GLOBAL REPORT 9

DENYS GLOBAL

Down the rabbit hole

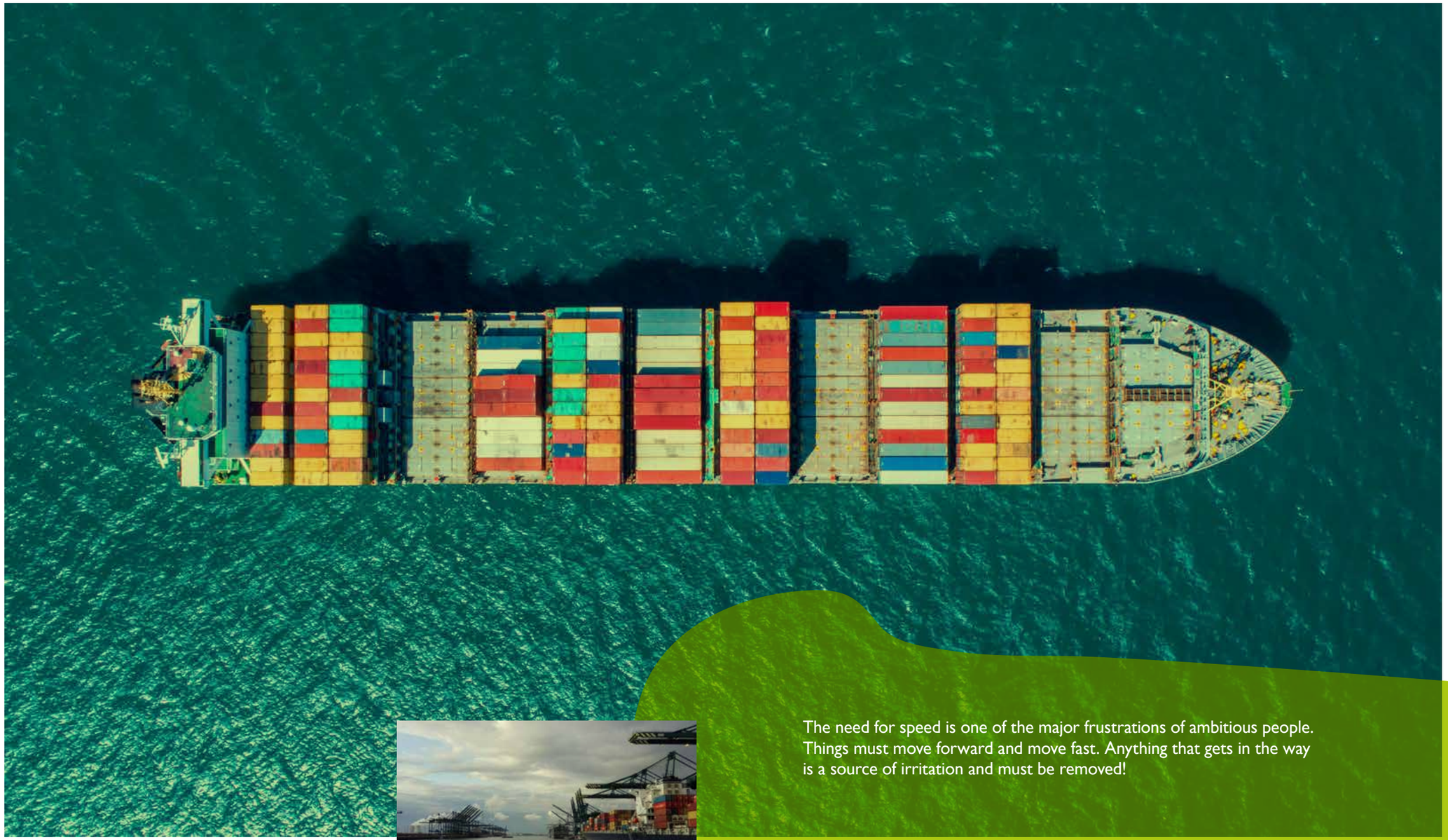
Later in this Global Report, referring to a famous quotation, we boldly say that at Denys we'd rather dance in the rain than wait for the storm to pass. If that sounds like the motto of an optimist, you're right, and I hope that doesn't bother you too much. Okay, working in the construction business does mean having to deal with a lot of inconvenience: dirt, discomfort, unexpected setbacks, pushback of various kinds... It's seldom a stroll in the park, but it's always fun.

It's fun especially when the work allows you to dream and be creative. It's fun when you can grasp all the opportunities to go down untrodden paths, imagine the different ways a project can take shape, and develop alternative approaches and techniques. I like people and companies who stand out from the crowd. It makes them shine.
Shine, for example, like Lewis Carroll's Alice, a confident, brave and resolute young girl who comes across the nervously hesitant white rabbit, unable to say 'boo' to a goose (Carroll's words), scurrying towards his rabbit hole.

"Oh dear! Oh dear! I shall be too late," worries the rabbit. Hearing the creature speak, Alice, who had 'begun to think that very few things indeed were really impossible', gets to her feet and boldly follows him down into Wonderland. Join us there and have fun!

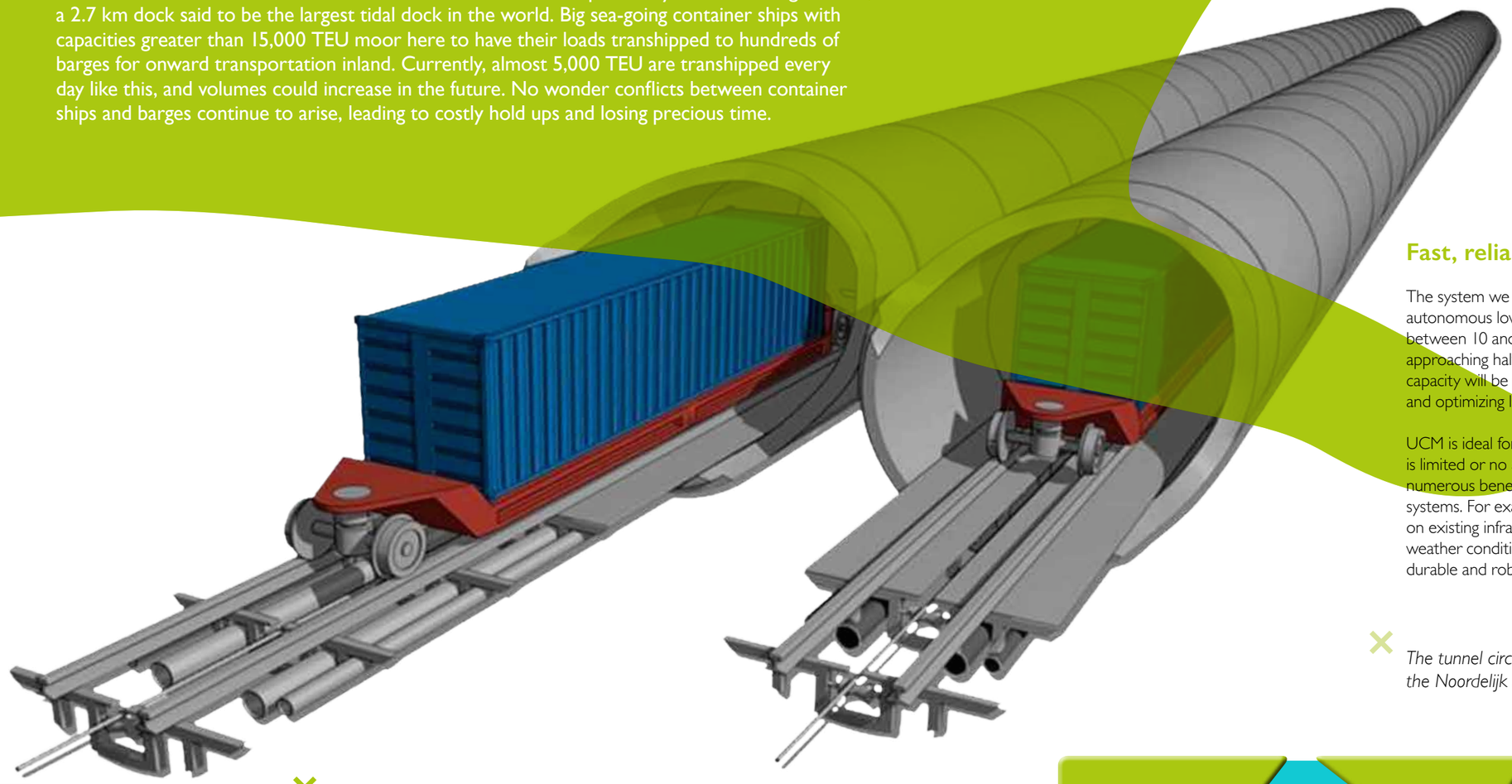
Johan Van Wassenhove / CEO Denys Group

Removing frustration



The need for speed is one of the major frustrations of ambitious people. Things must move forward and move fast. Anything that gets in the way is a source of irritation and must be removed!

We learned about this kind of frustration at the Port of Antwerp recently. Picture Deurganckdok, a 2.7 km dock said to be the largest tidal dock in the world. Big sea-going container ships with capacities greater than 15,000 TEU moor here to have their loads transhipped to hundreds of barges for onward transportation inland. Currently, almost 5,000 TEU are transhipped every day like this, and volumes could increase in the future. No wonder conflicts between container ships and barges continue to arise, leading to costly hold ups and losing precious time.



A series of autonomous low-bed wagons would move at speeds of between 10 and 20 km/h to transport more than 400,000 containers each year.

Going underground

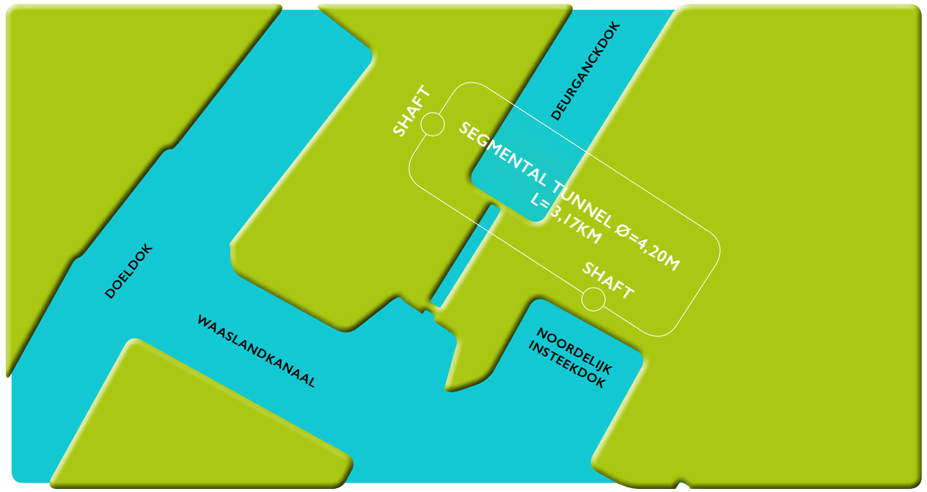
To get around this, Denys have developed an innovative solution called the Underground Container Mover (UCM). It involves digging a 3.17 km tunnel circuit connecting Deurganckdok with the Noordelijk Insteekdok to have barges be loaded there. Containers unloaded at Deurganckdok would be lowered down a 40 m shaft, transported along the 4.2 m inner diameter tunnel on intelligent low-bed rail wagons, before being lifted to the surface at the barge quay.

