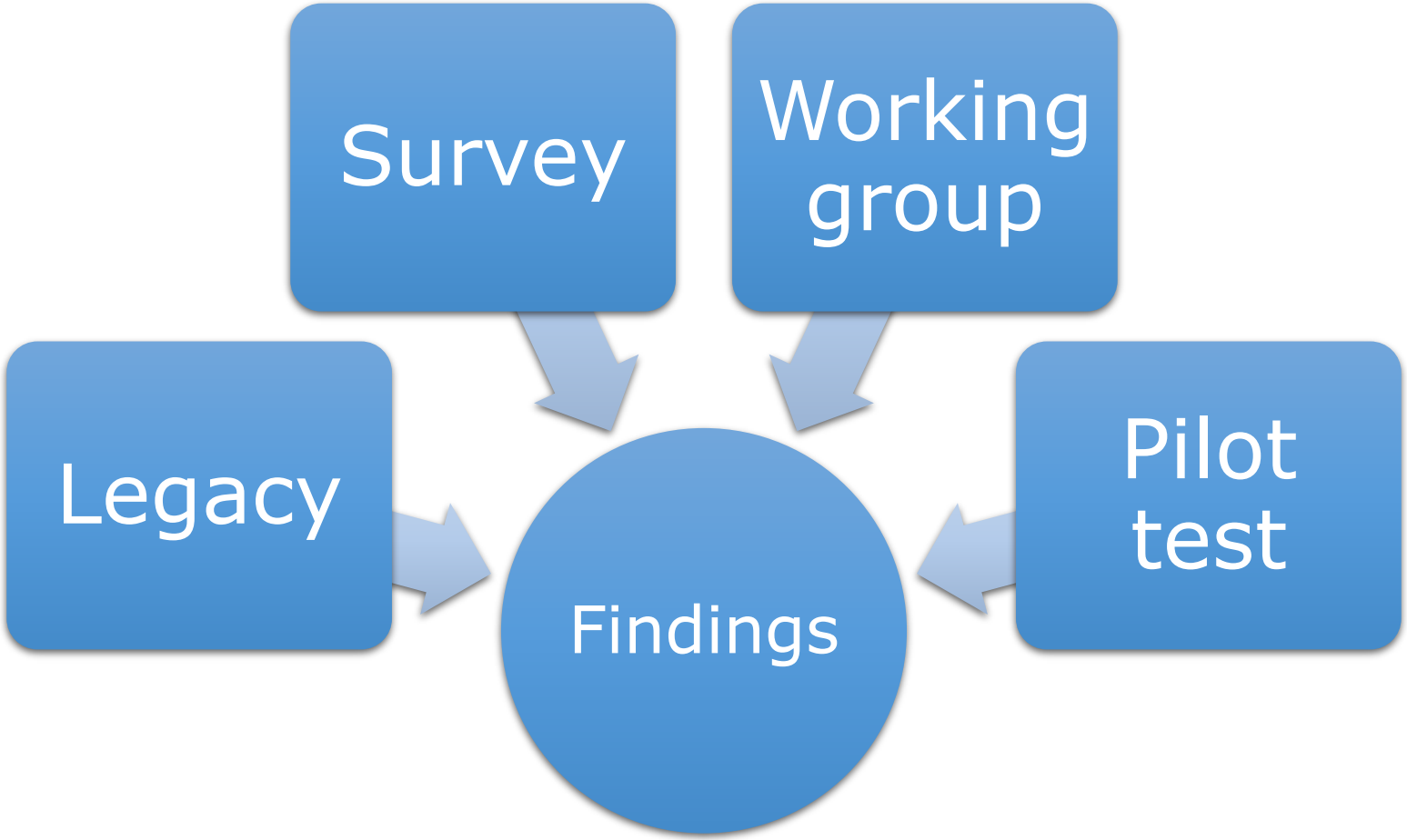
Taxonomy


Aims & Objectives
Be able to execute the following repair work in non-structural glasfiber reinforced composites while maintaining the correct aerodynamic profile and structural integrity (L2-skill):
• Trailing edge up to 1,5m
• Leading edge up to 1,5
• Core material up to 25cm(square)
• Laminate repairs down to core material
• Surface repair to paint and gel-coat
Learning objectives
The aim of this lesson is to introduce the reinforcement materials to the delegates, explaining the purpose, application and characteristics.
To successfully complete this lesson of the Blade repair course, Delegates must be able to:
▪ Distinguish between the different types of reinforcement materials
▪ Explain the characteristics and application of the different types of reinforcement materials
Enabling objectives
REINFORCEMENT MATERIALS CHARACTERISTICS AND APPLICATION
Training Staff shall explain:
▪ Why do we have the reinforcement materials in composite
▪ Explain the importance of fiber orientation in a laminate structure
▪ Explain the consequences of kinked or bent fibres in a laminate structure
▪ Explain the importance of overlaps between the repair material and existing material
▪ Explain the effect of dry fibre and air voids on the strength of laminate structure
Delegate must demonstrate the ability to:
▪ Lay up a repair in the correct order with straight fibres in the correct orientation and with the correct overlaps

