

SAFETY MATTERS



Nieuwsbrief van **Boskalis**

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voor Salvage

Colofon



Working safely at height



Gebruik van een hoogwerker

Working at height is involved in the activities of every division of Boskalis. Whether it involves construction of a wind park or salvaging a ship: colleagues must regularly venture high up as part of their work. In this special issue of **Safety Matters**, we examine the risks, discuss the training and equipment, and interview colleagues about their experiences.

The figures

Over the past three years, an average of one employee per two weeks was injured in a fall from height. Expressed in figures: of the 956 registered accidents in 2014, 2015 and 2016 (first six months), 72 involved a fall from e.g. a staircase, a (pilot) ladder or a machine footboard. That represents approximately 7% of all accidents.

Causes

The accident reports indicate various causes: failure to properly assess the risks, failure to adequately react/correct, failure to check/monitor the situation, assuming the wrong position for the work, poor access or lighting, defective tools.

Injuries:

The resulting injuries vary. Some colleagues are lucky, suffering only a twisted ankle, bruising and

scrapes while others fall so hard that they are (temporarily) unconscious and/or end up with bruises on their back, torso and legs. ■

TP's ??



Working at height on WoDS: “This is truly like high-level sports.”



Beklimmen TP

In 2013, Rob van Gemert (project director) and Eric de Troije (works manager) worked together on the West of Duddon Sands (WoDS) project, involving construction of a wind park in the Irish Sea. Boskalis had never been involved in this type of project before so this was a pioneering experience for the project team, who were tasked with safely and responsibly installing 108 windmill foundations at sea.

What was involved at height for WoDS?
Eric: “A lot of maneuvers were involved using transition pieces, such as the inspection at delivery, hooking up lifting tools and a slew of other examples. In each case, at least one person, sometimes more, had to work at height. In some cases, we could use cherry pickers, but not always. That meant someone had to climb up 25 meters of stairs on the outside of the structure.”



How did you prepare your team?
Rob: “It all starts with training your people. Everyone is trained in ‘rescue at height’ (see box). They trained on-site and were then able to directly apply what they learned in practice. It’s also crucial to have good, certified equipment on hand, which is kept in good condition. This is

one area where you never cut corners. We had everyone select their own, personal equipment. And finally, you have to show that you take the process seriously: make solid agreements, hold toolbox meetings, pay attention to the risks.”



What did you identify as the biggest risks?
Eric: “Fatigue and underestimating the situation. You have to be ‘fit for duty’. And you have to stop in time, like during inclement weather.”

What do you do if you see that people are getting tired?
Eric: “We keep them on the ground. But it’s best if you prevent this from happening, which is why we had two teams who alternated a climbing day with a day working on the ground. We also consistently devoted attention to this during toolbox meetings: be aware of when you’re getting tired and speak up in time. So it’s also about trust. NINA plays an important role here: an open atmosphere, taking responsibility for your own safety and that of your colleagues.”

Are some team members afraid of heights?
Eric: “Definitely. I’ve been up a couple of times and didn’t feel all that comfortable with it. When a young engineer told me last week that he had a cramp in his arm from climbing, I knew he had a fear of heights. I had the same thing; it’s

the fear that makes you cramp up. So we talk it through.”
Rob: “I would personally never have the guts to make the climb, which gives me the courage to talk about it with team members. You need to speak up if you’re fearful; there’s no need to be ashamed. This is truly like high-levels sports: respect.”



The WoDS project was brought to a successful conclusion without accidents or near misses. Thanks to the experience they gained, Rob and Eric are now involved in other, similar projects (the Wikingen project and the Veja Mate project, respectively).

Engineers Kjeld Ebbendorf (links) en Robin Peters voeren een inspectie uit op de Transition Pieces van Veja Mate



EQP 501 Technical Safety Standard

What does a safe ladder look like? What requirements have to be met for hoisting devices? The applicable rules are found in the EQP 501 technical safety standard.

