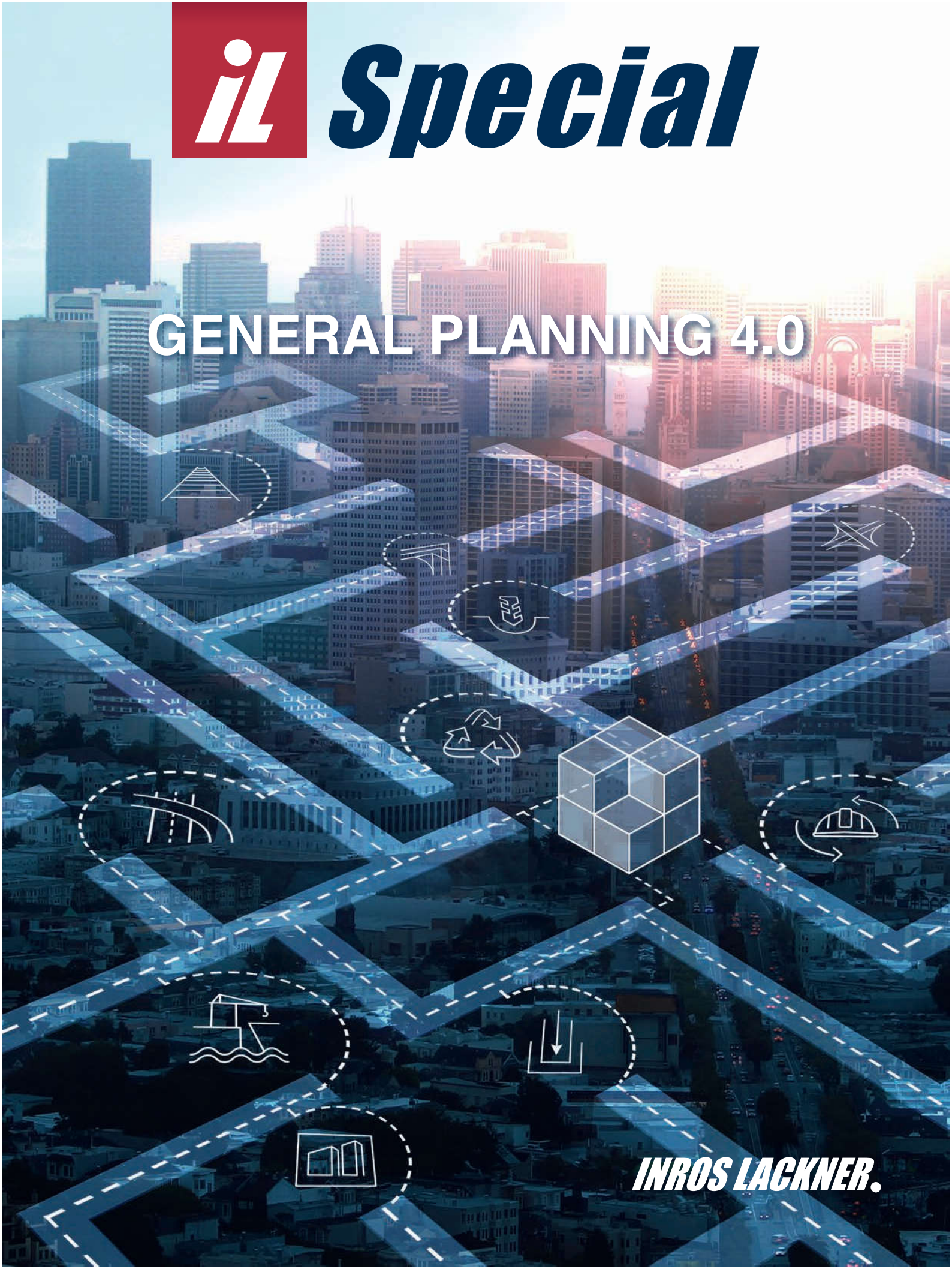
iL Special

GENERAL PLANNING 4.0



INROS LACKNER.

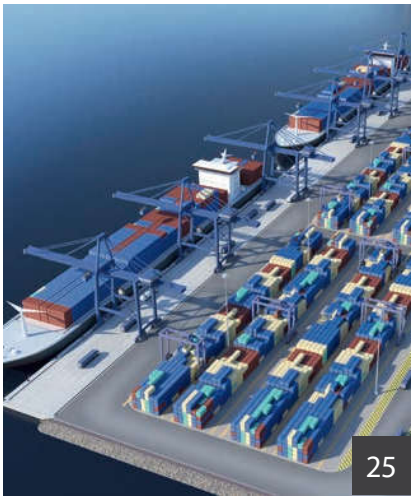
Dear readers,

General Planning 4.0 refers to the changes in the construction industry that are resulting from the fourth industrial revolution (Industry 4.0). As a General Planner, Inros Lackner brings together a wide range of specialist disciplines in one company, combined with appropriate IT systems and organisational structures that have been developed over many years. Although it presents new challenges, digitalisation makes it possible to optimise processes and structures, maximising future benefits. In doing this, it is important to maintain a balance between the tried-and-trusted and the new. As technical designers and general planners, we have been implementing complex projects with dedication and ambition for over 80 years. It is this experience that we bring to the increasingly popular General Planning projects on which we work, constantly benefitting from it in relation to issues such as functionality, sustainability, technological developments and communication structures. In this issue we explore the developments required in order to remain successfully positioned in the market, and take a look at some of our existing competencies and general planning projects. Digital processes are still largely »impulses« in General Planning projects, but in future they will be increasingly integral in contract award and implementation processes. Digital integration is necessary throughout a structure's entire value chain, from the planning and design stage right through to operation and maintenance.

Let's seize the opportunity offered by digitalisation – in conjunction with the right technical resources – in making planning and design processes, and construction projects, even more efficient and forward-looking than they are today!

Dr. Klaus Richter
Executive Director

Torsten Retzlaff
Executive Director



Change in the Supervisory Board

Professor Dr. Ing. Katharina Klemt-Albert is the newest member of Inros Lackner's supervisory board. Since 2016 she has headed the Institute for Construction Management and Digital Construction at Leibniz University in Hanover, with the focus in her research and teaching on digital transformation and digitalisation in design, construction and operation. Professor Klemt-Albert spent 14 years at a top management position in Deutsche Bahn AG, most recently managing an international project service provider with 1,500 employees. There, she was responsible for the realisation of major projects in Germany and worldwide. She has a strong personal interest in the development and implementation of technical innovations. Her experience in consulting and her in-depth knowledge in the fields of digitalisation and building information modelling (BIM) are a great asset for Inros Lackner, as noted by Uwe Lemcke in welcoming her to the board.

