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Partners in safety

Newsletter contractors TenneT

Welcome

Before most of us go on holiday, we are pleased to send you this latest edition of the TenneT safety newsletter. In the previous edition, we asked readers to give their opinion on the contents and lay-out of our newsletter. We received a large number of responses, which we very much appreciate. You can find the survey results under the heading 'Customer satisfaction survey'.

This newsletter includes our regular features, such as an update on the implementation of the Safety Culture Ladder, safety-related news and lessons to be learned from incidents. We also inform you about a number of new developments. For instance, we have included an interesting article on 'Energized Working' at TenneT,

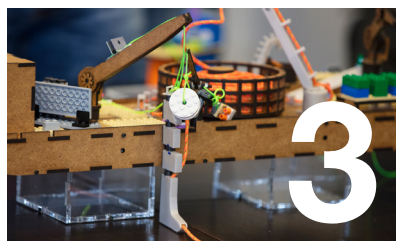
i.e. working on live installations. TenneT recently conducted a pilot project in which maintenance work was carried out on a live high-voltage line. Henk Barentsen, Senior Manager Grid Service Netherlands, tells us all about energized working and how (un)safe it is.



Oscar van Aagten

We hope you enjoy reading this newsletter.

I would also like to take advantage of this opportunity to wish you all a safe and pleasant holiday.



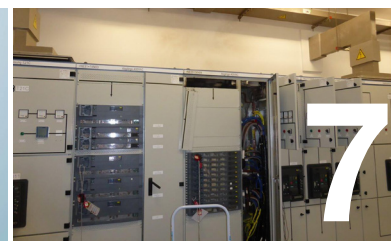
Better Together
HSSE events 2018

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TenneT certified at Level 3 of the Safety Culture Ladder

Audit

In March and April of this year, certification organization Kiwa conducted an extensive audit of TenneT's safety culture in the Netherlands and Germany. The auditors examined our compliance with the requirements of the Safety Culture Ladder (SCL), an NEN standard that sets out criteria for an effective safety culture. After 13 days of auditing, 13 site visits and nearly 100 interviews in the Netherlands and Germany, Kiwa concluded that TenneT fully meets Level 3 requirements (corresponding to a 'calculative safety culture'). The findings indicate that we even already operate at Level 4 ('proactive safety culture') in some areas (influencing contractors, policy and strategy, and compliance / familiarity with workplace procedures). This is a wonderful result for a complex organization like TenneT.

[> Read more](#)

Safety Vision 2022

Based on Kiwa's final SCL report, we are preparing a follow-up action plan aimed at reinforcing certain Level 3 aspects and particularly at becoming a proactive safety-aware organization in the long run and achieving Level 4 certification. We will combine this action plan with our new Safety Vision 2022 and the accompanying Roadmap, which are currently under development. The period covered by the current Safety Vision ends this year. The new vision document will focus on two key pillars: safety leadership and contractor management. Level 4 of the Safety Culture Ladder is also concerned with strengthening and expanding these pillars. In addition, we will focus on celebrating and utilizing

success, developing future-oriented KPIs, and intensifying our efforts to promote safety throughout the supply chain. If you have any suggestions and/or experiences that you wish to share, please feel free to e-mail us at safety@tennet.eu.

Customer satisfaction survey

Since late 2016, we have sent quarterly safety newsletters to our contractors. In the previous edition, we asked for your opinion about the contents and lay-out of our newsletters. We received 48 replies from 45 organizations, a level of response with which we are very pleased! The results are provided below. As the newsletter's contents and lay-out were evaluated as 'good' to 'very good', we will continue our current course. If you have any suggestions for improvement, please send an e-mail to safety@tennet.eu.

Questions	YES	NO
Do you read the Newsletter? Yes / No	48	0
Do you forward the Newsletter to colleagues? Yes / No	40	8
Would it be a problem if the Newsletter is only published in an English version? Yes / No	26	22
Can we call you for an interview?	21	27
Average (0 - 10)		
How would you rate the content of the Newsletter in terms of relevance? Scale of 0 to 10 (with 10 being the highest rating)	7,5	
How would you rate the content of the Newsletter in terms of depth? Scale of 0 to 10 (with 10 being the highest rating)	7,3	
How would you rate the layout / design of the Newsletter in terms of user-friendliness? Scale of 0 to 10 (with 10 being the highest rating)	8,1	



Latest news

Contractors get 'hands on' at 2018 Better Together HSSE events

Contractors involved in the entire COBRACable project came together to talk about safety at four 'Better Together' HSSE events organized at the COBRACable sites in Endrup (Denmark), Eemshaven (the Netherlands), and the Cable Enterprise vessel (Finland).