The EQP 501 standard is based on the yellow and black safety instruction booklet from the Association of Hydraulic Engineers, the rules of Bureau Veritas and the Cyprus flag state, and can be found in Q-Aid. This is a guiding standard in the new-build and modification of ships, initially for the Dredging fleet but a number of ships and trestles from Offshore have now also been adjusted to the standard. It should also be noted that for older ships, different construction requirements were in place and not everything can be carried out according to the current standard.

Safe Design
In such cases, Safe Design can help, says Edwin de Weerd. As a point of contact, he regularly fields questions from practice and



CSD Taurus. De by-pass leiding wordt geplaatst - er staat een steiger bij om op te werken.



CSD Taurus. De by-pass leiding is gedeeltelijk gemonteerd en ligt in de steun.



CSD Taurus. De steun waar de by-pass leiding in komt te liggen. Losse steiger is niet meer nodig als het platform is geïnstalleerd.

seeks workable solutions together with experts from within the company. “For example, the Taurus crew asked for advice about replacing loose scaffolding with a fixed work platform for installation of a bypass pipe. Together with Central Fleet Support, we designed the best solution.”
Please note: not all materials that are used to work at height fall under the EQP 501.

Scaffolding and harnesses, for instance, do not fall under the standard. For these materials, the rule of thumb is to get good information and make sure they are certified.

EQP 501 in brief:



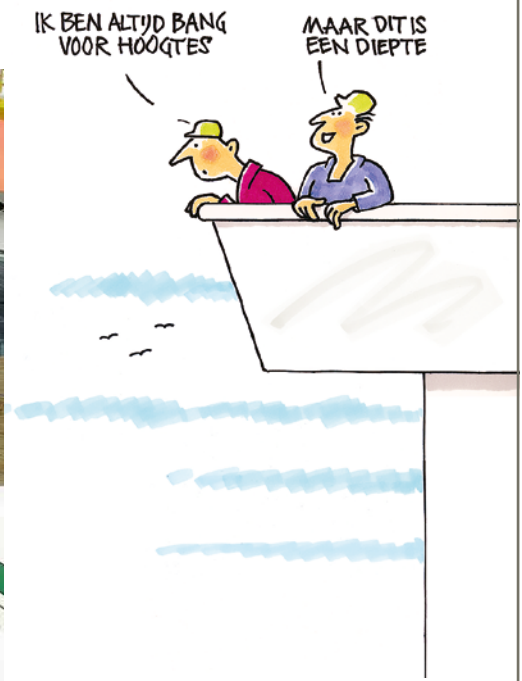
NIEUWE FOTO VOLGT



- Ladders:**
- 1) are equipped with a safety cage if they are higher than 2.50 meters
 - 2) are placed at an angle of 75 to 90 degrees
 - 3) have handholds at the top of the ladder

- Stairs:**
- 1) are placed at an angle of 20 to 60 degrees
 - 2) are equipped with an approved anti-slip coating (inside) or grated steps (outside)
 - 3) have a railing or knee railing

- Hoisting devices:**
- 1) are periodically checked
 - 2) must meet all applicable safety requirements
- For more information:
safedesign@boskalis.com



What should you do if the fire department doesn't show up?



hoge resolutie
aanleveren

During a fire drill, the project management of SAAOne discovered that the fire department was incapable of rescuing someone at great height. The poor doll used during the drill hung there dangling on the railway bridge under construction as part of a road expansion project in the north of the Netherlands.

“We were quite shocked,” says Marvin Schultze, who was responsible for implementing the project. “You expect that if something happens, you can call the emergency services and they’ll come and rescue you, but that’s not the case here.” The regular fire department’s ladders are a maximum of 24 meters long.

In the Netherlands, there are two firefighting teams that are specialized in rescues at height, but their response time is often too slow. “Fifteen minutes can be fatal if you suffer a bad fall with your harness because your legs can be crushed (HST, Harness Suspension Trauma, see box). That, too, was an eye-opener for everyone here at work: you think if you wear a harness and fall, there’s nothing to worry about but that’s just the start of your problems.”