Theory vs. practical

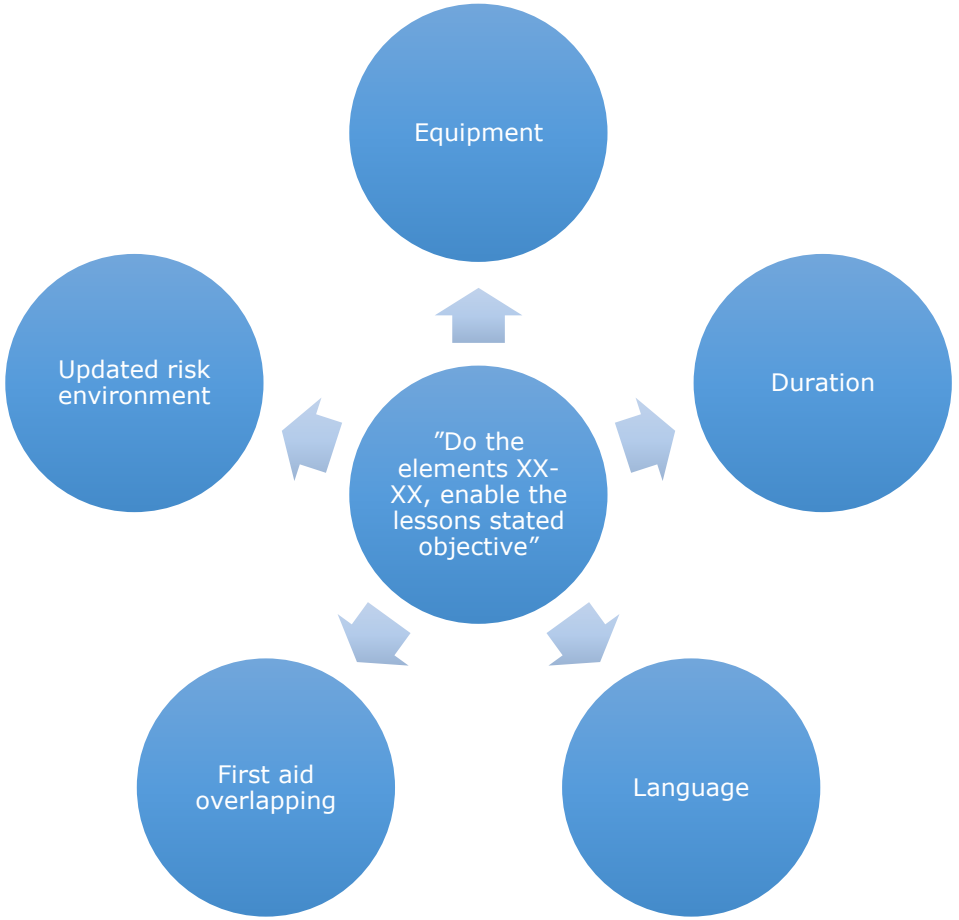
Learning retention rate theories supports a strong focus on practical exercises but there needs to be a theoretical foundation to train from