Why so deep? First, the tunnel needs to be well below the Deurganckdok lock, because it must not induce even the slightest displacement in its foundations. Second, our study showed that boring a tunnel is most cost-efficient if it takes place entirely within the deep clay layer, which starts at a depth of 22 metres. In this case, we opted for segment tunnelling to allow taking sharp turns.

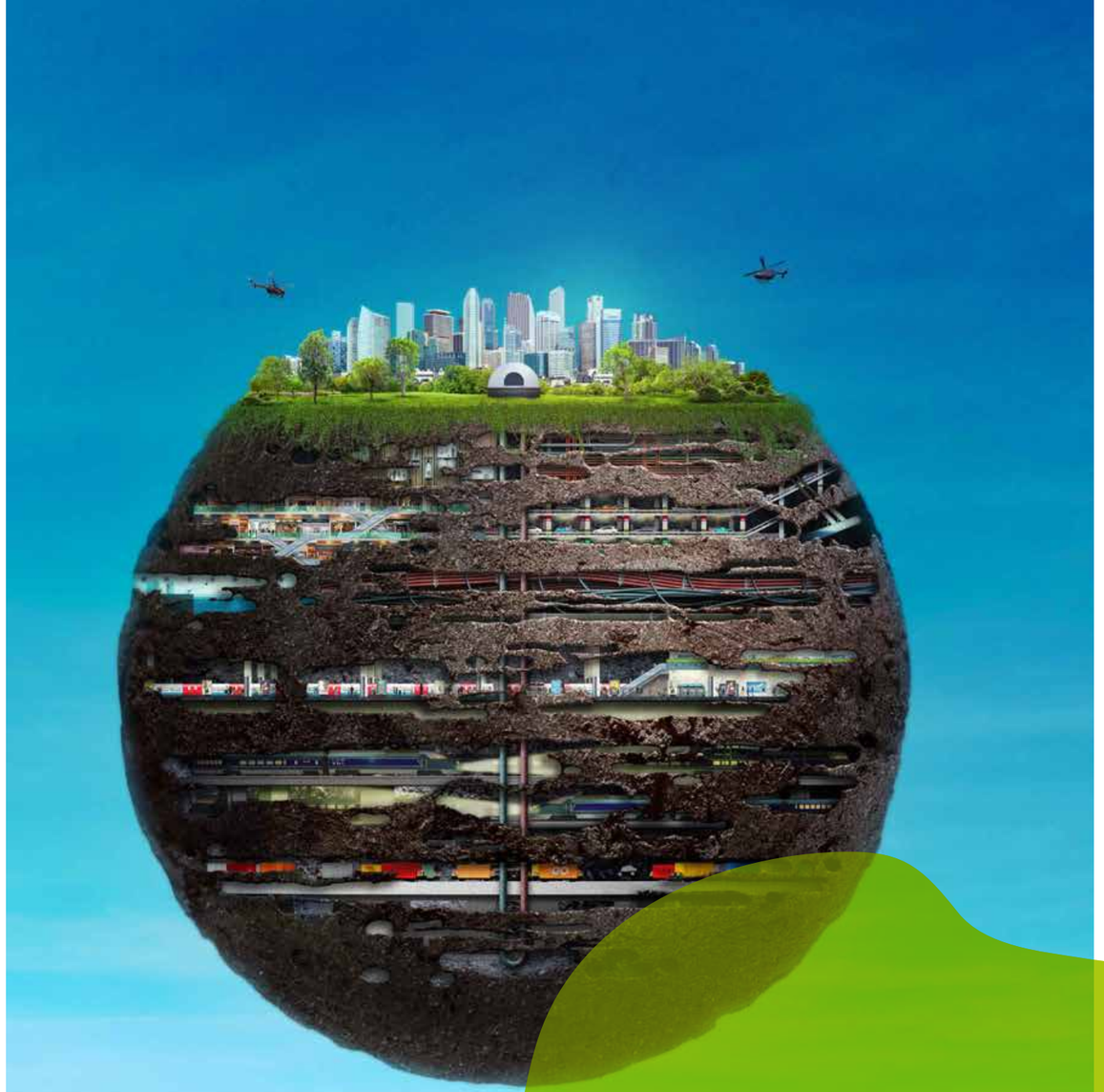
Fast, reliable and robust

The system we put forward involves installing ten autonomous low-bed wagons moving at speeds between 10 and 20 km/h, giving a capacity of approaching half a million TEU per year. Further capacity will be possible by installing additional shafts and optimizing loading and unloading systems.

UCM is ideal for use in any situation where there is limited or no aboveground space, offering numerous benefits compared to other transport systems. For example, the system does not depend on existing infrastructure, is unaffected by adverse weather conditions, operates reliably 24/7 and is durable and robust. A real winner.



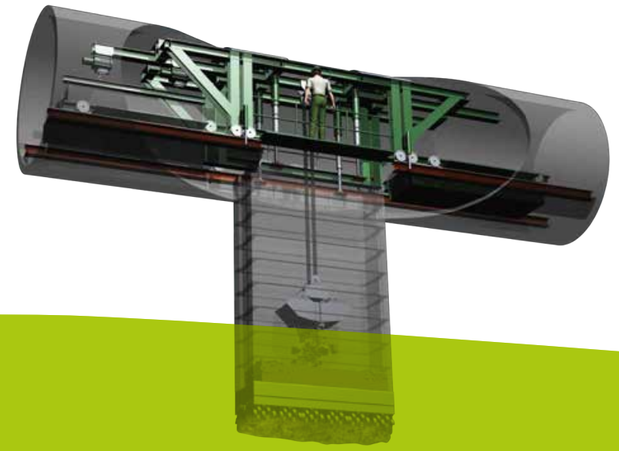
The tunnel circuit connects Deurganckdok with the Noordelijk Insteekdok where barges are loaded.



The greater part of our magic is beneath the surface

The revolution is underground

Denys is further developing its revolutionary WallslotRobot, which is essentially an automated underground trench excavation system which causes limited or no aboveground disruption. Working from within a tunnel or other underground situations, WallslotRobot drives reinforced casings into the earth while an excavator attached to the lower casing digs up the soil. This technique is up to five times faster compared to traditional methods, does not require a human presence in the shaft, and a chieves excellent waterproofing and a perfect finish.



Even below groundwater level

We're now entering a new project phase to make the WallslotRobot system capable of excavating below groundwater level. This will make this remarkable machinery ready for any challenges to come, particularly in difficult dense urban terrain, creating underground parking lots, subway stations, and other below-ground facilities and services.

45 months for the country's largest prison

Five years after announcing we'd won our bid for the major prison project in Brussels-Haren, we finally started constructing this huge complex for 1190 inmates. The long delay shouldn't be a surprise to anyone familiar with DBFM projects, especially since this is by far the largest project of its type we have taken on so far.
It represents a €315 million investment. The challenges are immense, not least in planning. We need to complete the entire project in 45 months, and that includes the 9 month preparation period from August 2018 to April 2019. Penalties for delays are pretty severe.

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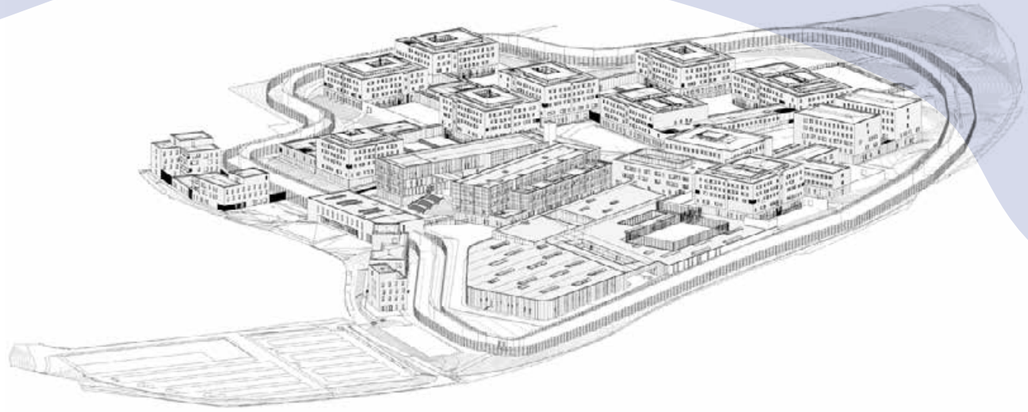

A contemporary architectural concept

It's a unique project in many ways. For one thing, it will be the first prison in Belgium to embrace a contemporary architectural concept, rejecting the star-shaped model that has dominated penitentiary architecture since the mid-19th century. The Haren prison design evokes more a charming village than a block of prison cells. While still deprived of their freedom, prisoners will have opportunities to learn a craft, work in teams or take part in sports.
The idea behind this is to socialize convicts by fostering group awareness and promoting a sense of responsibility, not just towards fellow prisoners but also the entire community.

Reducing planning risks

The prison-village will include no fewer than 11 buildings with a 125,000 m² total surface. In the last quarter of 2018, we have removed 60,000 m³ of historic waste. In January 2019, we began drilling the first of 4000 screw piles, to be followed in March by sewerage work. Structural work began in April. The design of the complete project will have taken 18 months in total when it will be finalized by the end of 2019. For organizational reasons, and to reduce planning risks, we subdivided the construction site into three independent zones. No fewer than fifteen tower cranes will be used during the project. Of course, anti-collision systems will be deployed for safety reasons.

The design of Haren prison evokes more a charming village than a block of prison cells.

Neighbours are kept informed through a newsletter, a website, and regular meetings.

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Active stakeholder management

Taken as a whole, the organization of the project is on a much larger scale than most projects we do. We are putting together a large project organization with three construction management teams, a design management team, and purchase, quality, financial and legal departments. We expect that at peak activity around 60 engineers and support staff will be on site to keep the project going.

Active stakeholder management has been implemented in this project. This includes keeping the local community and companies informed through a regular newsletter and a dedicated website (www.gevangenisharenprison.be). In addition, we try to minimize the construction site's impact on the normal life of people living or working nearby. For example, we continuously monitor noise disturbance and have defined specific access routes to our site for our subcontractors to use mandatorily.

Making it vandal-proof

Other challenges? Well, a prison is not your usual building. In this context every architectural detail must be designed and built to be vandal-proof. A high-tech safety system will be implemented to guarantee safety for everyone in the prison, including staff, legal advisors and visitors. Of course, we need to comply with all written performance requirements. But importantly, because of our experience with the forensic psychiatric centres in Ghent and Antwerp, we are also familiar with the unwritten needs of the sector. So, we avoid losing precious time discussing this kind of expectation.

Optimizing for the entire lifecycle

And then there's the operations and maintenance part of the project. Denys Support will be in charge of O&M services during 25 years after completion, which means we will be working there until 2047. It is in our best interest that we optimize the project for a minimal lifecycle cost and good maintainability. Since we have been partners in the DBFM project from the start, we are in an excellent position to do so. Simply smart.

Every architectural detail must be designed and built to be vandal-proof.

Comprehensive service

Haren prison is in some ways a dream project for Denys Support, our maintenance service, adding significant turnover to the already impressive portfolio of fourteen schools, four sports centres, a forensic psychiatric centre, and a tramway line, among others. Denys Support's body of work is comprehensive. At Haren, for example, we will take care of cleaning, waste treatment, and catering and laundry services in addition to the building maintenance. In general, we're quite unique in the construction business, offering maintenance of the building itself as well as its HVAC, lighting, and sanitary installations as well as other technical services.