Rescue Pack

In order to bridge this safety gap, Marvin and two colleagues decided to get special training at Industrieel Klimmen in Amsterdam. “We learned how to save someone at height using what’s known as a Rescue Pack. This consists of a set of pulleys and a ‘rod’ you can use to ‘catch’ someone from a different position and then guide them up or down. We shared what we learned at the construction site so that others would also know how to use the Rescue Pack.”



Lesson Learned:

If you have to work at height, it’s important during the preparation phase to check whether the local emergency services are able to rescue someone quickly. In addition, make sure there are people at the location who are trained in rescues at height and that the proper rescue equipment is on hand.



Did you know that...

...gravity affects everyone?

The Administrative Court in Amsterdam recently sentenced the Dutch National Opera & Ballet to pay a fine of 18,000 euros because it had failed to create a safe workspace at height. What happened? In Wagner’s opera

‘Siegfried’, a child plays the role of a forest bird who dances on a three-meter-high beam. By order of the Labor Inspectorate, a fence had to be erected on the beam. For artistic reasons, the head of the dance

company protested. To no avail. “Gravity has the same effect on an artist performing on a high platform as on a construction worker on scaffolding.”

Examining unknown risks: Harness Suspension Trauma (HST)

Did you know that being suspended in a harness after a fall can be life-threatening? Being suspended for a(n exceptionally) long time can even lead to death. This is referred to as **Harness Suspension Trauma (HST)**.

How does HST occur?

If someone falls and is dangling in the harness, the harness’ leg straps put pressure on the arteries. This prevents the blood from being properly pumped from the legs to the upper body, which disrupts circulation. HST can already arise within a half-hour of the fall.



hoge resolutie
aanleveren

What happens?

Because his blood pressure is falling, the victim quickly feels poorly. The blood oxygen level falls (it becomes oxygen-deprived) and organs, like the kidneys, start to fail. The victim can lose consciousness. If he is released from the harness and his legs are no longer trapped, the oxygen-deprived blood suddenly pumps quickly through the body. This can cause the heart to stop beating, can damage the kidneys and result in death.

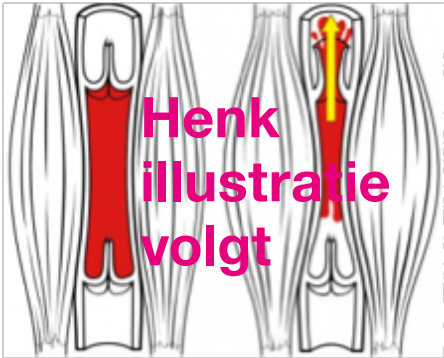
How can HST be prevented?

1) Preparation:

- Ensure workers receive advance instruction from an expert.
- Be prepared for disasters and have an action plan in place.
- Discuss among team members how you will handle it if someone falls and is suspended in his harness.
- Make sure there is always someone on-site who knows the rescue techniques and that the proper rescue equipment is on hand.

2) Implementation:

- Stay close to colleagues. If you’re working alone, always let someone know that you are working at height (and where) and always carry your mobile phone.



Henk
illustratie
volgt

- Take a ‘Relief Step’ with you when you work at height. This is a type of sling you can put your feet in to decrease the pressure from the harness on the groin and enables blood circulation to be maintained.

3) In the event of an incident:

- After a fall, try to keep your legs moving or regularly flex your muscles tightly for five seconds to maintain blood flow.
- If someone has been hanging in a harness, NEVER lie them down immediately because this can cause the heart to ‘drown’ in the sudden level of blood flow. Have the victim sit up.



Henk illustratie
volgt+tekstcorrectie

New climbing equipment for Salvage

This year, Salvage reviewed and updated all its climbing equipment. All employees are being trained to use the new equipment.



