



# SAFETY MATTERS



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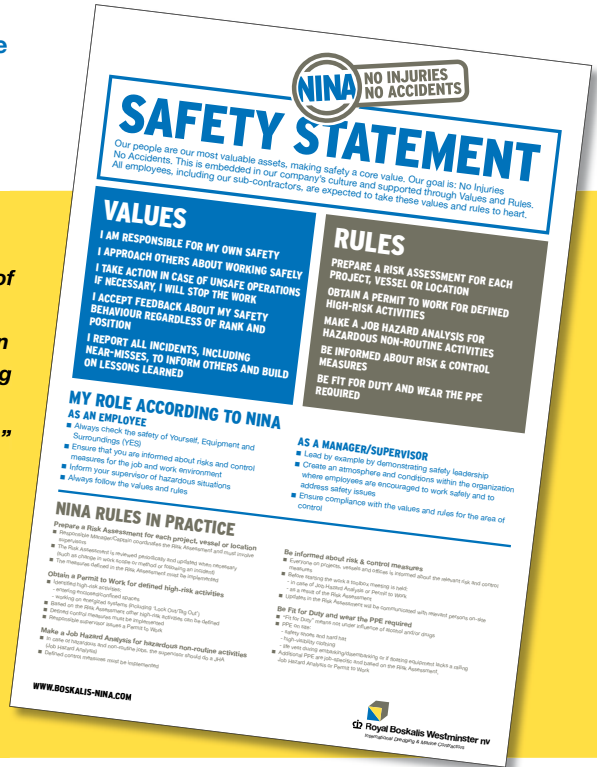


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## NINA rules in practice

What's it like to work under the NINA rules? And what impact have they had? In this issue of Safety Matters, four members of staff share their experiences.

*Boskalis introduced NINA to promote awareness among staff of the impact of personal behavior and of the behavior of colleagues, both on the clock and on their own time, as a means of achieving further reductions in accident and incident rates. To this end, five "Values" were formulated. Intended to promote safer working methods, the NINA rules are tools to more effectively coordinate safety in the workplace and to gear it to fit the specifics of each situation. In turn, those tools encourage discussions about the Values, bringing the cycle full-circle.*



"Boskalis carries out a wide variety of projects under very different circumstances. The NINA rules capitalize on that flexibility and are rooted

in the assumption that the work is 'risk driven'," says NINA project manager Wilko Bardelmeijer.

"We set out to improve on-the-job safety together, carefully reviewing all the tools used at Boskalis in the process. We ultimately came up with five golden rules - tools to assess risks, share knowledge, take appropriate measures and ensure awareness of those measures among everyone involved. Each rule can stand on its own; NINA unifies them.

*The rules empower you to handle any situation that comes your way!*

The rules are designed to improve on-the-job safety and reduce risks to an acceptable level, but no one shares the same definition of 'acceptable level of risk'.

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Operational staff should be involved in risk assessment, so they can share experiences and carefully analyze the various factors as a group. The NINA rules are not a checklist. We must continue to ask ourselves how the group assesses the safety aspects of a situation at any given time and how the circumstances could be improved. We need to share our concerns with each other, which, as you may have already suspected, brings me right back to the Values.

Ultimately, however, even if you've discussed all the rules as a group, it all boils down to individual actions and awareness before getting to work. We must all give thought to whether we are doing what we can to ensure our safety, whether the tools and equipment we use are in safe, working condition, and whether the



NINA safety statement

immediate work environment harbors any risks. This is where the first Value comes into play. It is precisely this combination of Rules and Values that makes NINA so unique in the

sectors in which Boskalis operates. And we ought to be proud of it!"



## Rule: Prepare a Risk Assessment for each project, vessel or location

Alkwin Landewee, Project Manager:

### "It saves time"

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"We dredged out and bermed a 26-kilometer trench for two gas pipelines for the Nordstream project in Germany and also carried out complex risk assessments for the project's core activities. The team member most directly involved in the work was asked to start the process. For each activity, he took stock of all potential risks and formulated possible

measures to minimize them. The list was then distributed to the other stakeholder departments for revision based on their own expertise. In the end, a highly comprehensive document was produced, which we discussed with the main contractor and the client during extensive meetings to reach consensus on a particular approach for each item. The client was able

to present its ideas clearly and succinctly, which proved highly valuable and informative for us. This approach also demonstrates to the client that we are well organized and have carefully considered all aspects of the job.