ONE STOP PARTNER IN FULL MAINTENANCE

A positive problem-solving attitude

Scan the QR code to enjoy the project video.

We're finally in the construction stage at Hinkley Point C nuclear power plant. In October 2018, we began laying the secondary water circuit of Unit 1 and before the end of this year we will start work on Unit 2. The works are now in full swing and completion of Unit 1 will be achieved within the coming months. A flexible and hands-on attitude was required to overcome the many hurdles that are typical for works of this size and magnitude. Team Denys consisting of 40 staff members and 150 workers have been praised throughout for its active and positive problem solving capability, an absolute must in an ever changing construction environment with many organisational and physical interfaces with other contractors. We are now looking forward to start and complete Unit 2 installation works with the same vigour and limitless energy so far.

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✕ *Our access to the construction area is piecemeal, leading to unforeseen planning and interfacing complications.*

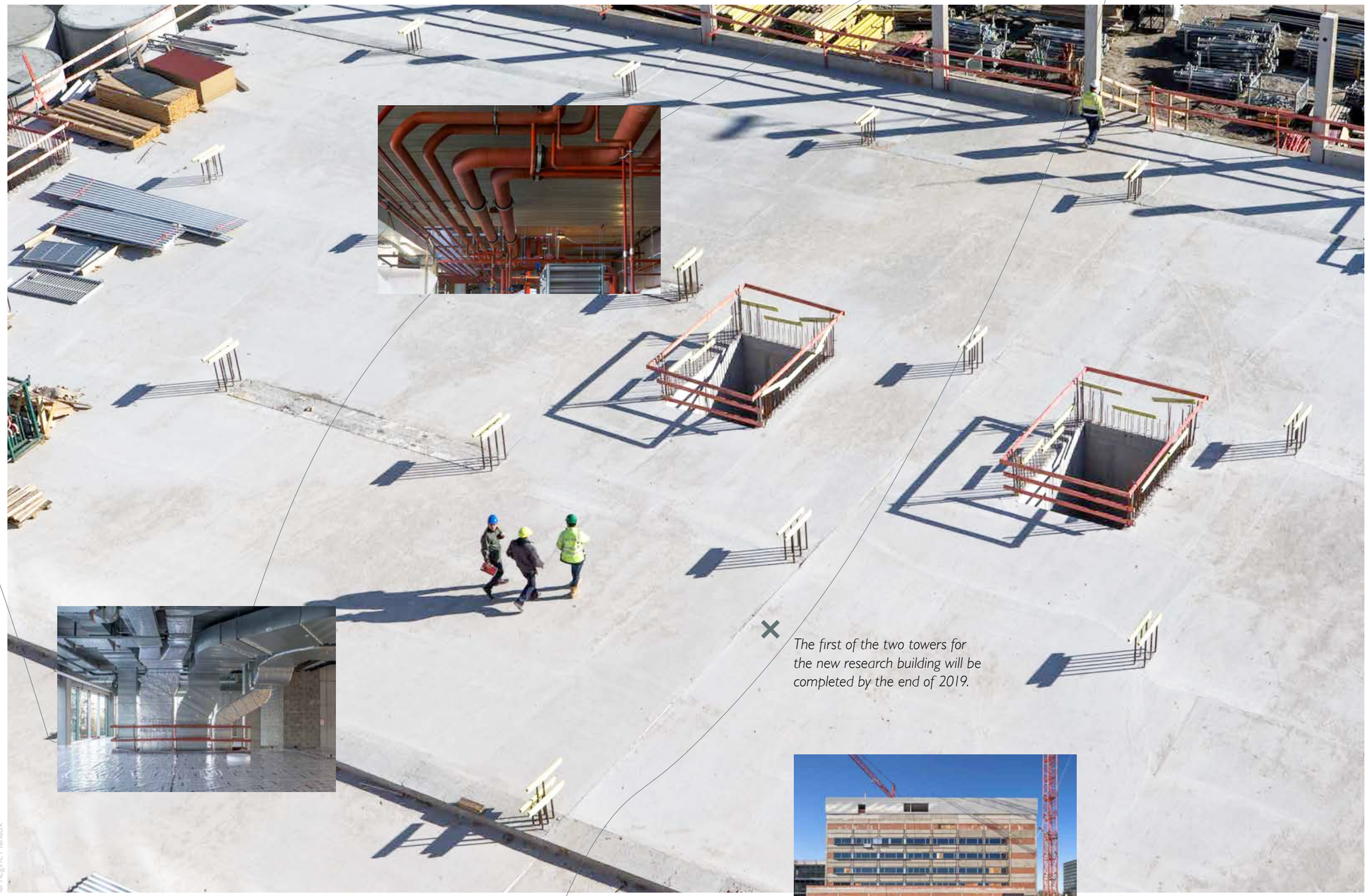
Park and ride

Close to the flyover leading to Ghent's historic centre, in the Ledeberg district, Denys is building a six-storey parking tower for 520 cars for visitors interchanging with public transport and for local residents. We're delivering in a turnkey fashion, taking care of everything, including foundations, drainage, the underground entry, and roads. The project has some surprisingly challenging aspects, especially the heavily reinforced fair-faced concrete elements with rather specific architectural joint arrangements. We had to cast these elements in situ using a lot of manual formwork.

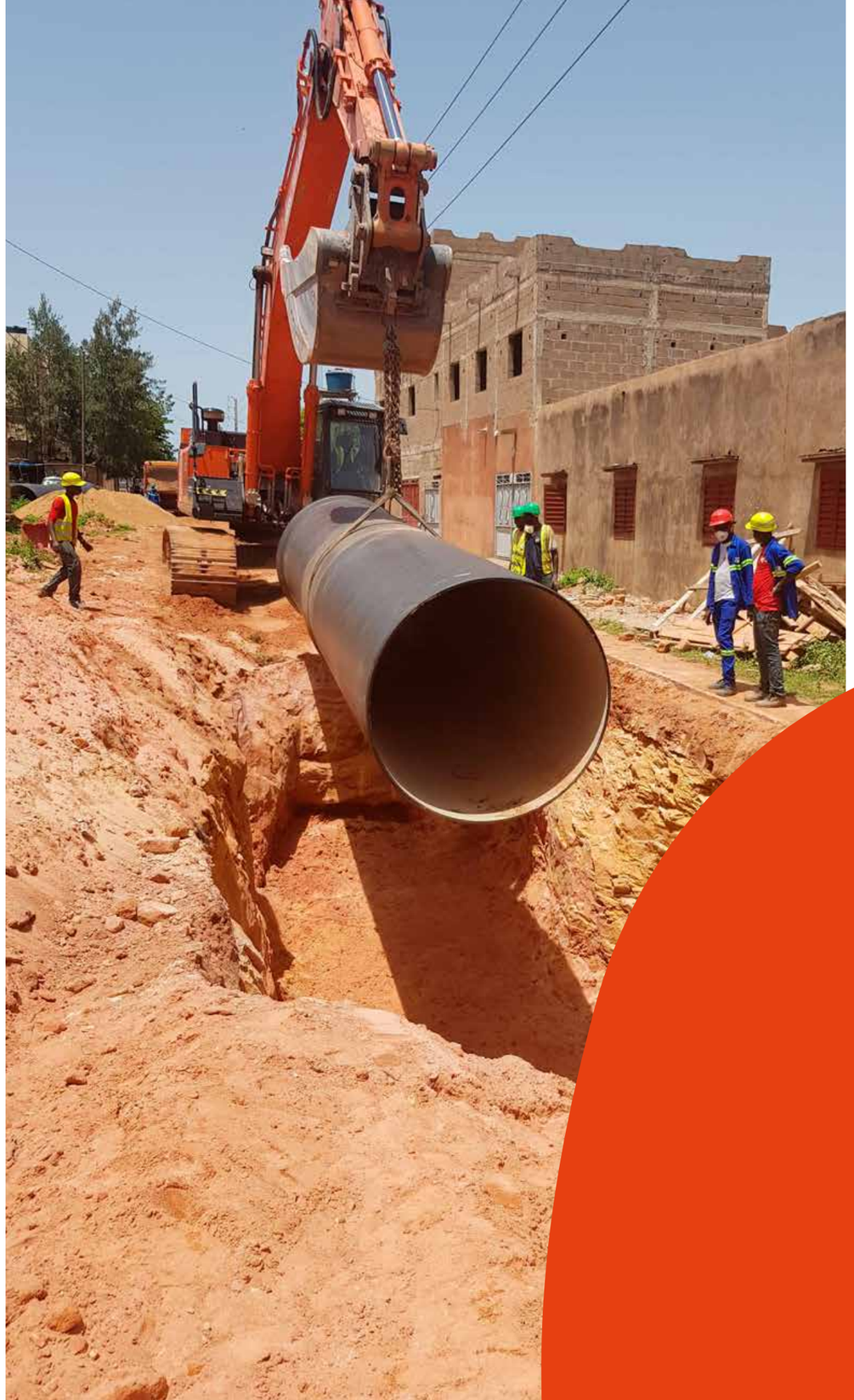
The Ledeberg parking tower will allow people to easily switch to public transport to enter the city of Ghent.

Two towers

In the south of Ghent, Denys is building a new research building in collaboration with Ghent University and the Flemish Institute for Biotechnology. It's an 11,550 m^2 project consisting of two five-storey towers connected by a spacious ground floor with underground parking. The first tower will be completed by the end of 2019.



The first of the two towers for the new research building will be completed by the end of 2019.



The rigorous way

Well done, Mali! The government of this Sahel country has been making its drinking water supply a top priority since 2010. A cornerstone of this strategy is the master plan for the city of Bamako on the Niger River, where the population of now well over 2 million continues to grow at a fast pace. The master plan, with a 2040 horizon, includes the steady development of water treatment plants, storage infrastructure and a vast supply network of transmission and distribution pipelines, including a social house connection program. The plan is being rigorously followed by the Société Malienne de Patrimoine de l'Eau Potable (SOMAPEP).

5 km per week

Denys has been contracted for a 215 km primary and secondary distribution network on the Niger right bank. The project involves supplying and installing PVC and ductile iron pipes ranging from 110 mm to 900 mm. The job involves many challenges, including minimizing the social and environmental impact, dealing with the urban environment and its dense traffic, the presence of informal housing, and difficulties with the hazardous underground. We're now progressing at a brisk 5 km per week and expect to complete by the end of 2019.

It's about being smart

Once again, success is all about being smart. Take logistics. No fewer than 700 containers of pipes and fittings need to be brought to Bamako. Established practice would be to unload ships in Dakar. But we figured out that this heavily used Senegalese port would be a bottleneck, so we're now docking at Nouakchott in Mauritania, 300 km to the north. We're transporting the containers to Bamako by escorted road convoys to optimize the transit time schedule. Delivery is under control.

A water supply success story

A similar success story is unfolding in the north of Ghana, where rapid population growth has encouraged the authorities to revise its water supply planning. In September 2018, Denys embarked on a major water treatment and distribution project, including the construction of a water intake at the Tono Dam, a treatment plant, pumping stations, a number of elevated water reservoirs, and over 200 km of transport and distribution pipelines. The treatment plant's sod-cutting ceremony took place in the presence of Hon. Cecilia Abena Dapaah, Minister for Sanitation and Water Resources.