Grand opening of the new Bauhaus Museum in Germany

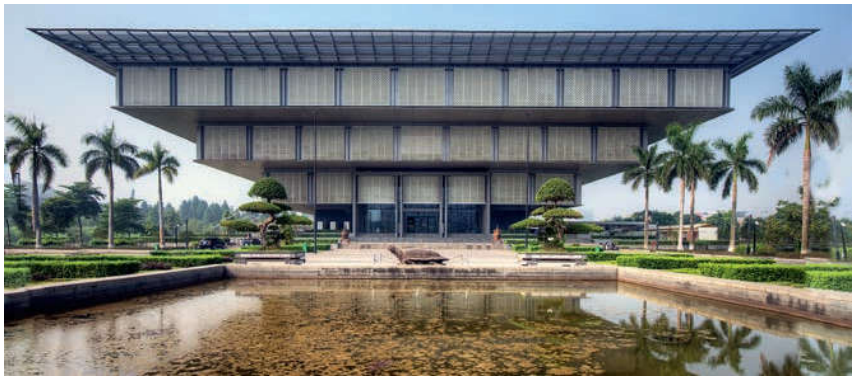
The opening of the museum, with German Chancellor Angela Merkel present, is one of the highlights of the centenary year of Bauhaus. After two and a half years of construction, the museum was inaugurated with a ceremony on 8th September 2019. Inros Lackner was responsible for the design of the technical building systems of the new building, which was built at a cost of approximately 28 million euro. The public presentation in this building of the world's second largest Bauhaus collection requires highly sophisticated technical solutions. Ducting for electrical equipment was provided in the exposed concrete ceilings, and the technical equipment for the exhibition areas was designed to be flexible and independent. Key components of the energy concept include a combination of thermal mass activation and air conditioning systems to ensure climate stability, and natural ventilation of the spacious foyer with its transparent façade.

»The implementation of this sophisticated indoor climate concept makes possible, for the first time, the comprehensive public presentation of the Bauhaus Foundation's valuable collection in Dessau – in particular its unique original artefacts from the 1920s and 1930s«, says architect Dr. Ing. Haie-Jann Krause, Head of Complex Building Design at Inros Lackner SE, emphasizing the project's great significance. Already in the architectural competition phase, the design by Gonzalez Hinz Zabala of Barcelona was a worldwide sensation. It represents – like Bauhaus itself – contemporary sustainability, efficiency and entire generations of construction.

Source: bauhaus-dessau.de. Photo: ©Thomas Meyer/OSTKREUZ

Hanoi's new courthouse

On the basis of an international competition, Inros Lackner Vietnam has been appointed as General Planner for the construction of Hanoi's new courthouse. In the course of the competition, Inros Lackner submitted two designs which considered the identity and traditional values of the Vietnamese culture. The designs presented a modern work environment with clear, transparent spaces and courtrooms for around 600 judges. In consultation with the client, the People's Court of the City of Hanoi, a new neoclassical design was developed on this basis. The construction costs are estimated at USD 30 million, and the gross floor area is approximately 30,000 m².



In the Top 10 of the world's most beautiful museums

In fifth place, Hanoi City Museum – an Inros Lackner reference project. Architecture and engineering meet in the design of Hanoi's city history museum – a special structure that showcases the heritage of Hanoi over the last 1,000 years and has been ranked fifth among the ten most beautiful museums in the world. The impressive building with a gross floor area of 30,000 m² resembles an upside-down pyramid. The top floor has the largest dimensions, at 92.4 m x 92.4 m. Moving downwards, the dimensions decrease – to just 42 m x 42 m on the ground floor. The building has an atrium from which all exhibition floors can be accessed. The architecture firm of Gerkan, Marg and Partners designed the new building. Inros Lackner was responsible for structural design, technical building systems and infrastructural planning.

Major waterway project in India

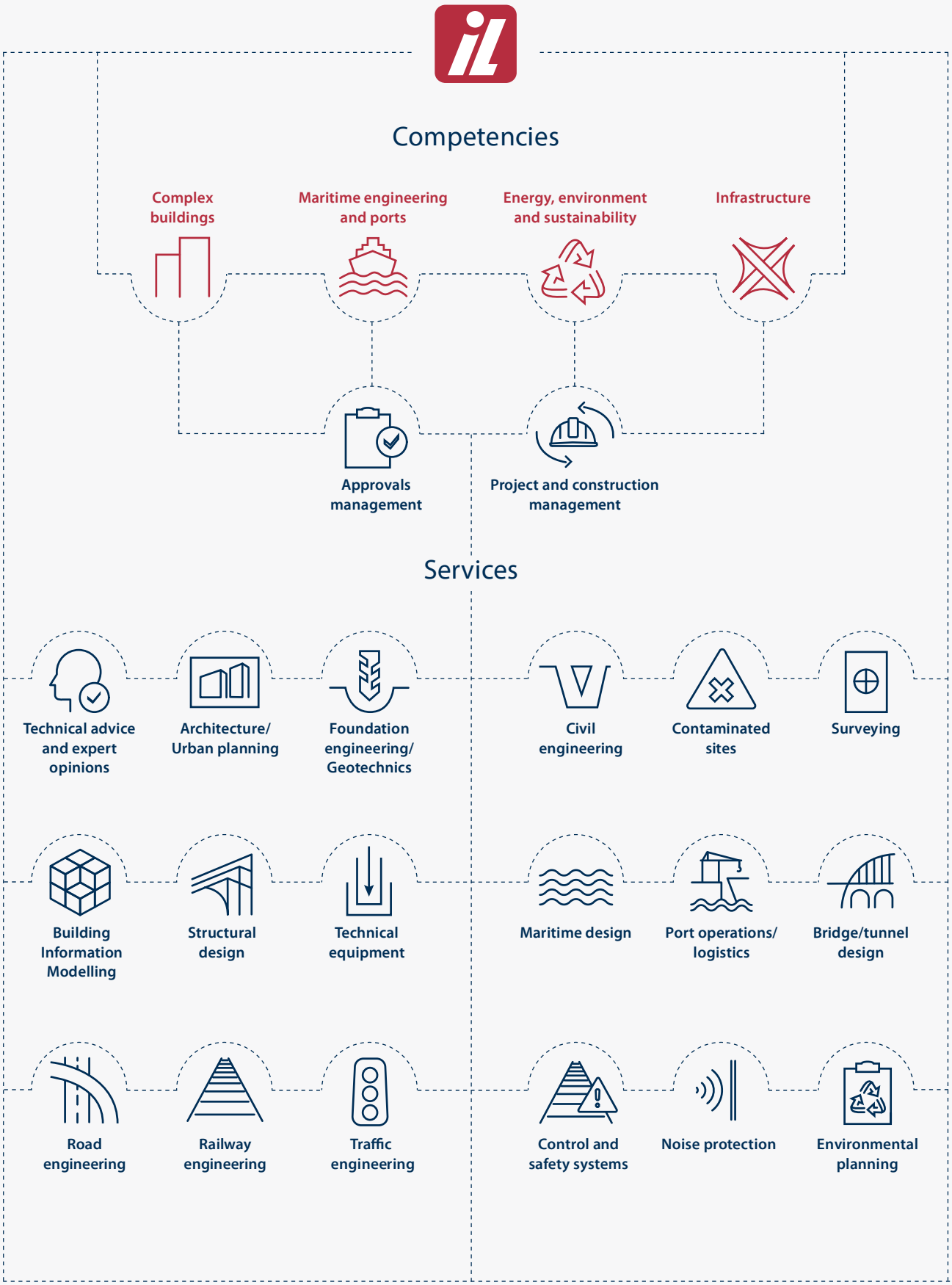
Inros Lackner is playing a key role in a project to improve and maintain the navigability of National Waterway 1, India's most important waterway and part of the Baghirati-Ganges river system. The sacred river, which has great economic value as an environmentally friendly, inexpensive and fuel-saving transportation route, is to be kept navigable over a distance of 711 kilometres. On behalf of the Inland Waterways Authority of India (IWAI) and the World Bank, Inros Lackner is responsible – in the roles of Technical Service Support Consultant and Project Management Consultant, with 40 German and Indian engineers – for site supervision and project management.