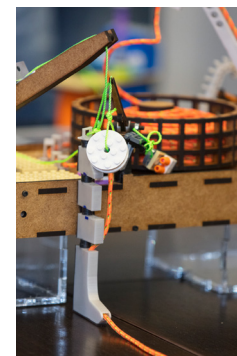
The COBRACable is a new 325-km-long subsea DC connection (interconnector) that will create a direct link between the Dutch and Danish power grids in 2019. Attendees at the Better Together HSSE events had a chance to gain 'hands on' experience through a 'Rehearsal of Concept' (RoC) drill (originally a military exercise). This gave everyone an opportunity to discuss safety awareness and how to make the operation safer.

The RoC drill was led by Kim Nødskov, who has created a 3D model of the Ulisee barge. The barge model was combined with a 3D model of the dike crossing, prepared by contractor De Romein. The aim was to explore safe cable pulling over the dike, as well as the use of the vertical injector on the barge. The drill revealed

some interesting HSSE issues that will be resolved before the start of the cable-pulling work.

At the end of the session, Paul-Jacob Vilhelmsen said: "It is clear that in the future, as a follow-up to the safety-by-design sessions, we should always involve the workers who are going to build and maintain the asset. For this purpose, we should preferably use a 3D model. This enables us to discuss all HSSE risks in time and solve them before they become an issue. We are Better Together."

The event concluded the 2018 series of four Better Together HSSE events, where project management staff and site personnel work together on health and safety.



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Remarkable progress

According to Kiwa, TenneT has achieved remarkable progress compared to last year: the entire company has demonstrated that it attaches great value to safety across the board. This was reflected by a strong commitment from the Executive Board, clearly visible campaigns at building sites throughout Germany, and workers and technicians showing how much they value safety.

The audit also revealed a high level of professionalism among TenneT employees, a quality that makes a key contribution to safety in the work environment. Safety awareness was very high at all locations visited, and there is a strong accountability culture in many places.

Continuous improvement

Of course, there are still aspects that can be further improved. We can strengthen our position as a learning organization by making even more effective use of information reported in iTask and obtained during Safety Walks and workplace inspections, in order to address and resolve safety issues. We have also found that each construction

project uses its own formats for safety communications. Apparently, no standards are yet available. This aspect can be addressed more effectively. We must also continue to focus on the

commitment to safe working practices, as we are still seeing (sub)contractors who are not adhering to the safety standards. TenneT will have to consider ways of prioritizing safety when engaging subcontractors.



Figure 1: Safety Culture Ladder

Follow-up

Based on Kiwa's final report, we are preparing a follow-up action plan aimed at reinforcing certain Level 3 aspects and particularly at becoming a proactive safety-aware organization in the long run and achieving Level 4 certification. This plan will be coordinated with our new Safety Vision 2019-2022, which is currently being prepared.



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Update on roll-out of Safety Culture Ladder at TenneT contractors

The implementation of the Safety Culture Ladder (SCL) at TenneT's contractors is proceeding according to plan. A number of German contractors have already achieved certification. The first contractors for our offshore activities have been certified, and Tideway Offshore Solutions recently even obtained Level 4 SCL certification following an audit.

In some cases, four to six weeks may pass between the final assessment of the certification institute and publication of the certificate on the NEN website. One reason for this is that the report must be finalized, whereupon the certification institute issues a positive recommendation to NEN. NEN then approves the entire application, followed by issue and publication of the certificate.



Changes to contractor relationships

Changes are being made to the group of originally selected contractors. Some contractors are no longer directly working for TenneT, and/or their contracts are about to end. In general, these contractors have not yet committed to upholding TenneT standards and/or have not visited our workshops. In the future, new calls for tenders will be issued and TenneT strongly recommends these contractors to nevertheless implement the SCL system in order to prevent a further weakening of their competitive position.

In addition, dozens of new contractors have been included in our selection as a result of tender procedures that were completed in 2017-2018. In many cases, a commitment to implement the SCL system has been contractually agreed with these new contractors.



Reserving audit capacity

Many certification institutes are starting to see their schedules for 2018 fill up. We therefore recommend reserving audit capacity as soon as possible. On the positive side, the number of NEN-qualified auditors and assessors is steadily increasing.

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Knowledge platform

Participants in NEN's knowledge platform are engaged in close consultations aimed at refining and uniformly documenting the Level 4 and Level 5 requirements of the SCL system. The publications resulting from these activities are scheduled for

late 2018. Contractors wishing to join the NEN knowledge platform can do so by concluding a so-called 'knowledge partner agreement' with NEN. The new, Come Together platform is in the process of being established. Talks are also ongoing with the existing Sustainable Contractors / Safe Contractors platform.