Methodology



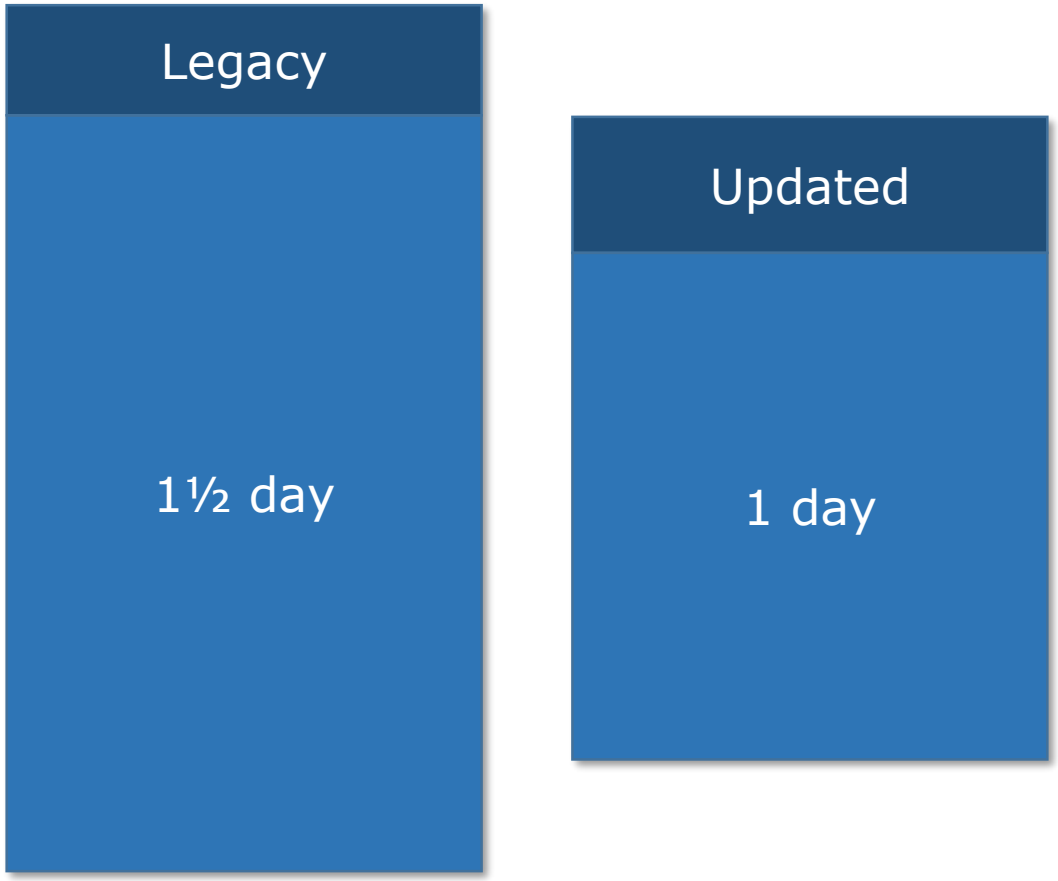
Survey

- ”Open” questions and a general feedback section
- Good engagement from the training provider community
- +80% satisfaction with the module
- Strong data foundation provided for a constructive review



BST Sea Survival, duration

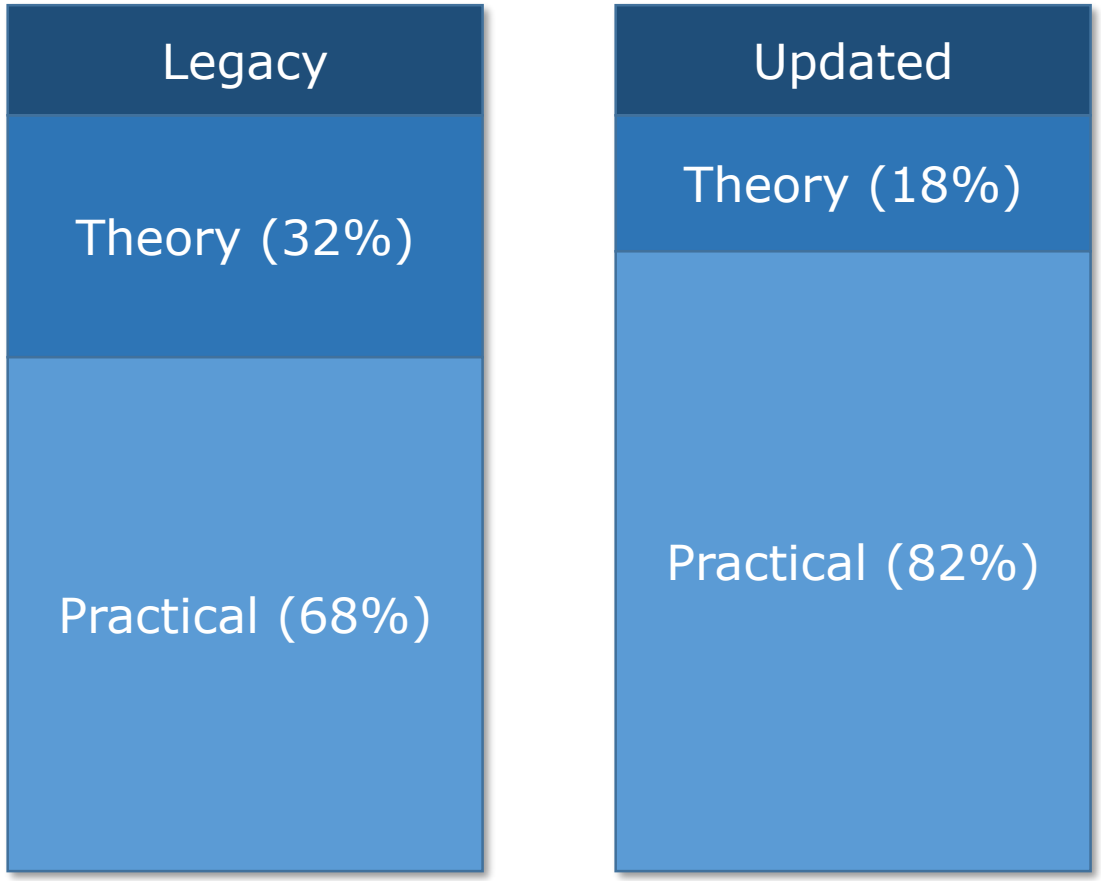
- Decrease in duration by moving theory elements into the practical lessons
- Shifted to a more direct (transfer) scope in the theory elements
- Changed the sequence of the lessons to support a better flow
- Reduced certain practical elements