Over a period of five years, the main shipping channel in six sections is to be kept navigable by continuous maintenance dredging. The cost is approximately 160 million euro, and more than 600 people are involved on site. A particular challenge is the large seasonal fluctuations in water level, over which the shipping channel's minimum depth must always be maintained. The volume of excavated material is expected to be around 35 million cubic metres.

©Liebherr

Giant crane in Rostock Port

One of the world's largest heavy-duty cranes enters service: Liebherr's TCC 78000 rail-mounted heavy-duty gantry crane can lift loads of up to 1,600 tonnes, is 164 metres high and weighs 5,500 tonnes. From its factory site at Pier III in Rostock Port, the crane can be moved all the way to the quayside at Berth 14 and used anywhere along the way. The addition of this high-end heavy-duty crane is a significant upgrade to the port's infrastructure. Inros Lackner was responsible for the foundations and external facilities for the crane, which has a total cost of approximately 43 million euro. This included two deep-founded beams to carry the crane track, supported on a double row of bored piles. In total, 756 bored piles of diameter 930 mm were required, with lengths of between 18 and 23 metres – dimensions that, corresponding to the size and function of the crane, presented significant design challenges.

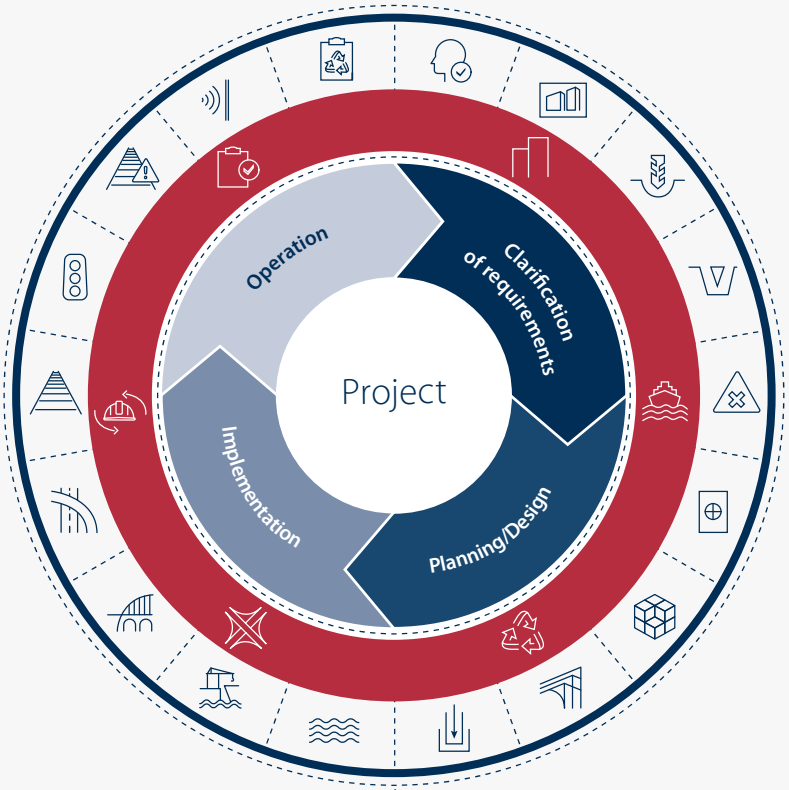

Competencies
Complex buildings
Maritime engineering and ports
Energy, environment and sustainability
Infrastructure
Approvals management
Project and construction management
Services
Technical advice and expert opinions
Architecture/ Urban planning
Foundation engineering/ Geotechnics
Civil engineering
Contaminated sites
Surveying
Building Information Modelling
Structural design
Technical equipment
Maritime design
Port operations/ logistics
Bridge/tunnel design
Road engineering
Railway engineering
Traffic engineering
Control and safety systems
Noise protection
Environmental planning

GENERAL PLANNING 4.0

Overall responsibility for projects in the context of Industry 4.0 is determined by new forms of collaboration and digital planning processes.