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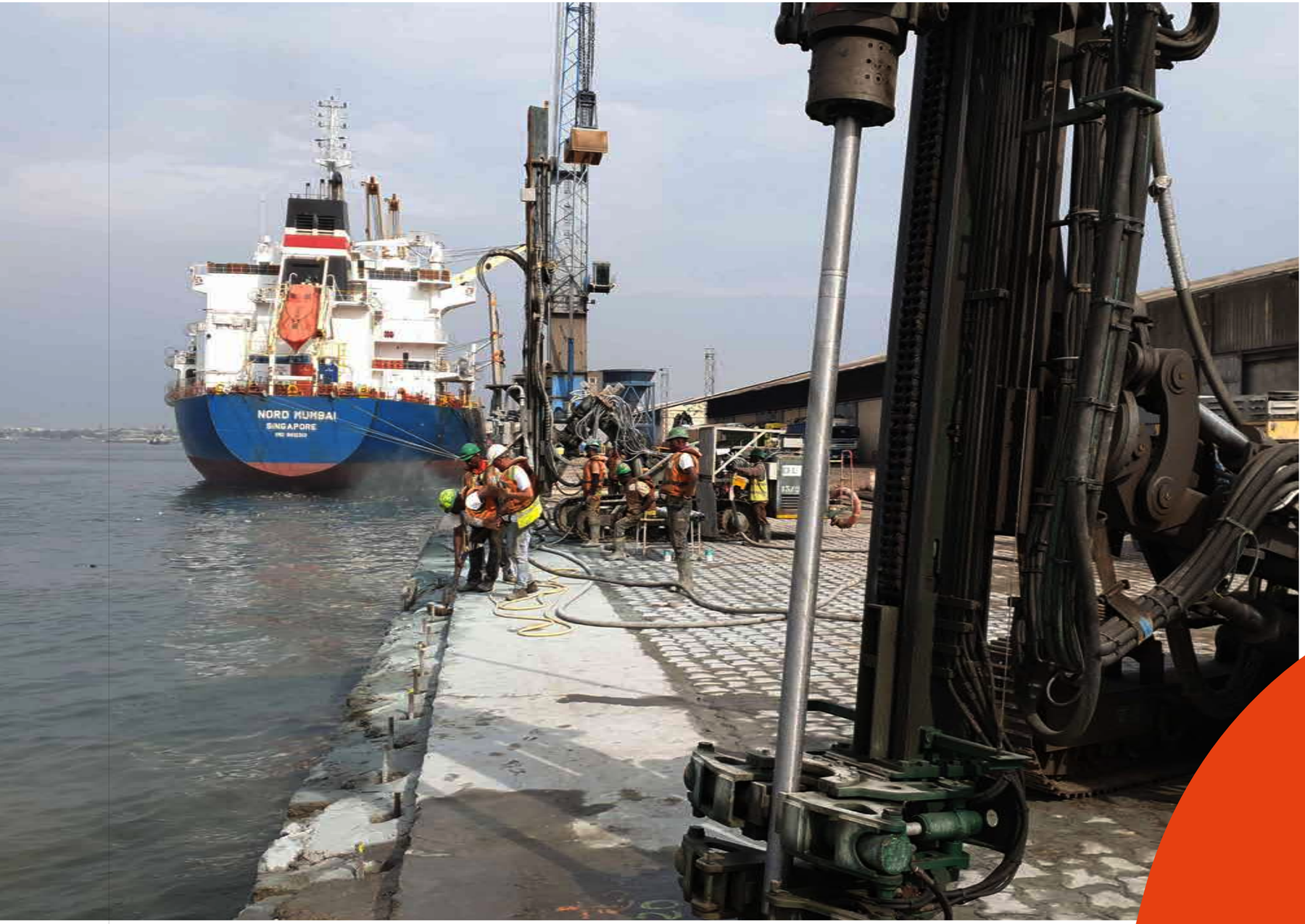


Deepening the quay

Successful projects lead to follow-up projects. That's what happened in Ivory Coast, where a few years ago Denys reinforced and deepened a 350 m quay in the port of Abidjan. We managed to ensure that the port operated continuously during the work, to everyone's delight. As a result, we've now been asked to extend the quay deepening by another 420 m.

AFRICA WATER WORKS

IVORY COAST

Happy to help

In Liberia, Denys has just started a Design and Build project to renew part of the water supply system for the capital city of Monrovia. Erosion and the civil war have rendered an existing section obsolete so we're replacing it with a 4.5 km DN1200 pipeline. The design phase is ongoing, including the development of a Resettlement Action Plan (RAP) to carefully manage any involuntary resettlement of people living in the area. While it is fairly uncommon to have the contractor take care of that, we have quite some experience in this area, so we're happy to help.

Clever survivors

There's been a noticeable upturn in pipeline investment all over Europe and Denys manages to win a significant share of the projects. The secret is that we're clever survivors. Our strategy of diversification always helps us to overcome the slacker years. During these periods, we wisely made the decision to keep our extensive pipeline expertise on board, further develop it, and make sure we have all the necessary tendering qualifications. That always pays off.

Scan the QR code to watch he project video.

A promising year

As a result, 2019 is a promising year for both our pipeline and microtunnelling activities. In January, we started work on a microtunnel to take HV cables under a railway line near Geneva Airport in Switzerland, and we'll be starting on another tunnel at the airport this summer.

In Germany, we're involved in the GASCADE Eugal project to bring Russian gas to Europe, constructing a dual 65 km DN1400 pipeline section and four DN2500 microtunnels east of Berlin. Also in Germany, we have started work to install a 61,3 km DN1000 pipeline for Open Grid Europe near the Belgian and Dutch borders, work that is part of the Zeelink project feeding gas to the Benelux. And in Poland, we're laying a 55 km DN1000 pipeline for the local gas transmission operator GAZ-SYSTEM. This project includes quite a number of river and rail crossings, and we'll be using the innovative and fast Direct Pipe technique.

2019 is a promising year for both our pipeline and microtunnelling activities.

Scan the QR code to watch he project video.

Up the hill it goes

An unusual challenge awaited us in Luxembourg, where we are putting the final touches to a 14.8 km DN1000 water pipeline which starts at the Esch-sur-Sûre dam. The challenge for us was the 500 m pipeline that will feed water from the Upper Sûre Lake to the pumping station in the valley some 120 metres below, and includes a 30° inclined section 300 metres long. We began by tackling this steeply-sloping section from below, welding the pipes on a temporary surface alongside the river and hoisting the whole into position using an impressive telescopic 300 tonne mobile crane. The last 150 metres of pipework were put in place using a winch set up at the top of the slope.

The project also involved the installation of no less than 300 km of communication and power cable ductwork alongside the pipeline. At its peak, 80 of our people worked at the site.

Scan the QR code to watch he project video.

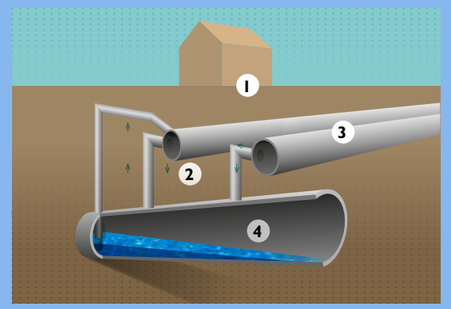
Working 24/7

A comprehensive project known as Aquaduct is under way to improve the interconnection between the major Flemish drinking water networks, aimed at assuring supply and price stability. As part of the project, Denys is constructing an 11.8 km DN1000 water pipeline from Tisselt to Buggenhout.
It involves both HDD and microtunnelling and demands 24/7 working at times to make clutch connections to existing pipes.

A tunnel to store excess rainwater

© Régine Mahaux

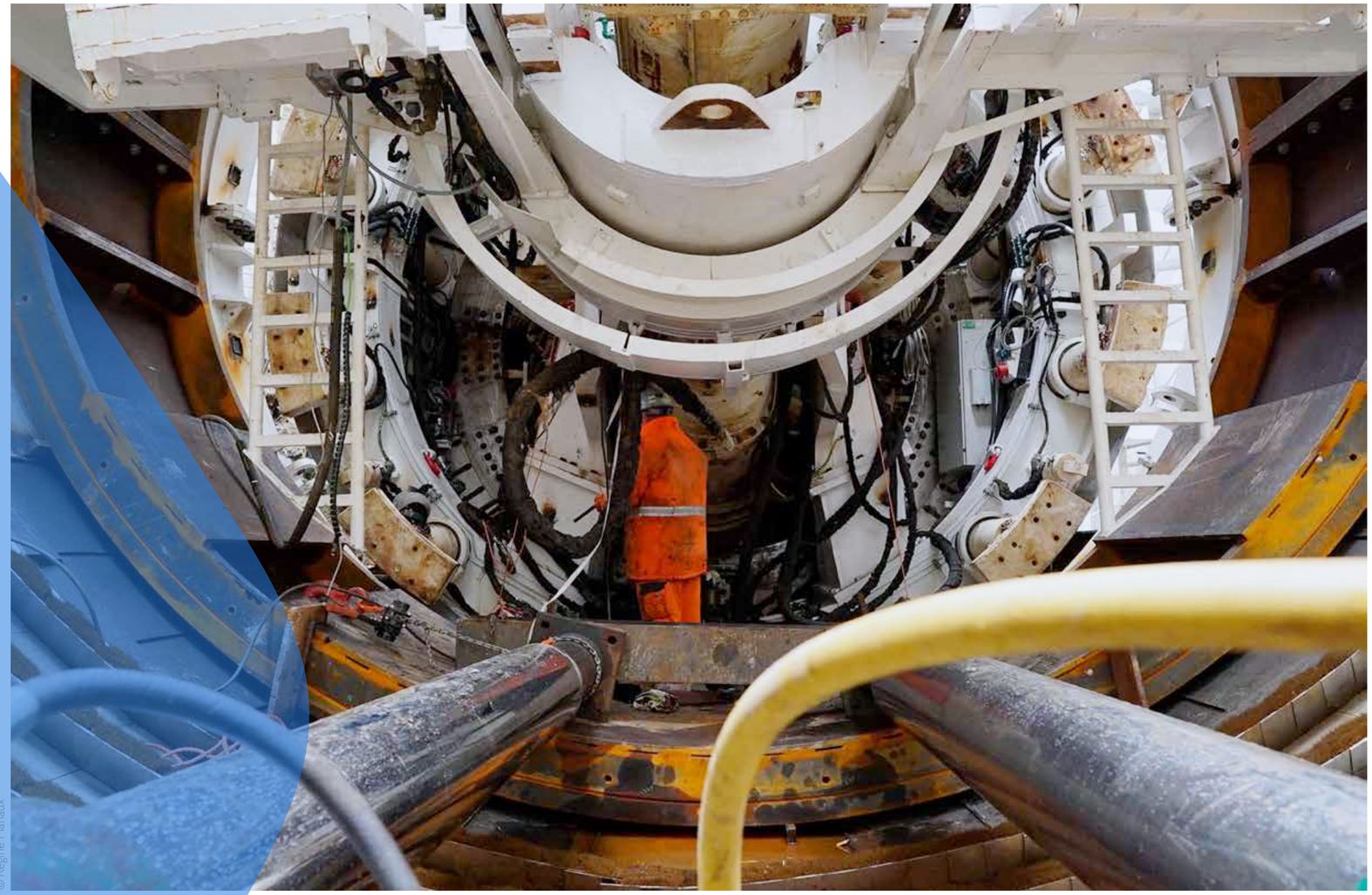
In March 2019, Petra was revealed to the public. It's the name Denys has given to the TBM we're using to dig the new Vivaqua rainwater basin tunnel in Woluwe in the Brussels Capital Region. The 377 metre segment tunnel with a 5.2 metre inner diameter will allow excess rainwater to be temporarily stored to avoid flooding. Rainwater tunnels are an excellent alternative to traditional cylinder basins, especially in densely built-up areas where it's essential to limit aboveground disruption and still achieve a large storage capacity. The Woluwe tunnel will store up to 8,000 m³ of rainwater.