Contrary to popular belief, risk assessment does not slow down

the process, it actually speeds things up. Normally, all documentation, including method statements, has

to be approved before starting each activity. The documents are sometimes sent back and forth six times in a time-consuming process. In certain cases, we agreed with the main contractor and the client that the preliminary method statements were sufficient for starting the project, provided the client had already fully approved the risk assessments, which was already done during the meetings. Ultimately, accident prevention is every client's foremost concern. You can cover that base by running through the risk assessment together. It helps to win the client's trust."



# Rule: Make a Job Hazard Analysis (Job Safety Analysis) for hazardous non-routine activities



**Sharief Spieker, relief captain on the Seaway:**

## “JHA/JSA gives you peace of mind”

*“Each time we moor and cast off, we perform a JSA together with all staff directly involved in the process, which means the crew both fore*

*and aft, the first mate and myself. My colleague Marco de Bruin and I agreed to perform the procedure in the same way. I added a diagram*

*of a vessel to the sample JSA for mooring operations available in Q Aid. During the JSA, I print out the diagram and draw lines on it.*

*We discuss the operation step-by-step using the drawing as a visual reference, establishing the order and procedure for tying and untying the cables, when to shake out the propellers, etc. However, we now use a tug for mooring if the offshore wind is strong, for example.*

*This was recently added to the procedure.*

*I can also sketch the tug on the diagram. At the same time, we also briefly discuss the back-up plan for when something goes wrong. What strikes me is how naturally everyone has taken to this approach. In the past, it was just assumed that everyone knew the procedure, whereas now we quickly discuss it as a team. It only takes five minutes or so, and the peace of mind it gives is worth every minute. When it comes to on-the-job safety, peace of mind is absolutely critical.”*

**Marc Schwan, SHE-Q representative (now stationed in Angola):**

## “When used properly, a JHA/JSA can be a powerful tool”

*“According to NINA, we have to perform a JSA for all non-routine operations. Think of it as a meeting, where you divide up the work into three or four steps together with the operational staff. You discuss the risks and actions associated with each step, which you jot down on a Q Aid form. That way you integrate safety into the meeting. A ship’s captain or chief engineer decides which operations to assess with a JSA, while the project manger,*

*superintendent, Technical Department, reclamation area foreman or marine supervisor is responsible for this on projects.*

*When applied this way, the JSA is a useful tool. However, it can lose its effectiveness if the procedure becomes too routinized and if it becomes a matter of going through the motions to meet the requirements. That sometimes happens when clients want you to perform a*

*JHA for each and every activity, instead of just hazardous, non-routine operations as is stated in Boskalis policy. The safety experts can then assist in the paperwork. This enables the team to remain focused on properly managing the risks and the required measures during the operation.*



# Rule: Be fit for duty and wear the PPE required



**Peter Zevenbergen, captain of the Crestway:**

## “Out here, your colleague is the only one who has your back”

*“To do the job properly, you have to be in good physical and mental condition, not just for your own sake, but also for the sake of your colleagues. After all, you have to be able to rely on your colleague being alert. ‘Out here, your colleague is the only one who has your back.’*

*Being ‘fit for duty’ means getting enough sleep, eating properly and minimizing alcohol consumption to ensure optimum performance. We have to adhere to several legal regulations, regarding the number of hours between shifts, for instance, plus various company rules and provisions, relating to matters such as proper accommodation and fitness equipment. It’s about feeling comfortable on board and*

*knowing your rights, duties and responsibilities. People don’t always realize what it’s like to be on board a vessel 24 hours a day. It’s fine when the weather is nice, but the Crestway is stationed in Europe, so weather is often stormy and cold with rough waters. Sometimes the vessel lurches around so much that you can’t get enough sleep. That makes work more difficult. After four weeks of work, we have four weeks off, and with good reason. The NINA ‘fit for duty’ guidelines encourage active consideration of the importance of feeling rested at work and a concerted effort to achieve that goal. That requires more energy and attention for staff not doing day and night shifts.”*