General Planning is characterised by coordination and integration, interdisciplinary thinking and the early involvement of all participating parties. There is no binding definition or clear specification for how responsibilities are shared. The requirements vary with the project and the client's objectives. As a General Planner, we can combine a wide range of specialist engineering services in-house and if required, integrate further services by working with subcontractors in a joint venture. The goal is to optimally coordinate complex processes and how the work is carried out. In our work we represent the client's interests, manage interfaces between the involved parties and provide project management services – with the aim of optimising planning and design work and achieving greater cost and schedule reliability. With the increasing digitalisation of planning and design processes, the structures of General Planning are also changing and require us to continually acquire new competencies – both technical and interpersonal – and to always look to the future. As a result, we consider the entire life cycle of buildings in terms of sustainability and maintenance. Digital models are used to illustrate project objectives and facilitate coordination with the client. And within the team, everyone has access to the same information.

On the following pages we report on certain key aspects of General Planning, with particular reference to digitalisation. Initial digital approaches to projects will be presented, as will traditional General Planning measures that we have successfully implemented with the integration of digital working methods. Without these experiences, our work and development as a General Planner would not be possible.



Clarification of requirements
- Consultancy advice and guidance
- Focus on structure life cycle
- Digital documentation of existing situation

Planning/Design
- Project start-up consulting
- Coordination of planners/designers
- Integrated planning and design (3D)

Implementation
- BIM execution plan (4D)
- AVA and process simulation (5D)
- Quality assurance
- Schedule and cost reliability

Operation
- Maintenance
- Repair
- Demolition/removal

IN CONVERSATION

Matthias Grabe
Chief Technical Officer (Member of the Executive Board), Hamburg Port Authority AöR

Matthias Grabe studied civil engineering at the Technical University of Braunschweig in Germany and at ETH Zurich, Switzerland's leading technical university. In his studies he specialised in structural engineering, hydraulic engineering, environmental engineering, geotechnics and tunnelling. He spent the first years of his career at HOCHTIEF and Ludwig Freytag, working on design, work preparation, estimating, purchasing and construction management. Thereafter, he took on increased responsibility for budget and personnel, in companies and in the management of major projects, both on the contractor side and in representing clients, project developers and investors.

In the last ten years, Matthias Grabe has been a manager at DB Netz, the German railway company's network division, and at the Wiebe Group. At DB Netz, among other things, he headed the company's bridge advisory board for several years. Since 1st October 2017, he has been Chief Technical Officer of the Hamburg Port Authority (HPA).

Mr. Grabe, what key advantages do you see in integrated planning and design by a single contract partner?
A General Planner offers a basis for efficient and reliable planning and design, through the internal close collaboration of all involved parties. As a client, I receive a structure that has been planned and designed by a single business partner, and the entire responsibility for planning and design lies with that partner. All trades and design aspects, from the piles in the ground to the lightning conductor on top, are coordinated in a single overall approach.

In the end, the ability to communicate effectively – both externally and internally – is defining for the benefits, or success, of General Planning work. However, while external communication is generally well covered by regular reporting to the client on planning and design progress, internal communication is often neglected. Coordination of work on a BIM model is not a substitute for good internal communication. In my view, project communication is an aspect of work culture that has potential for real development in the context of General Planning.

»The exponential growth in digital data facilitates great improvements in performance – we need, 'smart structures'«

General Planning makes it possible to network complex technical resources with individual customer needs. Do you have specific requirements in relation to the increasing demands on construction processes and developing digital capabilities?
Yes, the focus must be increasingly on the life cycle of a structure – in particular, operation and maintenance – from the outset. For example, the design and construction phase of a canal lock is typically about five to ten years, but the operation and maintenance phase will last between 50 and 100 years. Planning, design and construction therefore account for only one tenth of the lifespan of such a structure. I expect this factor of 10 to be recognised and integrated accordingly into the planning and design process. I am interested in a forward-

»I am interested in a forward-looking planning and design process that looks not only at initial technical aspects, but also at maintenance.«

looking planning and design process that looks not only at initial technical aspects, but also at maintenance. BIM models must be compatible for digital maintenance, so that structure maintenance can be carried out and recorded using modern computer technology. I am talking about »smart structures« in the sense of predictive maintenance. Relevant data, e.g. for the maintenance of bridges, must be proactively recorded. This will enable maintenance measures to be arranged in good time and problems to be avoided. This is already working very well in other industries in the era of Industry 4.0, but not yet in the world of civil engineering. Here, the focus is primarily on the construction process, and less on the time thereafter.

Digitalisation makes possible the ever-increasing availability of relevant data. What are the benefits of this for General Planning?
The exponentially growing amount of data in the digital planning process facilitates enhanced transparency and real performance improvements. The targeted use of this data supports reliable predictions relating to the condition of structures, machines and facilities. This makes planning and implementation of maintenance work more flexible. Loads and deformations can be calculated, extreme values can be assessed, and decisions can be made more quickly. Where appropriate, consideration can be given at an early stage to renovating a structure or removing it from service.

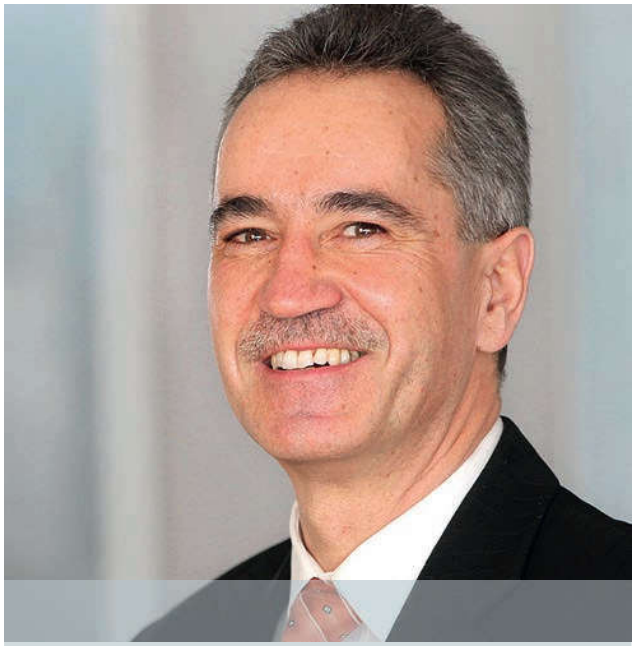
What potential for optimisation, or what added value, do you see in working with a General Planner?
Significant potential lies in forward-looking planning and design, and in consideration of the life cycle of each structure. With this knowledge, the General Planner must increasingly take on the role of a consultant, one of whose tasks is to convince the client that, although the initial investment may be higher, operation and maintenance costs over the entire life of the structure will be considerably lower. There must be a clear understanding: if we invest more up front, it will end up being cheaper. The great added value of General Planning lies in the cooperation itself. If all trades work well together, and project communication is transparent, the client can have confidence in the outcome.