1 - Sewer pipe draining water under normal conditions
2 - Sewer overflow activited in the event of heavy rainfall
3 - 8000 m³ stormwater detention
4 - Reinjection pump activated after the storm

Joining the large-segment tunnelling league

The Vivaqua tunnel is being constructed entirely from the launch pit, which means that after completing excavation the TBM will return to the entry point, leaving its outer shield behind. And while this may look like a fairly modest project, it means a lot to Denys because it's the largest diameter segment tunnel we have created so far. It is yet another story of ambition. We're now squarely in the large tunnelling business, and we're determined to win even more projects in the big league in the future.



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Denys is determined to win more large-segment tunnelling projects in the future.

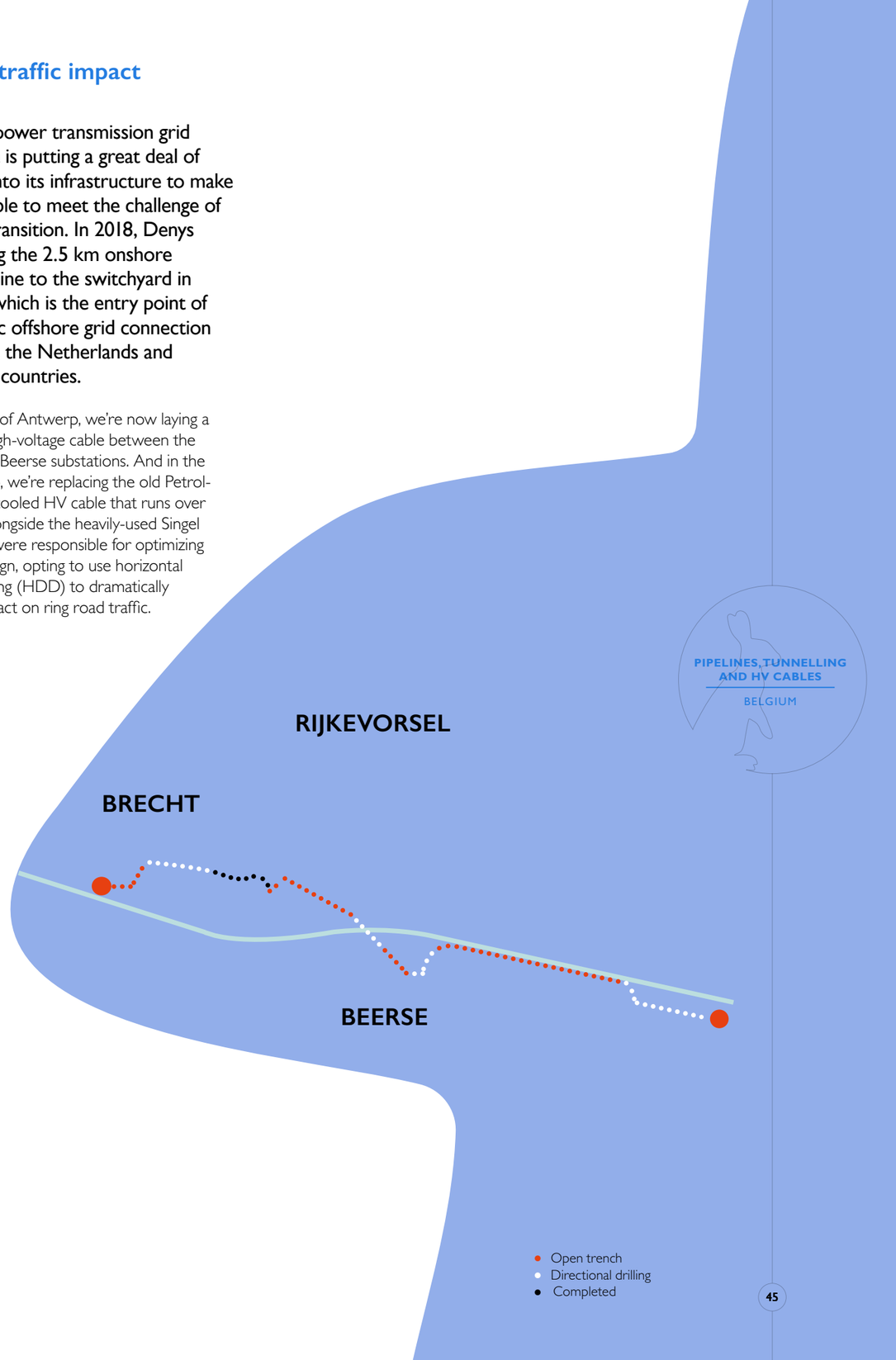
A matter of survival

In Cuesmes near Mons, Belgium, Denys renovated a drainage installation, which involved constructing a 200 m water pipeline. Known as La Scierie, the station is designed to continuously lower the groundwater level by pumping water through drains in an old mine shaft in the chalk massif at a depth of 40 metres. This 24 hour operation is necessary because the municipality has sunk 13 metres through decades of mining activity in the region during the last century, making groundwater drainage a matter of survival for the people of Cuesmes.

Reducing traffic impact

The Belgian power transmission grid operator Elia is putting a great deal of investment into its infrastructure to make it more flexible to meet the challenge of the energy transition. In 2018, Denys finished laying the 2.5 km onshore high-voltage line to the switchyard in Zeebrugge, which is the entry point of Elia's strategic offshore grid connection with the UK, the Netherlands and Scandinavian countries.

In the province of Antwerp, we're now laying a 9 km double high-voltage cable between the Rijkevorsel and Beerse substations. And in the city of Antwerp, we're replacing the old Petrol-Zurenborg oil-cooled HV cable that runs over 6 kilometres alongside the heavily-used Singel ring road. We were responsible for optimizing the project design, opting to use horizontal directional drilling (HDD) to dramatically reduce the impact on ring road traffic.



No problem, we can manage

We're also carrying out several pipeline projects for the Belgian gas pipeline operator Fluxys, more precisely a pipeline between Kraainem and Haren in the Brussels-Capital Region and a pipeline on Antwerp's left bank as part of the major Oosterweel infrastructure project.

In Mol, we're constructing a 33 km polyethylene water and fire protection circuit at the SCK-VITO nuclear research site, a project involving a number of organizational challenges, given the site's safety-sensitive status and the fact that it must remain fully operational at all times.

And then there's the 33 km DN600 oxygen pipeline between Temse and Zelzate we're completing for Air Liquide. We had to adjust planning so that archaeological remains discovered on the site could be secured. No problem, we managed.

Scan the QR code to discover the aerial overview of the project.

PIPELINES, TUNNELLING AND HV CABLES

BELGIUM

Shutting down the gas field

Energy supply in the Netherlands has been largely based on natural gas for the past sixty years. Since its discovery in 1959, the Groningen gas field has been the largest natural gas field in Europe and the tenth-largest in the world. But, as Bob Dylan muses, the times they are a changin'. Gas extraction in the province of Groningen will be entirely shut down by 2030. Not because the field is exhausted, but primarily for safety reasons, due to the increase in induced earthquakes in the region.

Making a virtue of necessity

There's a Dutch proverb that goes van de nood een deugd maken, which translates as making a virtue of necessity. That's what's happening. Dutch authorities are now seizing on the difficult decision to shut down the gas field as an opportunity to accelerate transition towards a carbon-free energy mix. They invented a typical Dutch motto for it: 'Van Gas Los', meaning something like 'cut loose from gas'. It's an ambitious programme, which aims to make every home independent of natural gas by 2030. How? By installing electric heat pumps, producing biogas, and above all building heat networks fed by various waste heat streams.

Transition taking shape

In Enschede, near the German border, we have completed the first phase of Warmtebaan Enschede, a 6 km extension to the town's existing heat network plugged into the Twence waste incineration and biomass production plant. We're now working on the second phase.

By the way, the energy transition is really taking shape in the Low Countries. In Belgium too, the total volume of work related to heat networks and HV cabling has exceeded the volume of gas pipeline work last year. Note for example that we're building a 1.25 km heat network in Dessel with diameters ranging from 32 to 100 mm. The commission includes laying the DN28 steelflex connections into individual properties.

Warmtebaan Enschede is a 6 km extension of the town's existing heat network.

Bringing waste heat to Amsterdam Nieuw-West

One of the immediate results of the Dutch gas policy revolution is a dramatic decrease in gas pipeline projects in favour of the development of heat networks. The good news: Denys has anticipated this evolution by developing solid expertise in heat networks. No wonder Nuon Vattenfall awarded us the contract to build the Amsterdam South Connection, a 4.5 km heat network to bring waste heat from the AEB plant in the Port of Amsterdam to the Nieuw-West residential area.

The tendering process was based on EMVI criteria, which places greater emphasis on aspects such as sustainability, cooperation, innovation, quality management and environment management, and includes a commitment to confer intensively with stakeholders such as schools, offices, and communities. We've just started the construction phase of the project which includes the challenging crossing of the Amstel River.

Mind the precious reserve

Denys is also building three new water pipelines in the Netherlands. It's a real beauty: three 1.4 km 84 inch pipelines feeding water from the Maas River at Dordrecht to three natural water basins in the nearby Biesbosch nature reserve. These basins are nicknamed the Water Lungs of Holland, because much of the country's drinking water supply is taken from them.

Three parallel 2.100 mm diameter pipes will be laid into the river bed using the off-bottom tow method.

Whenever the level of the Maas is high and water quality is acceptable, water will be pumped to fill the Biesbosch basins.

Biesbosch nature reserve is one of the most pristine areas in the Netherlands, a wetland where large groups of birds find cover, food and nesting facilities, and the home of animals such as horses, beavers, foxes, roe deer, and hares. As a construction company we're dealing with a lot of constraints here, which can be summarized as 'stay away from the precious reserve'. The pipes therefore have to be laid into the available river beds using the off-bottom tow method. What's more, we're hiring some of the Zilvermeeuw tourist boats to transport personnel to the construction island. For sure it's a nice change from the usual work.

Dual expertise = smoother project

The story of Denys France is becoming one of beauty, ambition and success. In 2018, we completed five pipeline projects. Six other projects were launched and are ongoing. The overwhelming reason for our skyrocketing business in this area is our dual expertise in pipeline fitting and microtunnelling. It's a winning combination that leads to better-optimized planning, and a smoother-running project down the road. This is amply illustrated in two current projects for GRTgaz and one for Géosel.

Projects completed (2018)
1 - TEREGA-Lussagnet-Guyenne
2 - Trapil-Beaucaire
3 - TEREGA-IBOS
4 - GRTgaz-Val de Saône
5 - TEREGA-Gascogne Midi

Ongoing projects (2019)
1 - TRAPIL-Balan
2 - TEREGA-Lac Lussagnet
3 - GEOSEL-Berre
4 - Communauté d'Agglomération Grand Paris Sud Seine Essone Sénart-Ris Orangis
5 - GRT-Roissy Express

Planned project (2020)
1 - GRT-Tancarville

In France, Denys completed five pipeline projects and launched six new ones.