Result

BST Sea Survival, content

- Moved theory elements into the practical lessons
- Updated content based on changed risk environment
- Added requirement for practical exercises pr. delegate
- Changes in practical exercises
  - Increased transfer exercises
  - Reduced helicopter rescue exercises
  - Updated life raft exercises



Result

BST Sea Survival, credits

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Working group contributors

SSE MAERSK TRAINING equinor SG

Pilot testing

Falck Safety Services MAERSK TRAINING

GWO

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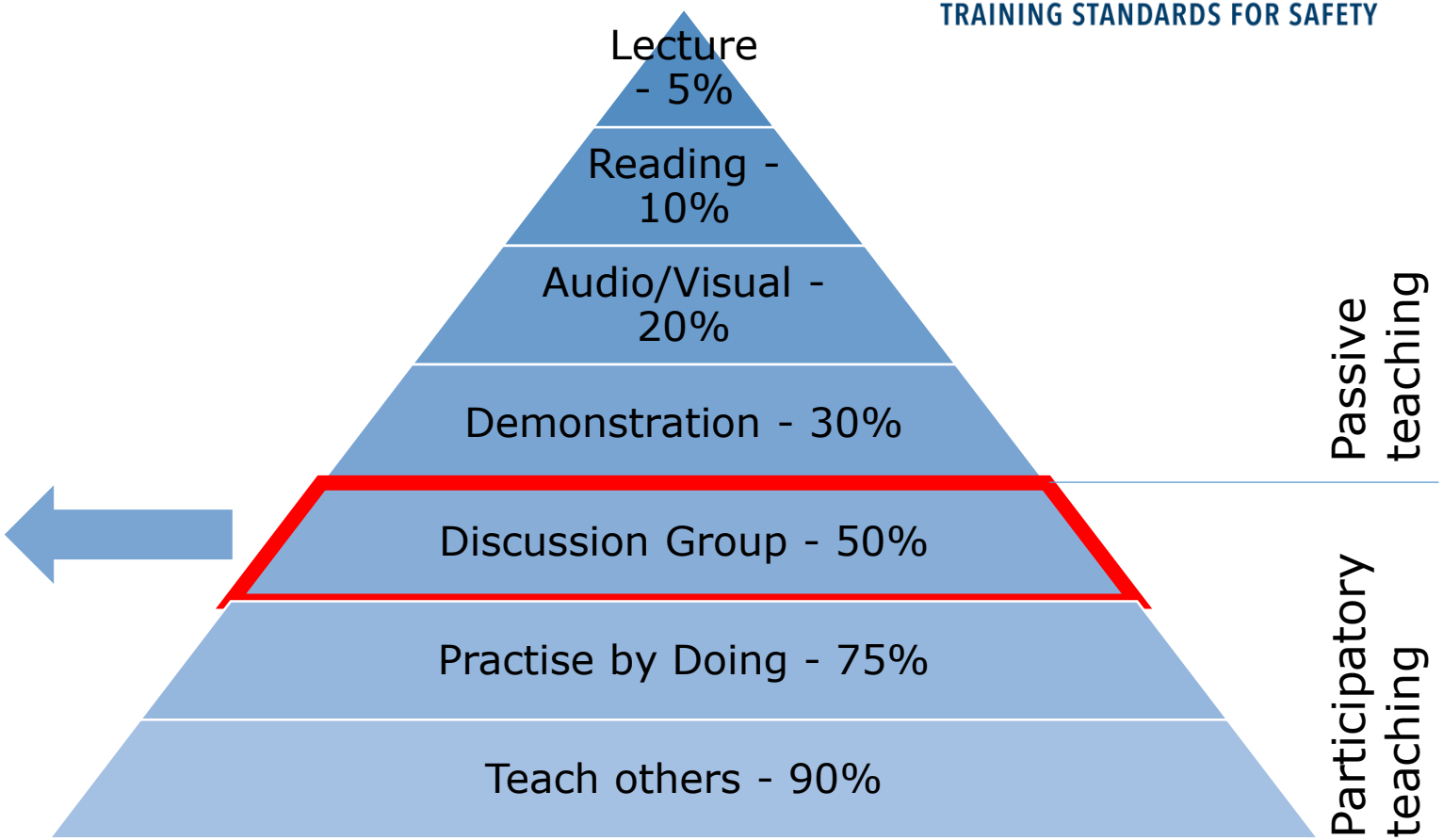
1st of October