In your view, what potential is there for market participants to become involved, e.g. through joint ventures?
In the private sector, a General Planning team of well-known and proven specialist planners and designers can be readily brought together. However, public contracts cannot be awarded in such a forward-looking manner due to the constraints of public procurement law.

Do you see a need – or an opportunity – in the future for other partnership-based contract models?
I see a very great need for partnership-based contract models – avoiding the conflict culture which in my view dominates today's project work too much. Engineers have lost sight of the end product in the hustle and bustle of contract work. Clients are only interested in optimising the price. The elimination of mistakes does not happen collaboratively, there is no culture of working towards a common goal with regard to construction progress within the programme. The focus is on the claims dispute. There is a great need in the industry for alliance and consensus.

Public procurement allows competitive dialogue, an approach we use at HPA. Alliance projects are being pushed forward and the first pilot projects are being implemented in the Port of Hamburg. This teamwork approach is aimed at mediation rather than confrontation.

IN CONVERSATION



Lutz Hempelt
Executive Director, INROS LACKNER SE

Lutz Hempelt studied civil engineering at the Technical University of Wismar. As a construction management engineer, he has gained more than 30 years of professional experience in all areas of hydraulic, civil and structural engineering. He specialises in commercial and technical management, and in schedule controlling for all participants on large construction projects and complex General Planner contracts. He spent twelve years at Heitkamp Construction as branch manager, and has been a member of the company management at Inros Lackner SE since 2014.

»With a view to Industry 4.0, a continuous digital connection from the quotation stage through the construction management phase and right up to the structure's operation and maintenance is a necessary development.«

Mr. Hempelt, with increasing client expectations and constantly developing digital capabilities, business processes are fundamentally changing. How have the business structures at Inros Lackner changed in recent years in order to be successful on the market as a General Planner?
We recognised the opportunities offered by digitalisation at an early stage. In 2014 we established our Building Information Modelling (BIM) working group, and integrated this working method into our process landscape. We have established our own internal guidelines for BIM projects, and are currently creating individual guidelines covering the increasingly complex requirements of the various disciplines/trades. Our goal is to improve the coordination among the BIM discipline models and to further optimise the processes and interfaces. Our BIM guidelines have now been fully integrated into our certified quality management system. In addition to this digitalisation work, we have also further expanded our specialist knowledge capabilities and adapted these in line with current developments. By having direct access to a wide range of services – covering traditional disciplines as well as specialised expertise relating to such aspects as contamination management, sustainable energy design and BIM – we can minimise the risk of problems at the planning to implementation interface and quickly respond to detailed questions during the planning/design process.

Strong customer focus, transparency and continuous project optimisation are the often-mentioned advantages of General Planning. Are there any other aspects that you would add?
Yes, there are clear advantages for quality. Internal interdisciplinary cooperation allows for simultaneous interconnection of project data at every stage. This further optimises interface management between trades/specialisations and minimises the error rate. If design is carried out in a model-based way, this further enhances quality control; potential errors can be identified by routine model checks. The quantities derived from the model also help improve cost reliability for all trades.

Clients can also better understand and track planning and design decisions based on such models. For this purpose, and also to enhance cooperation in the team, we have created collaboration rooms. Here, designers and the client make joint decisions with direct reference to a model.

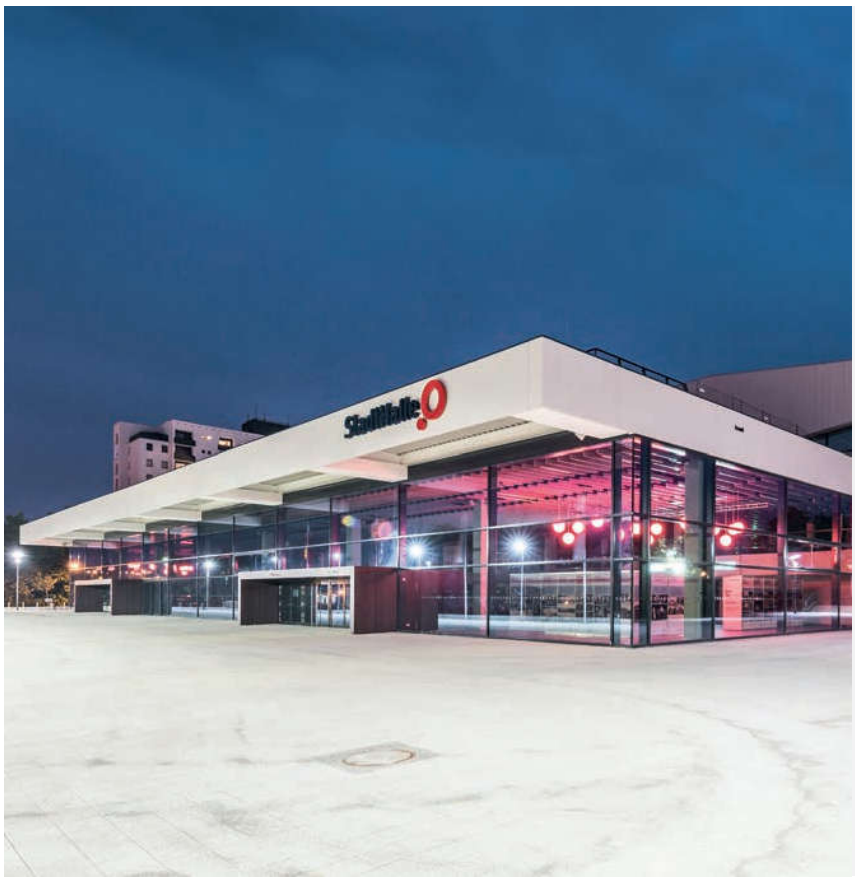
Why is General Planning particularly interesting for complex large-scale projects?
The number of trade-specific interfaces is greater. Large infrastructure and structural engineering projects have enormous planning, technical and organisational complexity. As contractual partner with sole responsibility for planning and design, a General Planner simplifies things for the client, performing the task of interdisciplinary coordination – closing gaps at interfaces, identifying risks, improving cost certainty and enhancing adherence to deadlines. A guarantee for this is the prerequisite expertise and mastery of the appropriate project management tasks as verified by relevant project references. Those who have not planned and designed structures of a particular type – such as bridges or laboratories, for example – will not be used on projects of that nature.