For Géosel, the French company in charge of storing and transporting strategic petrol reserves, Denys is laying several sections of steel and HDPE pipelines for hydrocarbons and brine at the Berravia site in the south of France, near Marseille. A particular challenge here is the construction of two curved microtunnels beneath the Arles-Marseille rail track.

About 200 kilometres to the north, we constructed a microtunnel beneath the Rhône River at Balan, upstream from Lyon, despite the tough geology. Coarse gravel meant that we had to carefully monitor boring parameters and manage slurry evacuation. We also did something we rarely do: instead of ending tunnelling in the customary reception shaft we had the tunnel-boring machine dig its way right to the surface, where it proudly showed off its sharp teeth. Peekaboo!

The tunnel-boring machine dug its way right to the surface, showing off its sharp teeth.

Crossing river and rail tracks

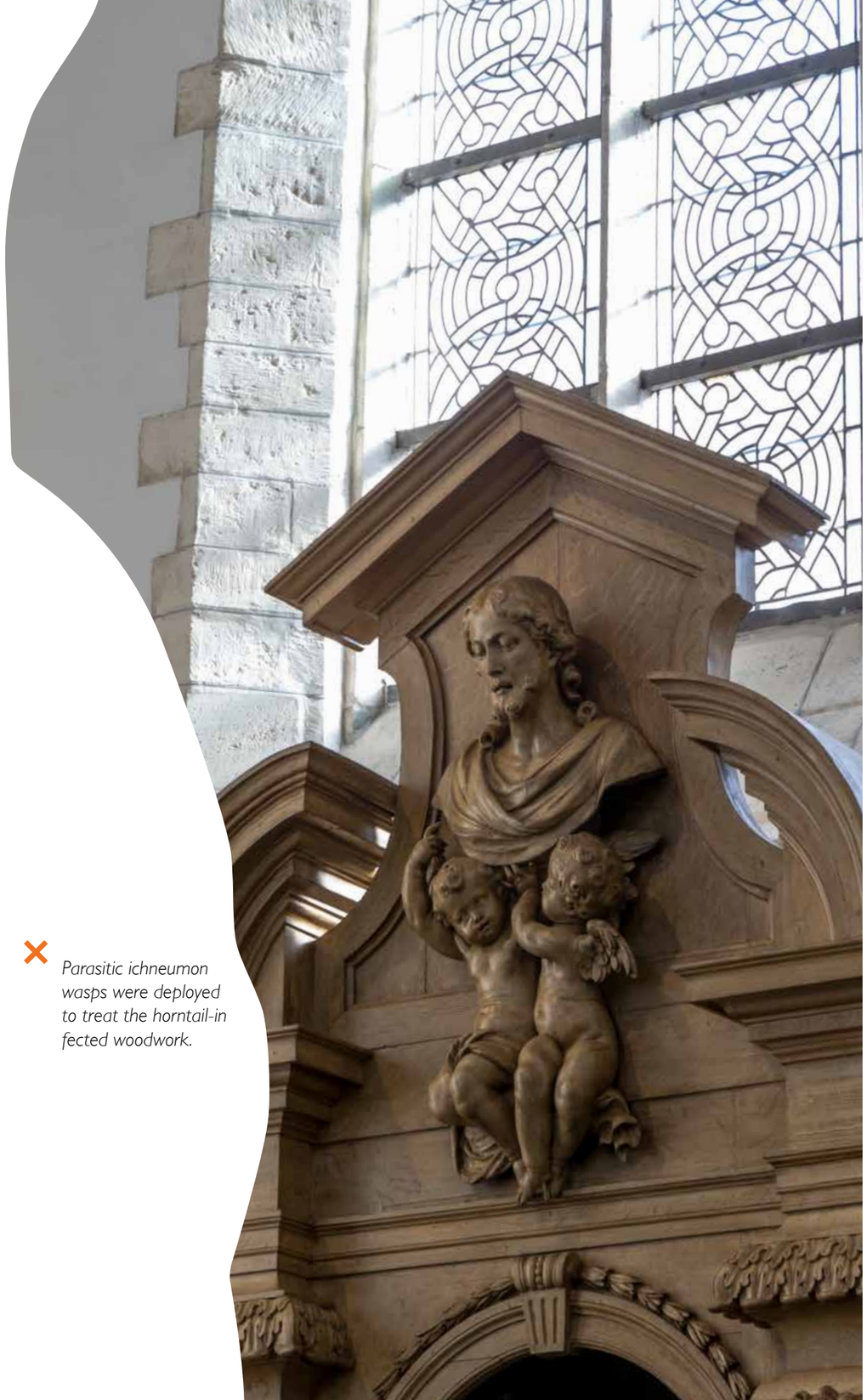
At Tancarville, on the Seine a dozen kilometres upstream from Le Havre, we're constructing a 632 metre DN1600 microtunnel under the river. We'll then be fitting the tunnel with two DN400 gas pipes, replacing existing pipes at a lower depth due to be taken out of service. This will allow deeper dredging and improve vessel access to the Port of Rouen further upstream.

The second project is at Mitry-Mory, near Charles De Gaulle Airport northeast of Paris. As a result of the new express rail line between Paris Gare de l'Est and the airport, several sections of gas main need to be diverted and laid beneath the future rail track. This involves the construction of two curved microtunnels, one of 114 metres DN1200 and another of 191 metres DN1400.

Special treat

Restoring a church interior is always a special treat for craftspersons who love what they do. We've just completed such a job in Saint Catherine's Church in Mechelen. Known as the poor people's church, this 14th century gothic edifice isn't about splendour, though it does have nicely polychromed timber-vaulted ceilings, richly sculpted confessional boxes, a remarkable pulpit and a number of large paintings, among which is De Aanbidding der Wijzen by Maurus Moreels, a pupil of Rubens.

All this has been taken care of with the utmost precision. One rather obvious thing was putting ramps on the floor to avoid punching through the tombstones below. But it also involved some special techniques. For example, part of the horn-tail-infected woodwork was treated using parasitic ichneumon wasps. This was more efficient than the customary gassing procedure, which would require a 10 m perimeter impacting other operations. Every detail counts.



Parasitic ichneumon wasps were deployed to treat the horntail-in fected woodwork.

A hell of a lot of fun

The redevelopment of the Handelsbeurs site in Antwerp is reaching completion. What is there to say at this stage? There's always something happening at a renovation site of this size, with seemingly innocuous last-minute changes, such as the decision to move a door opening a metre to the left, making a significant impact on activity planning. Fast thinking and swift decision-making was required to keep things moving forward.

Nevertheless, a job like this is a hell of a lot of fun, even if it weren't for the exquisite materials we're using. For example, the Vinalmont tiles we set in the main building's archway, a beautiful black stone from the same geological period as blue stone, but without the traces of fossilized crinoids.

Beautiful Vinalmont tiles were set in the main building's archway.

The hotel entrance was re-sited to the former Hotel du Bois.

© Régine Mahaux

Experience the incredible Handelsbeurs project. Scan the QR code for the video.

Improved spatial organization

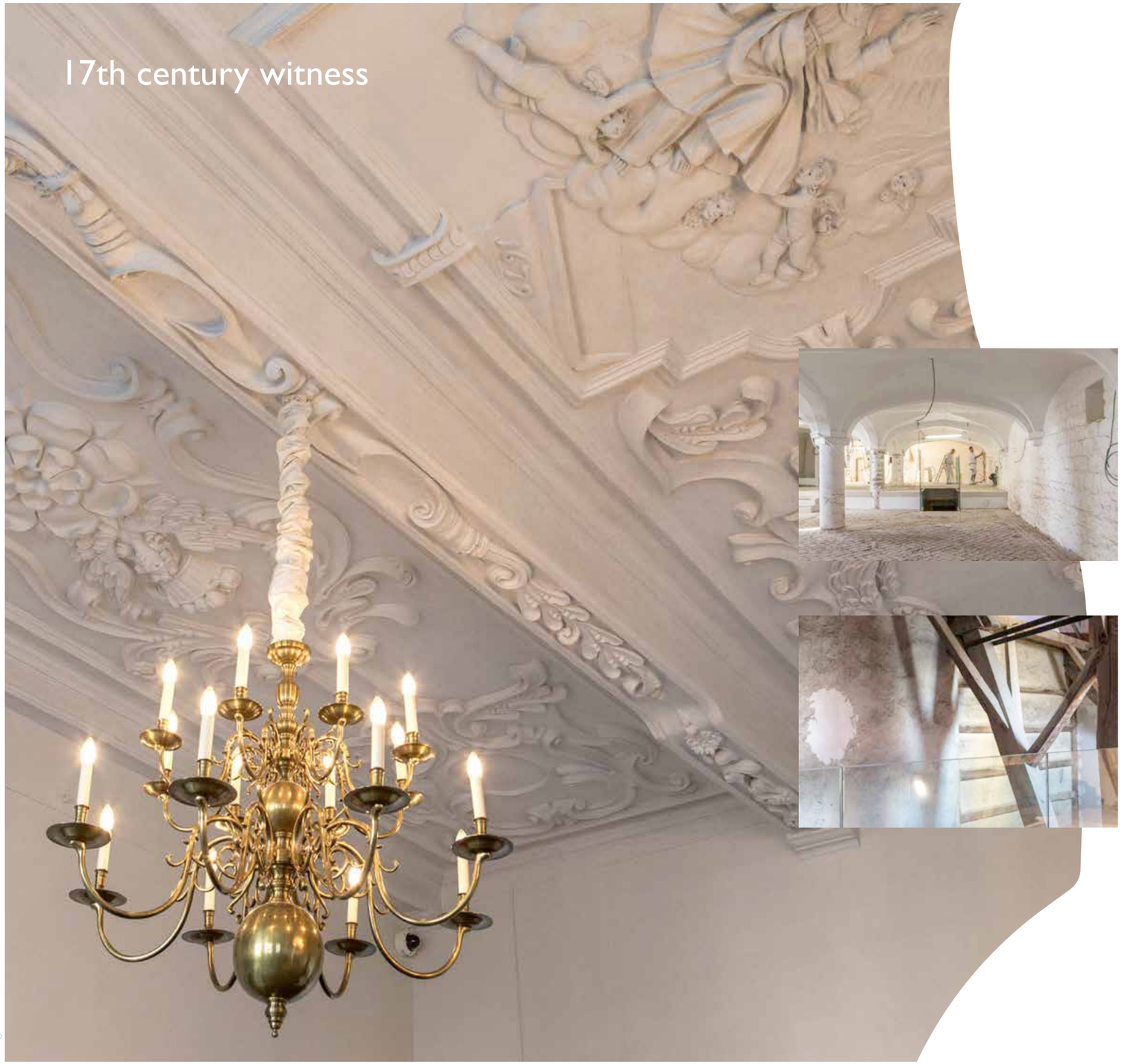
The events hall will open doors in October 2019 and the adjacent restaurant and 138-room five-star hotel will follow in December. The plans for the hotel were changed in one important respect last year: the entrance was re-sited to the former Hotel du Bois, which is the oldest building on the site and an icon for older Antwerp residents. While the change had a profound impact on operations, it does significantly improve the site's spatial organization and makes for a more visible separation of old and new architecture.

Multidisciplinary glory

The project's main power to attract is its multi-disciplinary nature, a veritable feast for a company like Denys. It has been such a glorious combination of construction, renovation and restoration work, and an incredible opportunity to deploy our great engineering skills, use advanced foundation techniques and put in place specialized monitoring tools. If another project of this type and size comes along, we would love to be a part of it.