# This time in...

## ...Namibia

**Despite Walvis Bay's well known high concentrations of hydrogen sulfide (H<sub>2</sub>S), the Argonaut and the Cornelis Zanen can still be safely deployed to dredge the harbor approach channel thanks to a reliable safety policy.**

According to Jan van Caam, captain of the Cornelis Zanen, "The crew was somewhat apprehensive about the operation at first, but it didn't take long before they all felt confident that we were taking the necessary measures to ensure on-the-job safety." Captain of the Argonaut, Jacob Brands, is also extremely pleased with how thoroughly prepared the project was. It ultimately went without a hitch and without incidents. "I have to admit, it was more rigorous than I expected: you were only allowed to stay on deck for a half hour for each 2.5 hour rotation. Otherwise, everyone had to stay inside."

As a standing order, the crew had to comply: before suctioning, everyone had to go inside and report to the first skipper, who was also the one responsible for reading the meters in a central unit on the bridge (see box). The crew could return to the deck or the engine room only after he gave the "all's clear" signal. According to project manager

Ronald Stegenga, coordination and communication were key, "We discussed the risks extensively and let everyone ask questions whenever they wanted. That kind of open communication is essential. Hats off to the crew, who stayed on their toes until the end."

### Personal gas meters

Both vessels were modified when the project started in late 2010. The last ten meter section of the hopper was covered on the Argonaut, while the sand pumps of the Cornelis Zanen were fitted with a degassing installation to facilitate controlled removal of the gases released during dredging. The air conditioning inlets were also fitted with filters to keep the H<sub>2</sub>S out of the crew's quarters and gas meters were installed near the inlets at various points, including in the air conditioning system and the engine room, to ensure constant monitoring of H<sub>2</sub>S concentrations. In addition to an escape mask, the entire crew

was issued a personal gas meter and instructed to keep it with them at all times.

Safety expert Cor Weijers, who advises Boskalis on H<sub>2</sub>S-related risks, was involved in the project from the beginning, training the crew to use the monitoring and measuring equipment. He had never before experienced such high H<sub>2</sub>S concentrations. "During the dredging, I went on deck with my respirator on. Within a three meter space, gas concentration levels varied from zero to 1,500 ppm. That just proves the danger of thinking it'll only be a second."



H<sub>2</sub>S-measuring instrument

"Using the meters became a habit," says Jan van Caam. "While it did lead to more delays than usual, particularly in the morning when high concentrations were measured due to a lack of wind, but we would just wait awhile, turn the vessel, or continue dredging elsewhere. In the afternoon, it was windier so the gas dispersed more quickly. All things considered, I'd say the measures were the reason why the day to day operations went so smoothly."



New ventilation inlet locations accommodation and engine room

Closure of engine room inlet

Blower on degassing outlet

Last 15m of hopper covered by 'Wrap-it'

**The project was completed on schedule and without incidents. Boskalis received a formal "excellent" safety appraisal from the client, with special mention of the company's proactive approach, thorough preparation for H<sub>2</sub>S-related risks and high degree of safety awareness.**

# This time in... continuation

## What is H<sub>2</sub>S and why is it so dangerous?

H<sub>2</sub>S is a natural by-product of decay, created through the decomposition of organic sulfur containing materials. It often occurs in combination with methane. H<sub>2</sub>S can be identified by its characteristic smell of rotten eggs. It is far more dangerous, however. When present in high concentrations (>100 ppm), it paralyzes the olfactory nerves, resulting in the loss of the sense of smell.