Digitalisation offers various possibilities for acquiring new strengths – what does this mean in the context of General Planning?
With a view to Industry 4.0 and digitalization in the construction industry, a comprehensive consideration of all processes, from the offer stage through the design and construction stages to the maintenance of the structure is a necessary development. For us, this means managing interfaces between different software applications with the aim of unifying model structure and attributes.

The active networking of architectural, technical, physical and functional properties over the entire life cycle of a structure requires clearly defined standards and agreements. These must be defined. We have set up an Innovation Working Group to test applications with Office 365 and develop guidelines for a comprehensive digital workflow – also with regard to project communication and the handling of data structures. In all this, the human aspect must not be neglected – we need not only digital communication, but above all partner-like communication.

In the future, General Planners must have more agility in addressing individual needs. What potential is there for optimisation?
Among other things, this involves how we understand our role as a consultant, with an ever-stronger focus on life cycle and sustainability. We need to shine a light on the added value brought by investments over the years, and thus influence planning objectives accordingly. If a project is to be completed in five years, it is important to know from the outset how a design model based on the BIM method will be used later on. It must be possible to develop and operate data platforms, e.g. for facility management, from the 3D models. This requires the needs relating to the structure's future operation to be made available in good time. The comprehensiveness and the accuracy of the data are crucial. A model base developed from this can speed up the design process. In addition to specialist planning and design work, new roles and responsibilities, such as the position of BIM manager, are developing. As a successful General Planner, we also want to become more involved as a problem solver and to identify new needs, e.g. relating to sustainable solutions and corresponding certification processes. This is an important focus in our company. Often, innovative solutions are not permitted by an objective of minimising construction costs. In such cases, we as consultants must involve the client in a forward-looking approach to design and use.

Reference project: Modernisation of StadtHalle Rostock



On behalf of inRostock GmbH:
Compliance with the ambitious schedule for the implementation of this complex construction project, with its various construction phases, was a particular challenge – with the modernisation of the existing building and the construction of an extension having to take place almost in parallel during event-free periods. There was a high need for coordination between the client, planners and designers, project controllers and constructors in order to ensure that events could be held as planned and to facilitate short-notice design adjustments due to inaccuracies in the information available on the existing structure. All in all, we managed to stick to the schedule thanks to collaborative project work.

Lutz Hempelt, Project Management

View of StadtHalle Rostock after the modernisation

TRANSFORMATION OF CITY HALL

The Hanseatic city's central event venue StadtHalle Rostock has now been converted into a multifunctional congress and event centre.

StadtHalle Rostock, located near the main train station in the city centre, was opened in 1979. After several decades of service, the ageing event centre had reached its limits and was increasingly less able to meet requirements, especially in terms of space during large events. With the modernisation project from 2016 to 2018, the StadtHalle Rostock was transformed into a modern, attractive event centre, all within the allocated budget and timeframe. The range of shows, concerts, sports events, dance events and other societal highlights that can be accommodated has been expanded. About 20 halls and breakout rooms offer multifunctional combination possibilities for 10 to 6,600 people. Following the renovation and expansion, StadtHalle Rostock is now well equipped to competitively meet the needs of Germany's northeast in the future.

The contemporary ambience (both internal and external), the energy-efficient technology and the barrier-free (accessible) design are hallmarks of this General Planning project. A particular challenge was to »react« to the existing building – to show consideration of its 1970s design while still managing to create a modern event location.

Petra Burmeister, Chief Executive Officer of StadtHalle Rostock

I have worked at StadtHalle Rostock since 1987, and I feel very closely connected with the building's development. With this modernisation project, we have taken an important step for the city and the region. Our requirements, based on more than 30 years of experience in the industry, were clear and we had high expectations. In Inros Lackner we selected a local General Planner with the technical capabilities to master the complex planning and design challenges posed by our project, involving both an existing and a new building. The company's architectural design also convinced us from the very beginning. Together we have grown in the project, especially in terms of coordination and communication which were both excellent. I am very pleased with the result, and proud of the new StadtHalle Rostock – a fine example of a building of its kind in the northeast of Germany.

View of StadtHalle Rostock before the modernisation

Foyer area

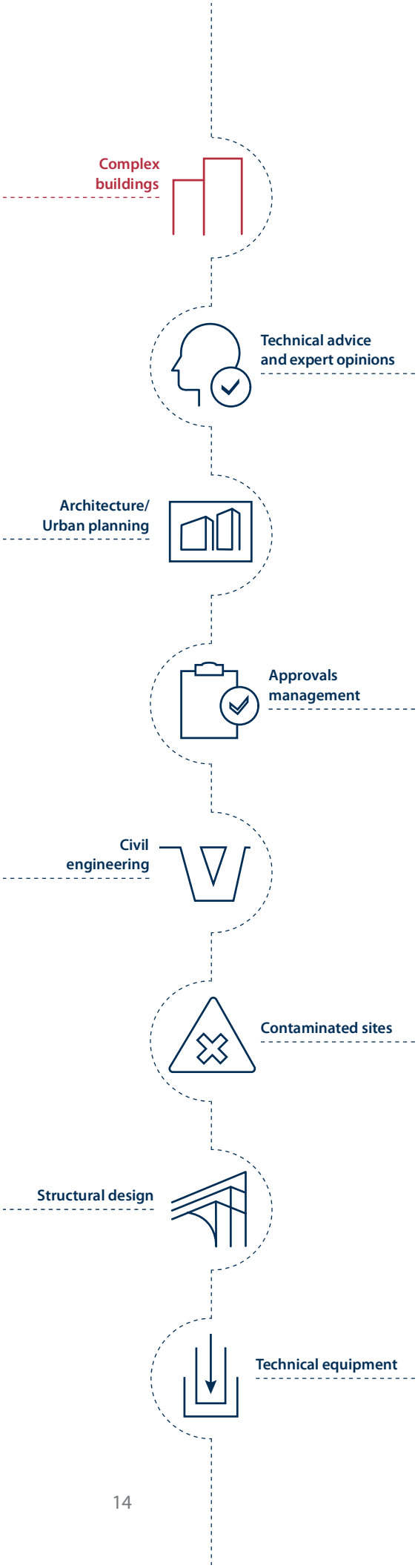
Modernisation at a glance

Inros Lackner's design proposal for the expansion and renovation of StadtHalle Rostock evidently impressed the building's owner, today inRostock GmbH. The company was contracted to provide General Planning services from start to finish (HOAI phases 1 to 9) for project planning and design, structural design, technical building systems and civil engineering as well as for the specialist design work relating to fire protection, thermal insulation (EnEV), sound insulation and room acoustics. The basis and framework for the planning and design services were drawn up in a catalogue of measures, which included the following focal points.