2nd of October

4th of October


Lecture - 5%
Reading - 10%
Audio/Visual - 20%
Demonstration - 30%
Discussion Group - 50%
Practise by Doing - 75%
Teach others - 90%
Passive teaching
Participatory teaching

Improving governance of our network

Broder Illing, Risk Manager - GWO

Audit & Compliance Committee
Our mandate:

- Adequate governance, consistent quality in delivery of training by all providers
- How have we done this?
  - Criteria for Certification Bodies
  - Criteria for Training Providers
  - Standards

  Feedback from you: ”It works ok, but assumption is an auditor knows GWO training standards”

A better way: Criteria for Certification Bodies v5

TRAINING STANDARDS FOR SAFETY

FROM 1.10.2018

- New Auditor Workshops
  - (Yongzhi Wu - GE Renewable Energy reports about WS in Shenyang)
- Auditor/Certification Body must:
  - Document/demonstrate to GWO their attendance at workshops or trainings participated in/witnessed
  - Information listed on GWO web site
- Allowance for audit on basis of ISO 17065 (service provider) and/or 17021 (management systems)
- 'Man-Day' estimates: updated and easier to understand

‘Man-Day’ requirements: Criteria Version 5

Man-day estimation table	QMS	On-site training
Stage 1	0,5-1	**0,3 X duration of modules**
Stage 2	**0,5-1**	**0,3 X duration of modules**

Improvements for 2019

CB Criteria from 1.4.2019

- Becoming hard requirement: Document/demonstrate to GWO CB/auditor's attendance at workshops or trainings participated in/witnessed
- Template/checklist to guide auditors – usage optional, but may become requirement as of 1.10.2019

Survey function – Training providers able to evaluate CBs and send feedback to GWO

In conclusion

- We’ve been listening to your feedback
- Greater transparency
  - Publication of compliance list
- Improving quality assurance of audits
  - Workshops
  - Templates/checklists
  - Survey

TRAINING STANDARDS FOR SAFETY

GWO in 2019

Results of TC/SC strategy session
September 18-20th

Safety Training Standards

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Agreed Reviews:
BTT: all modules, release April 2019
BST: WAH, MH reviewed modules, release April 2019
EFA and ART review to begin in Q3

Agreed development:
BTT, installation module, April 2019
Blade repair, April 2019

Potential new w current staff:
1 new training standard project: Slinger Banksman
1 cross cutting quality assurance project

Develop Supporting Training Material
Video instruction guides

Governance & compliance

WINDA
- Maintain Operations, 99,9% availability

Governance (mitigate risk) of Certification Bodies
- Develop auditor qualification and training workshops
- Develop checklist for Auditors as Annex to CB Criteria

Communication & engagement

TRAINING STANDARDS FOR SAFETY

New website
Improved UX, support standards development, improve member profiling, training providers and certification bodies

WINDA statistics
Annual report, with more data throughout the year and accessible on new website

Content
Increased production of content + training provider news for own media
industry media and business relevant social media.

EVENTS
- Stakeholder Forum@ WindEurope Bilbao (2 April)
- Stakeholder Forum @ AWEA OM&S (27 Feb)
- IPF2019 (8 April)
- AWEA WindPower (20 May)
- WindEurope Offshore Copenhagen (26 Nov)
- China Wind Power (16 Oct)
- Auditor qualification and training workshops in US, Europe and China (Feb, June, October)