Additional guidance

The Safety Culture Ladder is a relatively new standard that provides frameworks for companies in various sectors. However, we have noted that some sectors may need additional guidance documents for users and/or auditors. Such guidance is developed and drawn up by a working

group of relevant experts, including representatives of certification institutes, companies and clients. A number of TenneT contractors (mainly in the offshore industry) perform activities using helicopters and/or vessels. NEN is currently selecting and issuing invitations to representatives of these contractors.



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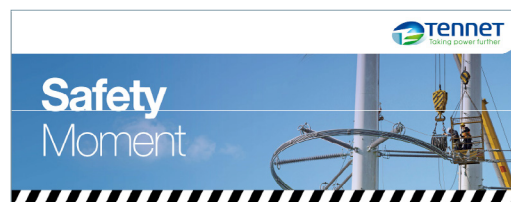
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Incidents and improvement measures

A selection of recent incidents and improvement measures is provided below. The incident descriptions have been anonymized to protect the privacy of the people involved.



Employee injured by falling ground lead

Incident: A falling ground lead injured an employee's arm. The ground lead was secured to a hook ladder that was being hoisted from the ground into a pylon. While the ladder was being guided on the ground into its vertical hoisting position, the ground lead became detached and fell down. The terminal of the ground lead fell onto the employee's forearm and caused a flesh wound.

Cause: The incident was caused by the fact that the ground lead had not been properly attached to the hook ladder. When the 10-metre-long ladder was hoisted up, the employee moved closer and closer to the suspended load and therefore into the danger zone. The 13-metre-long ground lead had not been secured to the ladder.

Improvement measure: The incident was discussed with the project employees, with a special focus on the Life-Saving Rules. One of those rules is 'Do not work, walk or stand under a suspended load.' In addition, a control line is to be used and ground leads must be secured to ladders, using a carabiner for instance.

Cook sustains cut to finger

Incident: A cook sustained a cut to his finger when cutting vegetables.

Cause: Protective gloves are impractical when cutting vegetables, and were therefore not available. No cutting machine was available.



Improvement measures: Cutting and peeling machines will be purchased for the relevant sites in order to minimize the use of knives for cutting. In addition, more suitable protective gloves will be made available.

Employee's hand gets trapped

Incident: An employee was assisting an engineer and an operator in extending the chain of an excavator. For that purpose, the chain had to be lifted from its housing. This was done using a small crane. The employee was holding up the chain, and became trapped between the chain and the housing as it was being lowered.

Cause: The employee was unaware that the operator was about to lower the chain. The engineer did not warn the employee that this was going to happen.

Improvement measures: In future, work involving a chain will be performed using a spreader or hoisting equipment, but without assistance from a third party in order to avoid communication problems. The relevant procedure has been discussed with the employees involved.



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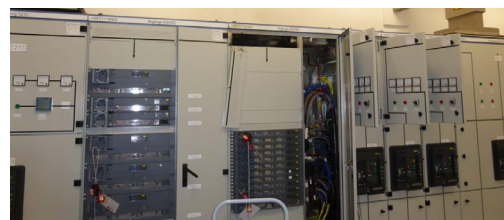
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Incident at DolWin3 land station: works on 400V cabinet cause arc flash

On 13 February 2018, an incident occurred in the communication building of the DolWin3 land station, which is currently under construction. Works were being carried out on the 400V cabinet.

The foreman of a subcontractor had brought additional wires of the control cable into the already existing cable tray and had fixed them using cable ties. For this purpose, he had to open the front cover of the cabinet and remove the cover of the upper cable tray. After having installed the additional wires, he pressed the cover of the upper cable tray back onto the fitting. This caused a short circuit, resulting in an arc flash. All related and directly impacted supply systems were turned off by the switching operator. The foreman was hospitalized for two days with burns on his left hand before he could return to the site without physical constraints.

A root cause investigation of the incident has been performed. The main conclusion is that there is an issue with the lay-out of the 400V cabinet. Since the cable tray is mounted on a thin metal strip which touches the busbars at low mechanical



pressure, a short circuit can occur. In this situation, the short circuit occurred while closing the cable tray. The partition between the busbars and the device compartment had not been manufactured correctly due to a possible design error.

As a consequence, all works on the cabinets of this manufacturer have been stopped. Additionally, all cabinets at the land station and on the platform were checked to determine if similar conditions prevailed. However, no cabinets of this manufacturer have been installed on the platform. As a technical measure, the busbars have been insulated using shrink tubes to prevent any direct contact with the live elements. In addition, TenneT Offshore will no longer use cabinets of this manufacturer in future projects.