Extension of the northern foyer areas: These were expanded by the addition of a new foyer over two floors with a new roof landscape. In doing this, visitor access and box office facilities were redesigned, barrier-free access was optimised, and a sliding door was integrated into the façade to facilitate event installations. Cloakrooms, catering facilities and new breakout areas were also provided in the foyer area. In total, the foyer was made about 2,000 m^2 larger and twice as high. Extensive glazing and modern, bright furnishings contribute to an open and very transparent design. The eye-catcher is the welcome area in the new foyer, which offers congress planners many different usage options for receptions, exhibitions, services and gastronomy.

Redesign of the plaza at the building's north side: This plaza has been shifted northwards at the previously existing depth, with redesign of its features, stairways and planted areas.

Increase in seating capacity: The small seating area at the north side of the large hall was removed and the roof was extended by about 5 m, making space for a new seating area with 670 seats. The former reporters' cabins in the upper area at the east side were also removed, making room for 170 extra seats. In addition, a new heavy-duty floor was installed, as were state-of-the-art lighting and sound systems.



Hall 1: In the main hall, load-bearing elements were removed and suitably replaced, achieving increased flexibility in terms of building use for future events. The entrance doors to the hall from the foyer were renewed, as were nine emergency evacuation doors, and four large billboards were integrated into the modern new cladding.

Construction phase, September 2017

Structural shell: The existing building has been optimised with respect to energy conservation. The façades were completely replaced by post-and-beam constructions with heat insulating glazing. The concrete stairs at the sides were demolished and replaced by straight reinforced concrete structures, with a wheelchair lift at the east side. Heaters in the side foyers have been renewed, and fire protection doors have been added in some corridors. Delivery of event technology is now possible via two new large sliding doors, which will also provide improved fire brigade access in the event of a fire.

The design process was based on an architectural model and a number of specialisation design models, all coordinated as part of the General Planner's duties. The BIM working method facilitated quick and efficient decisions and consultations with the client, with simulations generated by the model as appropriate.

Jacqueline Lembcke, Architect

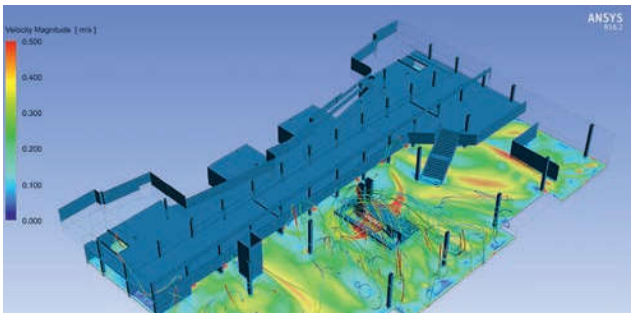
I was mainly responsible for the design of the new seating areas and all connecting areas (side foyers, storage areas, corridors, roof extension). I also had responsibility for external stairway design, colour and material concepts, sampling and various detail designs. The project design was completely done in 3D, with every corner of the building visualised, which was especially important for complicated details and for the intensive coordination processes. Especially in the construction phase I often needed to quickly work on details that could not be fully considered during the design phase, since adapting an existing building always involves surprises that require a quick solution.

Sebastian Lieske, Project Engineer (heating, ventilation, plumbing)

As a specialist designer I was able to work on this complex project from start to finish – from the project start-up consultation at the very beginning until the opening ceremony at the very end. I primarily worked on the building's ventilation systems, including tendering, contract award and supervision of installation. The interfaces and influences between the new equipment and the old, which of course had to be considered, were demanding. Using ventilation simulations from the Institute for Ventilation and Refrigeration Technology in Dresden, we investigated in advance, for example, whether our design could prevent or minimise the spread of food odours from the foyer into the event hall. As a newcomer, I learned to assert myself in a project with a tight schedule.

Key data – heating, plumbing, ventilation and fire extinguishing systems

- 5 new ventilation systems with a total capacity of approx. 85,000 m^3/h (= approx. 850 typical hairdryers), weighing approx. 33,000 kg
- Air entry via 242 air outlets under the seats of the new north seating area
- 10 motor-adjustable air outlets at a height of 13 m above the hall's internal surface
- 60 motor-adjustable air outlets for the foyer extension
- 3-stage air filter with potassium permanganate and zeolite volcanic rock to reduce odours from kitchen air by environmentally friendly oxidation
- Approx. 1,800 m^2 of floor heating in the new foyer area
- Hidden downpipes (inside columns) for the drainage of rainwater from the new foyer's roof
- Provision of services for two amply equipped catering areas
- New underground firefighting water tank in the outdoor area with a volume of approx. 75 m^3
- 427 sprinkler heads
- Optimisation of the heating system in the existing part of the building



Air velocity distribution in the foyer and individual flow paths

Ventilation plant on the foyer roof with vertical outlet ducts

Construction phases and interim solutions

The modernisation work began in 2016 with initial measures involving pollutant remediation in the hall area and the renovation and extension of toilet facilities. An event-free period of six weeks in the summer presented an optimal opportunity for construction work. After that, design and construction work could progress only within very tight time constraints. A second opportunity to progress quickly with the work arose during the event-free period in summer 2017. A temporary wall was built as an interim solution to separate the old building from the construction site of the new foyer. During this time, the seating area was also extended, the entire north side had to be opened for this. From autumn 2017, events took place next to the construction site. The narrow time windows, as allowed by events and advised accordingly, were adhered to during the construction phases in 2017/2018. Detailed preparations and time planning were key prerequisites for the work to be performed by the various involved contractors, considering the great potential for the work of one to affect the work of others. This was especially the case since any unplanned reduction in the availability of the city hall's facilities would have had considerable economic consequences for the client. The event-free periods were to be strictly adhered to for the construction works on and in the building. The opening took place as planned, shortly before the Hanseatic City of Rostock's 800th anniversary.