Argonaut 1 with partly covered hopper

As it is not water-soluble, H<sub>2</sub>S remains trapped between sludge particles due to the static pressure of the water. Dredging upsets this equilibrium, as a result of which the gas is transported to the surface along with the water and sludge with potentially disastrous consequences. H<sub>2</sub>S and methane

combined with oxygen form an explosive gas. H<sub>2</sub>S is also highly toxic and poses serious health risks. Short-term exposure to low concentrations of H<sub>2</sub>S (up to 100 ppm) causes physical discomfort, including respiratory irritation, coughing, wheezing, headache, irritated eyes and diarrhea. Exposure to concentrations exceeding 300 ppm causes lung

disorders, and extremely high concentrations of H<sub>2</sub>S, exceeding 700 ppm, are lethal.

Despite the infamy of the H<sub>2</sub>S concentration levels in Walvis Bay, the gas can be found all over the world.

Consult Q-Aid and the safety instructions for more information about H<sub>2</sub>S.

## NINA moments



### Jan van Caam:

According to Jan van Caam, "With NINA, it's easier to make progress in the area of safety. The extra gas meters we wanted and several spares were dispatched immediately. That's how things should be done."

### Jacob Brands:

Jacob Brands relates, "There were no filters in the crew's quarters at first. We assumed turning off the air conditioning would stop the gas from entering, but then we realized that even though the meter wasn't shooting upwards, the quality of the air was poor. After discussing the matter with the operational staff and technical department, I decided to shut down operations. We ordered a filter casing immediately. Before that, the crew had slept onshore. The main office's response to my decision is what struck me the most. They didn't ask 'why?', but immediately asked what needed to be done to make it happen."

### Ronald Stegenga:

Ronald Stegenga says, "When winds are unfavorable, the dredging operations in the port can pose a potential risk to dry dock workers and fishermen here on boats. That's why I discussed the risk assessment and the procedures with the port authorities. This was apparently unprecedented. Although the bay has been dredged many times, no one ever paid attention to the potential risks onshore. Together, we decided that the work would be carried out in the evening and that access to the downwind section of the port would be prohibited during the operation. We regularly monitored gas concentration levels on the dry docks. When high levels were measured - which happened once - we informed the port authorities immediately and stopped dredging. That went really well with the port authorities. In the end, NINA's impact reaches far beyond an individual vessel."

WHO IS NINA!!





## The unique natural beauty of Walvis Bay

Walvis Bay is the largest foraging area in southern Africa for migratory and non-migratory species of birds. Part of the surrounding area is covered by wetland, which is home to large colonies of seals, dolphins and flamingos. Averting incidents that could harm the environment was therefore a key goal, according to project manager Ronald Stegenga. "We set up a monitoring program to continuously measure turbidity at various points in the bay,

because of the strict regulations on water turbidity. Each week, we collected water samples and measured the heavy metal content in the sediment. We also took weekly samples of oysters and mussels, as they are the first to show signs of possible contamination. When the project is finished, the monitoring program will continue for another three months, as there is very little information available about the water quality in this area.



**We look forward to hearing your ideas on how to improve safety. Please send them to: [safety@boskalis.nl](mailto:safety@boskalis.nl)**

## Monitoring and measuring equipment

The Argonaut and the Cornelis Zanen were equipped with an unprecedented H<sub>2</sub>S detection system: never before had a sensor-based monitoring and measurement system been used in combination with a central unit that makes it possible to view measurement data from the bridge. The sensors were installed strategically, so staff can monitor concentrations directly from the bridge. As the entire unit is mobile, it can be reused elsewhere for other projects. Incidental measurements were carried out at and around the hopper using a mobile meter with a sensor capable of detecting H<sub>2</sub>S concentrations of up to 1,000 ppm. This meter is also capable of registering the maximum concentration, beyond the normal range of measurement. On the Cornelis Zanen, a record concentration of 7,500 ppm was recorded above an open hopper.



 Personal monitor

Visit [www.boskalis-nina.com](http://www.boskalis-nina.com) to read about the experiences of chief engineer Cees Dubbelaar with the modification of the Cornelis Zanen for the Walvis Bay project.

"On the very first day, before you knew it, the only stairway from the deck to the pump room was covered with welding and power cables. You had to dig your foot in to find the steps. It was extremely dangerous. So we decided to put in hooks where everyone could hang their cables. Through coordinated efforts and communication, you can quickly improve workplace safety."



## Colophon

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