Marco Mentink

At the end of March 2016, a new European regulation governing personal protective equipment (PPE) went into force (see box). In anticipation of the change, Salvage reviewed

all its climbing equipment and engaged a partner to provide expertise, explains Marco Mentink, Technical Support Manager Salvage. “We presented a number of practical examples and, based on these, put together a climbing, abseiling and rescue set. We also immediately scheduled training sessions to teach people how to use the sets. We are providing the training worldwide to everyone, from super- visors to apprentice divers.”

First aid backpack

The new equipment is being disseminated worldwide so that the same gear is available everywhere. “Uniformity increases safety,” says Marco. “And after a job, such as in the case of Modern Express, we have all materials inspected and repaired by an expert so that we are certain our equipment is functioning properly. After each job, there are lessons learned that lead to improvements. For example, on the advice of Rotterdam’s Havenziekenhuis, all First Aid materials have been repackaged from an aluminum case into a backpack. So we’re continually considering where improvements can be made.”

The rescue set consists of:

- rope, 25 meters 11 mm semi-static
- anchor sling
- descent device
- pulley system
- various carabiners

This set only enables a victim to be pulled up or down, or the rescuer can descend with the victim.



Illustration 2 photos of the climbing and abseiling set and of the rescue set

The climbing and abseiling set consists of:

- rope, 50 meters 11 mm semi-static incl. 2 eyes creating 2 lines of 25 m
- descent device
- back-up line clamps + damper
- handled ascenders + foot loop
- various carabiners
- sit harness
- orange climbing helmet
- 3 anchor slings
- various carabiners
- line protectors
- rescue scissors

Materials are suitable for users up to 140 KG (309 pounds)!



Training in fall protection and climbing techniques

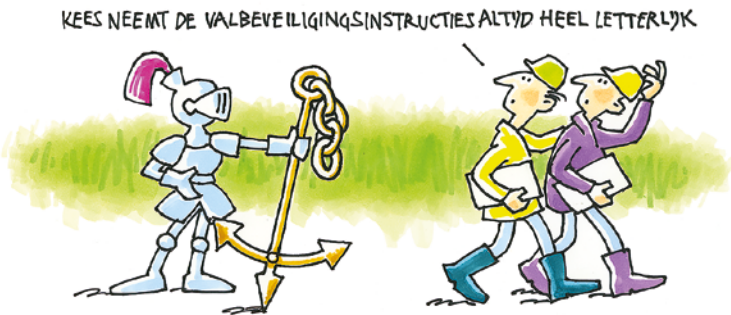
Working at height requires specific knowledge and skills. Boskalis hires in experts to train employees.

One such expert is Safe Site Valbeveiliging, located a stone’s throw from the headquarters in Papendrecht. The company provides trainings in fall protection and climbing techniques for all Boskalis divisions. “Preferably, a training is customized,” explains location manager Dirk van Blijswijk. “At Salvage, for instance, people must be prepared for unexpected situations. We anticipate this by showing them a broad range of solutions, such as different ways to attach a line. And by ensuring they know their equipment from top to bottom, which enables them to use it more creatively. Such as using a positioning line as an anchor sling. As a basis for Offshore and Dredging, we use the GWO ‘Working at height’ and ‘Rescue at height’ trainings, which many clients require.”

Risks

“When climbing is involved, employees must be thoroughly prepared,” says Dirk. “We often see that people aren’t using the right tools because they simply don’t know better. So they’ll wear a harness and attachment device but not a damper, for example, to absorb the impact if you fall. Therefore: make sure you’re well-informed. And sometimes people aren’t entirely sure

how to use their equipment. You can have good fall protection gear, but still suffer an accident if your anchor point is too low. Therefore: don’t create a false sense of safety. In some cases, people think they can’t fall. An underestimation that also creates risks. In conclusion: it takes time to learn how to handle your equipment and use it to work safely. Give yourself and your colleagues the time you need.”



Examples of questions that can come up during a training in fall protection/climbing techniques:

- How does the environment affect working at height? What are the risks? What is the force created during a fall?
- How do you inspect a harness? What is the proper way to put it on and how should it be maintained?
- How do you use a lanyard and what should you pay attention to in using the various types of lines?
- How do you carry out a rescue/ evacuation and what risks must be taken into account?