The Handelsbeurs project was a veritable feast for a multidisciplinary company like Denys.

17th century witness



© Régine Mahaux

The Tiendenschuur was formerly the abbey's fiscal granary.

Denys is carrying out four distinct restoration projects in Park Abbey in Leuven, a Premonstratensian abbey since 1129. Although only a few fathers live and work at the site today, the abbey looks very much the same as it did in the 17th century. The monastery and its surrounding buildings are practically intact. Since 2012, the site has been undergoing a transformation into an impressive multifunctional site hosting exhibition, cultural festivals, sporting events and other leisure activities. Many buildings have already been restored and a comprehensive restoration campaign with a 2025 horizon will make the effort complete.

Exposing historic vaults

This year, Denys is completing the south wing restoration, including the beautifully-sculpted west facade and the magnificently decorated ceiling. We're using our robot for some of the facade elements, but it also involves a lot of manual work. As for the ceiling, we've sacrificed a small part of it to expose some of the original 15th century trough vaults which lie behind. Restoration involves making tough choices sometimes.

Authentic architecture, new activity

Opposite the south wing we're also transforming the Provisor's house into an office building, while of course preserving the original architecture and detailing. And just across the Neerhof inner court we're restoring the Tiendenschuur, the former granary where farmers had to leave 10 per cent of their yield because of a tax imposition. Here too, the authentic architecture will accommodate new activities, including a cheese dairy.

RESTORATION AND RENOVATION

RED STAR LINE MUSEUM ANTWERP

Mezzanine in the museum

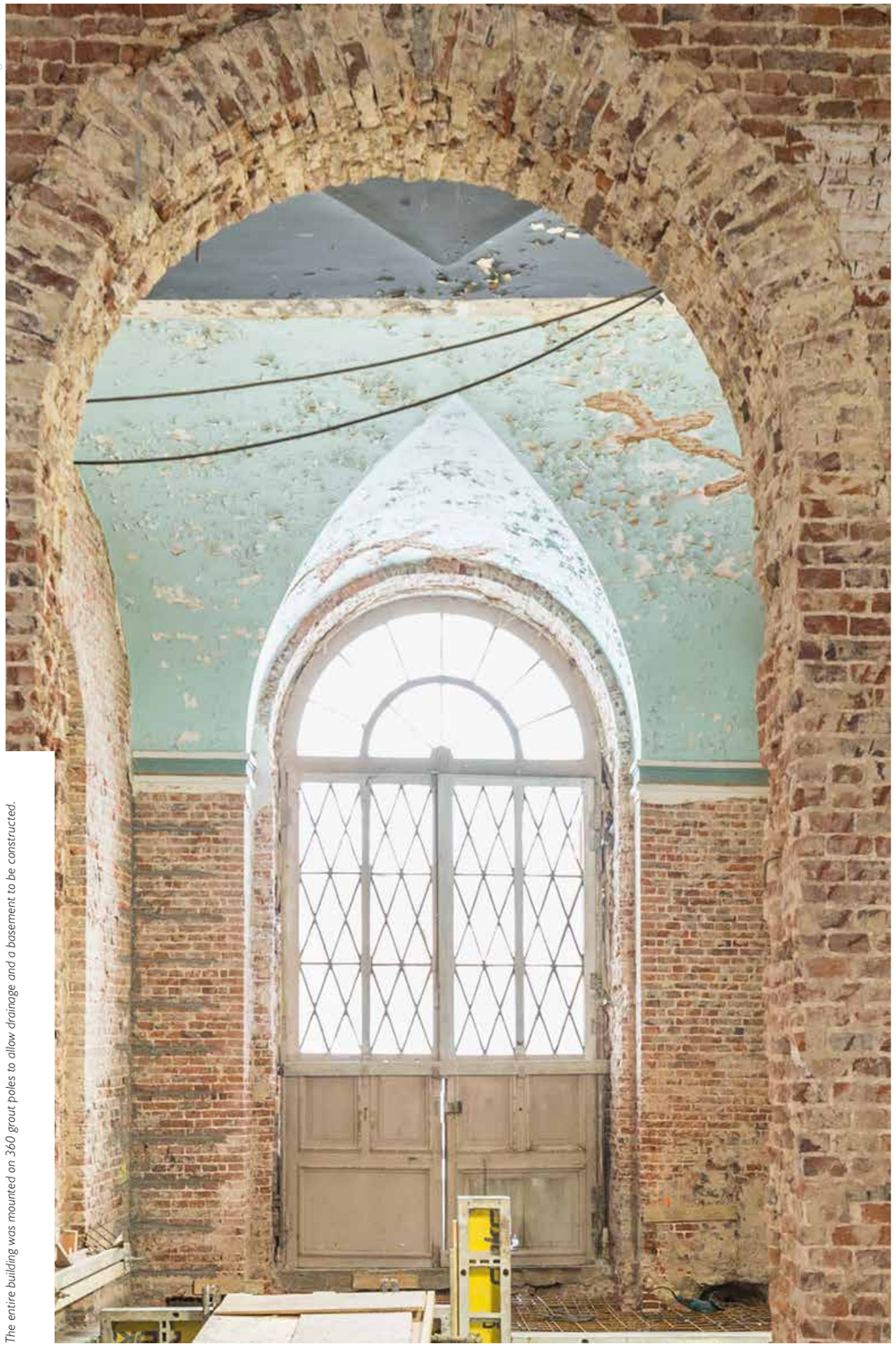
The Red Star Line Museum in Antwerp tells the story of Belgian emigrants seeking their fortunes in North America between 1873 and 1934. The warehouse in Antwerp where they gathered to embark on Red Star Line ships was transformed into a museum which opened its doors in 2013.

Denys has now built a mezzanine in the entrance hall. It's a platform made from 17 tonnes of steel, which we attached to the existing wooden structure. The heavy steel beams had to be carefully slotted through a 2 m glass door using a small crane we installed within the building. The mezzanine floor was finished with African Padauk parquet in a beautiful reddish colour. How fitting.

A small crane was used to carefully slot the heavy steel beams through the 2 m glass door.

Learning to dance in the rain

Working in inner cities often feels like fighting an uphill battle. The logistical challenges that come with it are becoming tougher and tougher. Take our hometown of Ghent, where a new traffic circulation plan has further complicated things. Denys is involved in three renovation projects in the city centre at present, and each of them requires us to take extra care with construction site organization due to the limited space. But we're not losing our cool. On the contrary, we like to live up to the famous Vivian Greene quote: "Life isn't about waiting for the storm to pass. It's about learning to dance in the rain."



The entire building was mounted on 360 grout poles to allow drainage and a basement to be constructed.

Renovating the old Art School

One sizeable project in the heart of Ghent is the renovation of the old Art School building, opposite the former monastery of the Augustinians. The transformation into a residential unit with 11 apartments is turning up a wealth of intriguing challenges. For example, we first had to put the entire building onto 360 grout piles to stabilize the building's foundations – a task, in large part, we had to accomplish from within the building. There's also the complex roof, consisting of five distinct structures, four of which are renovated while one is a new replacement steel structure to create additional space. And at one point we'll need to construct a convoluted 3D glass structure to connect two of the roof elements.

A staircase of granolithic concrete

Installing 10 m long steel balconies on the rear facade was also a technical conundrum, requiring us to deploy our best engineering expertise. And then there's the immense central staircase, which the architect asked us to build in granolithic concrete, a material developed for decorative flooring, and not meant for structural purposes.

Challenging but gratifying

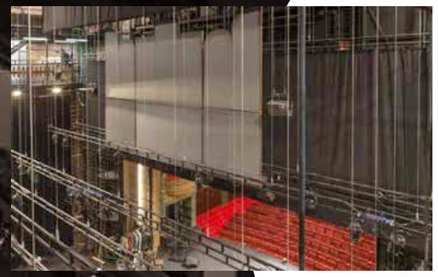
In the block which runs between Veldstraat, Korte Meer and Voldersstraat, Denys is transforming a cluster of buildings into a 114-room hotel with additional commercial space. This is all taking place in the middle of Ghent's busiest commercial area, where time is money and space comes at a premium. The first phase was the renovation of the Veldstraat facade and the construction of the commercial area, which involved secant piling and jet grouting with very little room for manoeuvre. For example, for the sprinkler installation we needed to construct an underground water basin between four existing walls. In addition, organizing the work was a challenge, since it was limited to specific time slots to reduce noise and dust annoyance. Still, we completed within five months. Happy to help!

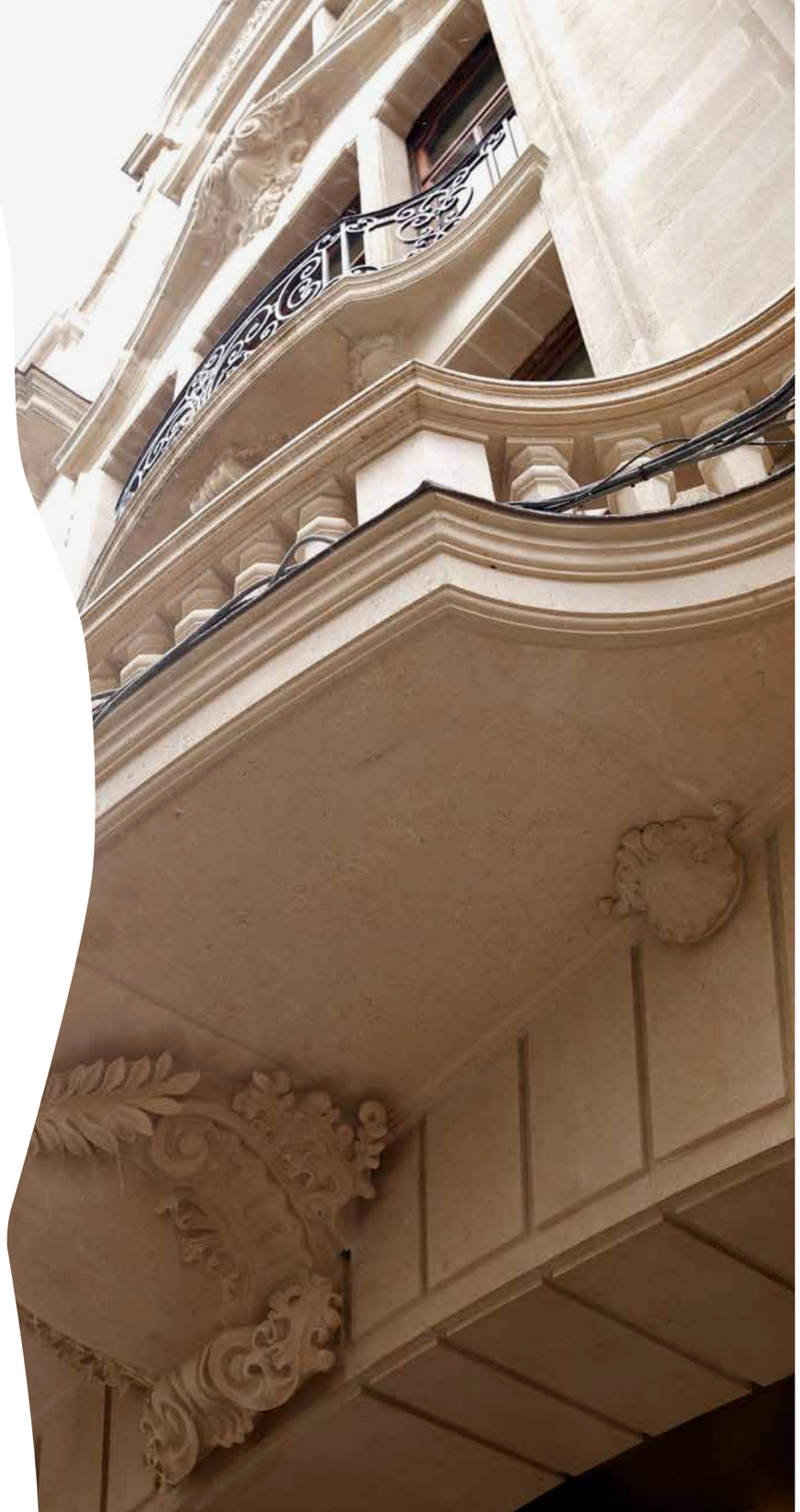
Work was limited to specific time slots to avoid disrupting commercial activity.