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Energized working

For the first time in the Netherlands, TenneT performed work on a live high-voltage line after obtaining special one-off permission from the government. The pilot project was carried out in Dedemsvaart in April of this year. This unique event came about thanks to close collaboration with French TSO RTE, contractor Joulz, and Venko, the party performing the work. The project was initiated by Henk Barentsen, Senior Manager Grid Service Netherlands at TenneT. He is very enthusiastic about the results: “It’s wonderful what we’ve achieved in four years’ time!”



In the Netherlands, working on live installations (known as ‘Energized Working’) is prohibited by law, although the practice is permitted in other European countries. The importance of the availability of the

high-voltage grid and the increasing complexity of the electricity supply system as a result of the energy transition make it more and more difficult to switch off the operating voltage of grid elements in order to perform work. As a result, it is becoming impossible to perform maintenance work on certain parts of the grid or to do so on time. Energized Working offers a safe alternative. TenneT and Joulz therefore wanted to conduct a pilot project in Dedemsvaart to demonstrate how this method works, and that it does not pose greater risks than working on disconnected installations.

“TenneT began to explore this way of working four years ago,” says Barentsen. “We familiarized ourselves thoroughly with Energized Working, first in France, then in the United States, and then again in France in collaboration with RTE, our fellow TSO. We were impressed with

the protocol used abroad. There is a fear in the Netherlands that Energized Working is unsafe. That presented an obstacle, in addition to the fact that this method is simply prohibited by law in the Netherlands under the Working Conditions Decree, which deviates from European legislation in that respect.”

Safety first

Energized Working is not new. Almost all other countries worldwide allow maintenance work to be performed on live high-voltage lines. This is possible thanks to special techniques, clothing and equipment. Energized Working does not pose greater risks than working on disconnected installations. Henk Barentsen: “You could even say that this method offers greater intrinsic safety. Energized Working is a careful step-by-step process. A ‘dry run’ is carried out, on-site consultations take place, and the



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Of course, special safety measures are taken. Employees receive dedicated training, and use special insulated cranes, scaffolding and clothing. RTE, TenneT's French counterpart, has been applying Energized Working for some time. As they possess relevant experience, a special RTE team visited the Netherlands to help carry out this pilot project. The site was prepared for painting work using special techniques. The parties collaborated very effectively. "The work was even completed ahead of schedule," says Henk Barentsen.

When asked if TenneT will work on live installations more often in the future, Henk replies: "The Inspectorate of the Ministry of Social Affairs and Employment granted an exemption for this pilot project. TenneT would like to apply the Energized Working method more often."

Why apply Energized Working?

- Energized Working does not pose greater risks than working on disconnected installations (known as 'planned unavailability'), which has traditionally been the standard approach in the Netherlands.
- Switching the voltage back on also poses risks.
- Energized Working allows the high-voltage line to remain in operation, which of course benefits the security of supply. This is important because availability requirements are increasing due to the growing share of solar and wind energy, as well as the rise of data centres and smart grids.
- Due to the massive maintenance workload in the coming years, working with planned unavailability is becoming increasingly complex. There is growing pressure to continue work under unfavourable conditions (too cold, too wet, too warm). This leads to increased risks.
- In the rest of the world, performing maintenance on live installations is common practice.

Results of pilot project

- The work was carefully planned and performed under limited time pressure (since the high-voltage lines were live), with few disruptions. The only disruption was caused by rain. Even when Energized Working is used, no work can be performed when it is raining.
- 'Thou Shalt not Work on Live High-Voltage Lines' is a golden rule that is ingrained in Dutch electrical engineers. All parties involved must therefore gradually gain trust and confidence. People will only accept that this method is safe and effective when they see for themselves that work can be performed on live high-voltage lines and installations, with careful preparations and use of the right equipment. Seeing is believing.
- TenneT, RTE, Joulz and Venko collaborated very smoothly.
- Many other parties were interested in the project and paid a visit, including representatives of industry associations, contractors and ENTSO-E, as well as administrators.

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The summer holiday period is about to start.

Will you be travelling safely? Check out the website of the Royal Dutch Touring Club (ANWB) www.anwb.nl or its German counterpart ADAC www.adac.de

Life-Saving Rules

www.tennet.eu/company/safety-at-tennet/life-saving-rules

Safety Culture Ladder

www.safetycultureladder.org

Safety at TenneT

www.tennet.eu/company/safety-at-tennet/safety-at-tennet

Contractor Management

www.tennet.eu/company/safety-at-tennet/contractor-management