International standards and rules for working at height:

European Regulation on PPE

At the end of March 2016, a new European regulation was published on Personal Protective Equipment (PPE). According to this regulation, fall protection and climbing equipment fall under Category 3: personal protective equipment that is designed to protect people against risks that can have very serious consequences, such as death or irreversible damage to health. PPE in category 3 comprise complex tools that must meet strict requirements and must be manufactured under a quality assurance system (recognized by the EU).

ISM Code – International Safety Management Code of the IMO

The objective of the ISM Code of the IMO (International Maritime Organization) is to increase the safety of international shipping. The code provides an international safety standard. Ship owners/operators are expected to conduct risk assessments for certain activities and take the necessary measures to eliminate or reduce those risks.

GWO – Global Wind Organization

The Global Wind Organization was founded in 2009 by 13 wind power companies with the

objective of creating a safety standard for the sector and achieving an accident-free working environment. That standard was translated into a GWO training, which is required for all workers in the wind power sector. The training teaches workers to work safely at height and to recognize and put a stop to unsafe situations. The demands that are imposed on GWO trainers are high and they are closely monitored. The GWO standard is a guiding standard in the sector.

IRATA – Industrial Rope Access Trade Association

IRATA was established in the United Kingdom during the 1980s in response to maintenance problems in the offshore oil and gas industry. The organization developed industrial climbing techniques that enable safe work at height. IRATA has since become a global concept. The requirements to become IRATA-certified are strict and the trainings are expensive. In the Netherlands, IRATA is not required by law.

Working at height in practice: the salvage of the Modern Express

This year, following a heavy list, the Modern Express roll-on-roll-off ship was abandoned by the crew off the coast of France. Smit Salvage was awarded the LOF contract and was able to establish a towing connection and tow the Modern Express to the safe harbor of Bilbao in Spain. How do you do your work on a ship that is positioned under a 45-degree angle of inclination? Antoin Brouwer, diver foreman, reflects back on the scene.

"I was just hanging in the ropes for a 'Rescue at Height' training when I was called in for the job," Antoin says. "So I was immediately able to put into practice what I had learned. The French marines flew us by helicopter to the Marine Express to examine where and how we could make a towing connection. The immediate question is, where can I secure myself."

Abseiling

The Modern Express job was the first in which Antoin used the new climbing equipment. He was able to use his (previous) experience and the expertise of two external experts (employees of Rope Access / Safe Site Training), who went along as supervisors to provide practical advice and support. Antoin: "The descent is one of the biggest risks, so we constantly consulted with them on the best place to secure ourselves and how best to go down. For example, we also had to abseil along the sides of the ship to reach the hold via the gangway. In such a situation, what do you use

as an anchor point? I quickly mastered the technique for climbing and abseiling, but you have to pay continuous attention. Everything is dark and nothing is functioning. Fatigue starts to creep in. That's why we always work in small teams; this enables us to keep an eye on each other."

Working more safely and efficiently

Antoin: "You used to hold on to the ropes, but now you secure yourself using line clamps and ascenders. This way of working is safer and more efficient because your hands are free and you're better able to position yourself to do the work. I learned a lot from the experience."

In the end, (due to) the poor weather conditions it took several attempts to secure a towing line, made from Dyneema, to the ship. But in February, the Modern Express was towed to the port of Bilbao and successfully righted. ■

Foto Antoin Brouwer?

Een goed idee ter verbetering van onze veiligheid bedacht?

**Stuur dit naar:
safety@boskalis.com**

ZO JANSSEN,
HET BESTE VALBEVEILIGINGSIDEE
ALLER TIJDEN? IK BEN BENIEUWD.



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Modern Express maakt slagzij



Colofon

Safety Matters is het veiligheidsbulletin van Koninklijke Boskalis Westminster nv in Papendrecht, Nederland.

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