Inner city space constraints meant that we had to open up the roof to drop in large steel beams.

Safety, care and perseverance

In the area between the Saint Bavo Cathedral and the Belfry of Ghent, Denys is renovating the NTGent city theatre, involving the installation of high-performance SIL 3 compliant stage winches to meet contemporary staging practices, a project that is all about safety, care and perseverance. We had to deal with quite a few unpleasant surprises. For example, authorization for our construction site was withdrawn at the last minute, forcing us to set up an auxiliary site next to the cathedral. Inner city space constraints also meant that we had to open up the roof to drop in some large steel beams using a tower crane. And planning was impacted by the need to reroute an undocumented HV transmission cable running under where we planned to put the truck lift. No matter what, we kept on smiling!



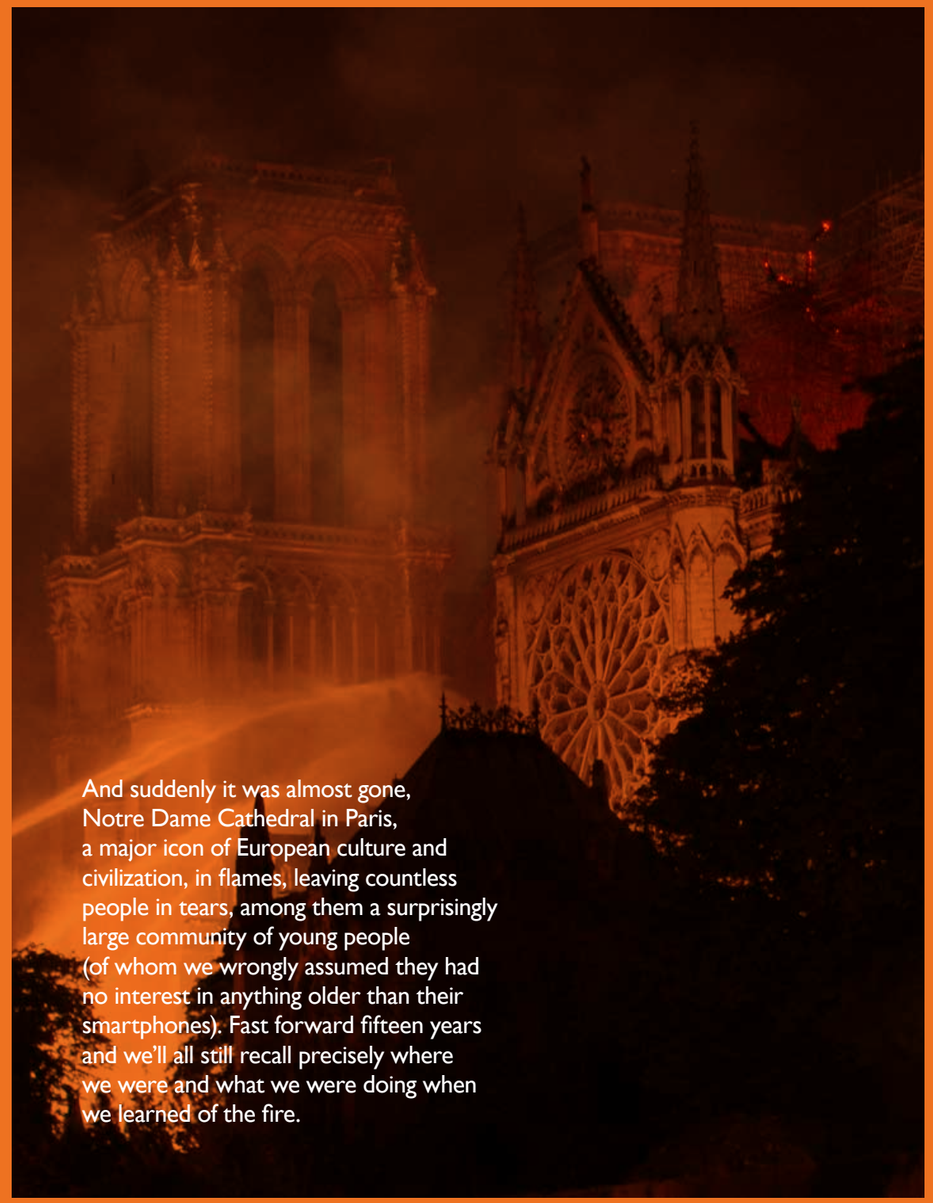


The Zonnestraat restoration project has won the prestigious Gentse Monumenten award.

Ambitious renovation in sync with commercial interests

The spectacular restoration Denys carried out in Ghent Zonnestraat a few years ago has won the prestigious Gentse Monumenten award in the private property category. Rightly so, we would dare to say. The 1921 building with its elegant neo-rococo facade took quite a beating in the post-WWII era. Denys was able to restore the facade in its original state, using the same sand-lime stone as in 1921. We also reinstated the beautiful interior, parts of which had been messed up over the years. As a result, the building is now a flagship store of outdoor retailer A.S. Adventure, proving that ambitious renovation and commercial interests can go hand in hand.

The cathedral will stand proud again



And suddenly it was almost gone, Notre Dame Cathedral in Paris, a major icon of European culture and civilization, in flames, leaving countless people in tears, among them a surprisingly large community of young people (of whom we wrongly assumed they had no interest in anything older than their smartphones). Fast forward fifteen years and we'll all still recall precisely where we were and what we were doing when we learned of the fire.

Our 3D carving robot steps up the intricate process of reconstructing sculpted stone pieces.

Five years

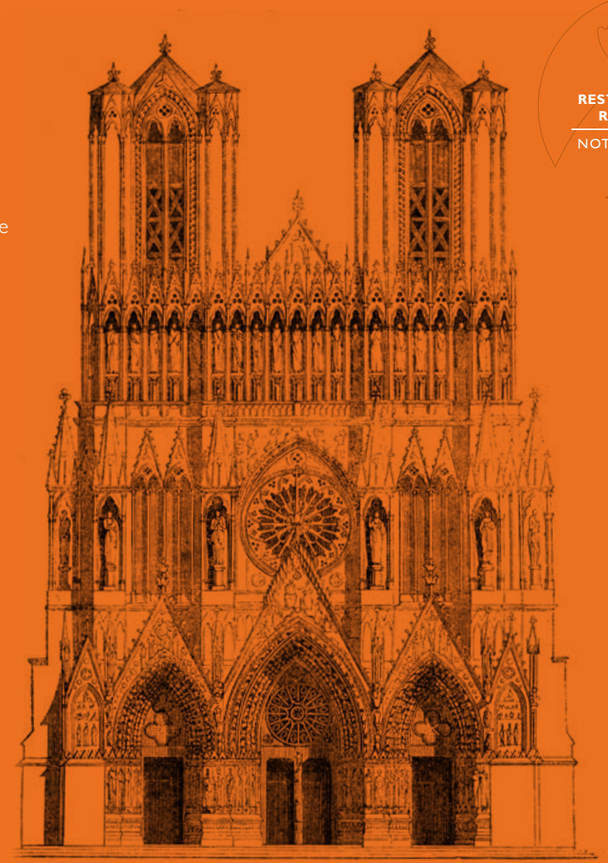
Fifteen years? By then, the cathedral will surely be restored to its pre-fire state or renovated with a contemporary touch. President Macron and others have been quick to urge a much more ambitious timeline of five years. The funding hurdle is being swiftly overcome, or so it seems, but there are many other challenges to address. Sourcing the requisite expert capacity might be the biggest of them all.

Expertise, care and ingenuity

We just want to say Denys stands ready to help. We know what it is to restore and renovate architectural heritage. We've been doing exactly this for decades throughout the Benelux countries, highlights including the Gravensteen and St. Peter's Abbey in Ghent, the Handelsbeurs and St. Charles Borromeo Church (after a fire) in Antwerp, and the Church of Our Lady of Laeken in Brussels. It requires solid expertise and great care and, not least, a measure of ingenuity to move things forward.

Machines and artists

Speaking of ingenuity: our 3D carving robot could come in handy. With it we can step up the intricate process of reconstructing complex sculpted stone pieces. This capability could be important when it comes to meeting deadlines. And we needn't be afraid that machine-sculpted artefacts end up lacking heart or energy: real human sculptors will apply the final touches. The robot is efficient, but we are the artists.



Long after Notre Dame is restored or renovated, we'll all be able to recall precisely where we were when we heard about the fire.

DENYS ARABIA

SAUDI ARABIA

60 days to get mobilized

In June 2019, Denys starts work on two stretches of pipeline in Saudi Arabia as part of the Saudi Aramco pipeline rehabilitation scheme. It includes a 163 km section with diameters 18 and 20 inches and a 37 km section with diameters 46 and 48 inches. According to the contract we need to get mobilized within 60 days of signing, which happened at the end of March. It's short notice, but no problem for us, in part because experienced staff are already in the area finishing up a successful project in Jubail. The new project must be completed within 30 months.

Our successful campaign in Jubail served as an excellent reference to support the new bid.

The Rise of Denys

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A recognized brand

Our activities over the past year have confirmed the continuing remarkable upward trajectory of Denys, and our current project portfolio indicates that 2019 will be another one of those glorious years. The volume of work in our home country of Belgium is further expanding thanks to our tenacity, for example in large-scale projects such as the Brussels-Haren prison. Furthermore, our international presence is a well-established fact, with Denys almost a household name and a recognized brand all over Europe, in large parts of Africa, and in the Middle East. And we're exploring other parts of the world too, firmly convinced that our technology, expertise and commitment can be decisive for anyone wanting to embark on a bold project.

A fully equipped logistics hub

Meanwhile the ambitious extension to our Ghent-Wondelgem headquarters is coming to completion. It will include almost 2400 m² of additional office, meeting and training space (an 80% increase on what we have now) plus a brand-new logistics hub almost double the size of the former depot. As well as plenty of space to store materials and park construction vehicles, it incorporates fully equipped maintenance and welding workshops and a state-of-the-art spray-painting booth. Parking for 190 vehicles, including ample EV-car charging facilities, will be on the roof.

With the latest technology

The office building is, of course, equipped with the latest available technology, including borehole thermal energy storage with concrete core conditioning, an impressive 90 by 9 metre rooftop solar installation and an intelligent low-energy lighting system. Come and see for yourself later this year.

The office building is equipped with the latest available technology.

The hub includes maintenance and welding workshops and a state-of-the-art spray-painting booth.

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Standing out from the crowd

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