External view of National Assembly House (© Christian Gahl)

NATIONAL ASSEMBLY HOUSE, HANOI

New parliament building of the Vietnamese government

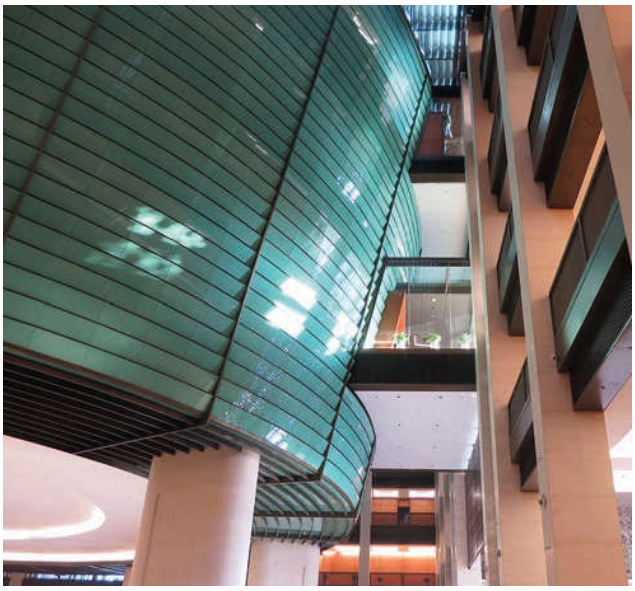
In an international competition to provide complete planning and design services for the Vietnamese government's new parliament building, the partnership of gmp and Inros Lackner prevailed and was awarded the contract. Inros Lackner then designed the earthquake-proof main structure and the building's technical building services, and was also responsible for the tender process and local supervision.

The building has a square base plan with a length of 102.5 m on each side, and a gross floor area of approx. 60,000 m². It has two main parts – the Main Meeting Hall and a surrounding five-storey structure. In the design of the building, which is located in a seismic region, 3D and 2D finite element calculation models were used as well as more traditional design methods.

A real eye-catcher: the Main Meeting Hall

The heart of the assembly house is the parliament's round Main Meeting Hall, of diameter 51 m and height 26 m, which is supported on eight columns at a height of 9 m above the ground. This hall, which can accommodate approximately 1100 people, is at the centre of the building's square base plan, and is surrounded by a five-storey structure containing a banquet hall on the ground floor, foyer and reception areas for guests, and the offices of the members of parliament. For seismic protection purposes, the Main Meeting Hall and the five-storey structure are structurally independent of each other, connected only by access bridges. The building also has two basement levels, housing exhibition areas, a museum and building services.

Roof structure



Access bridge to Main Meeting Hall

A »spoked wheel« for a base slab

The elevated base slab of the Main Meeting Hall is of reinforced concrete and constructed in the shape of a spoked wheel. This base slab is supported by eight composite columns, arranged beneath its 1.75m-high outer ring. From this outer ring, eight radially oriented pairs of beams connect, via an intermediate ring, to an inner ring with a diameter of 10 m. The 1.6m-high central area of the base slab was constructed as a hollow cell structure with top and bottom solid slabs. The air conditioning system of the hall and of the foyer beneath is integrated in the base slab. The hall's eight support columns pass through the two basement levels to the foundation slab, receiving lateral support from the basement floor and roof slabs.

Complex buildings

Technical advice and expert opinions

Approvals management

Structural design

Technical equipment

Project and construction management

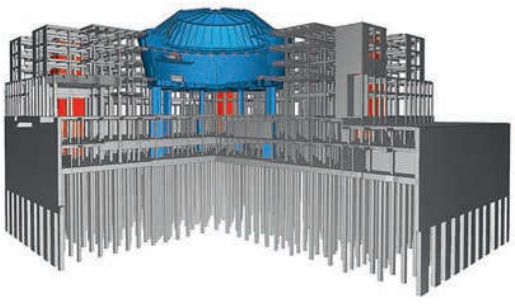
Construction of the Main Meeting Hall's base slab

Dome roof's steel supporting framework
The Main Meeting Hall's roof structure consists of a steel support framework covered by 25cm-thick prefabricated reinforced concrete elements, the joints between which were subsequently grouted. The dome-shaped roof's steel support structure has a diameter of 50 m, and has bracing rings both above and below. It is flexibly supported at 32 bearing points on reinforced concrete elements on the hall's outer wall. In addition to their load-carrying function, the hall's eight main support columns must also be able to withstand the high seismic forces that might arise. Each column has a steel core consisting of a welded H-beam with supplemental plates added, with overall dimensions of 2,660 mm x 900 mm, a length of 16.3 m and a weight of 78 tonnes.

In addition to the demanding structural work on the project, Inros Lackner was also responsible for the planning and design, to the highest international standards, of the integrated »invisible« technical building services.

This specialist design work covered, among other things:

- Emergency power supply (4 generators, each 2,000 kVA)
- A transformer station (10 transformers, each 1,600 kVA)
- Air conditioning (8 cooling units, each 700 kW)
- Structured cabling with 8,000 GG45 connections
- Solar panels (900 m^2)
- Ventilation equipment (Total capacity 465,000 m^3/h)
- Building services management system (10,000 data points)
- Sprinkler and gaseous extinguishing systems, and smoke extraction equipment
- Rainwater and wastewater pipework
- Water treatment plants for general drinking water and for the kitchen area



Key data
GFA 60,000 m^2
Dimensions 102.5 m x 102.5 m
Construction costs
EUR 195 million (gross)

© Christian Gahl

50Hertz Transmission GmbH Headquarters / General Planning

- Technical advice / Expert opinions
- Façade design
- Structural engineering
- Building technology
- Fire protection
- Thermal building physics
- Supervision of construction

INSIGHTS

INROS LACKNER AS GENERAL PLANNER – IN NUMBERS:

> 500
EMPLOYEES
One of the leading German General Planning teams

> 80
YEARS OF EXPERIENCE
Planning, design and management of large projects

> 800
GENERAL PLANNING PROJECTS
In the infrastructure and structural engineering sector in the last three years

> 20
SPECIALIST DISCIPLINES
From energy, contamination and building land to AVA and project management

Development of Turkmenbashi International Seaport / General Planning

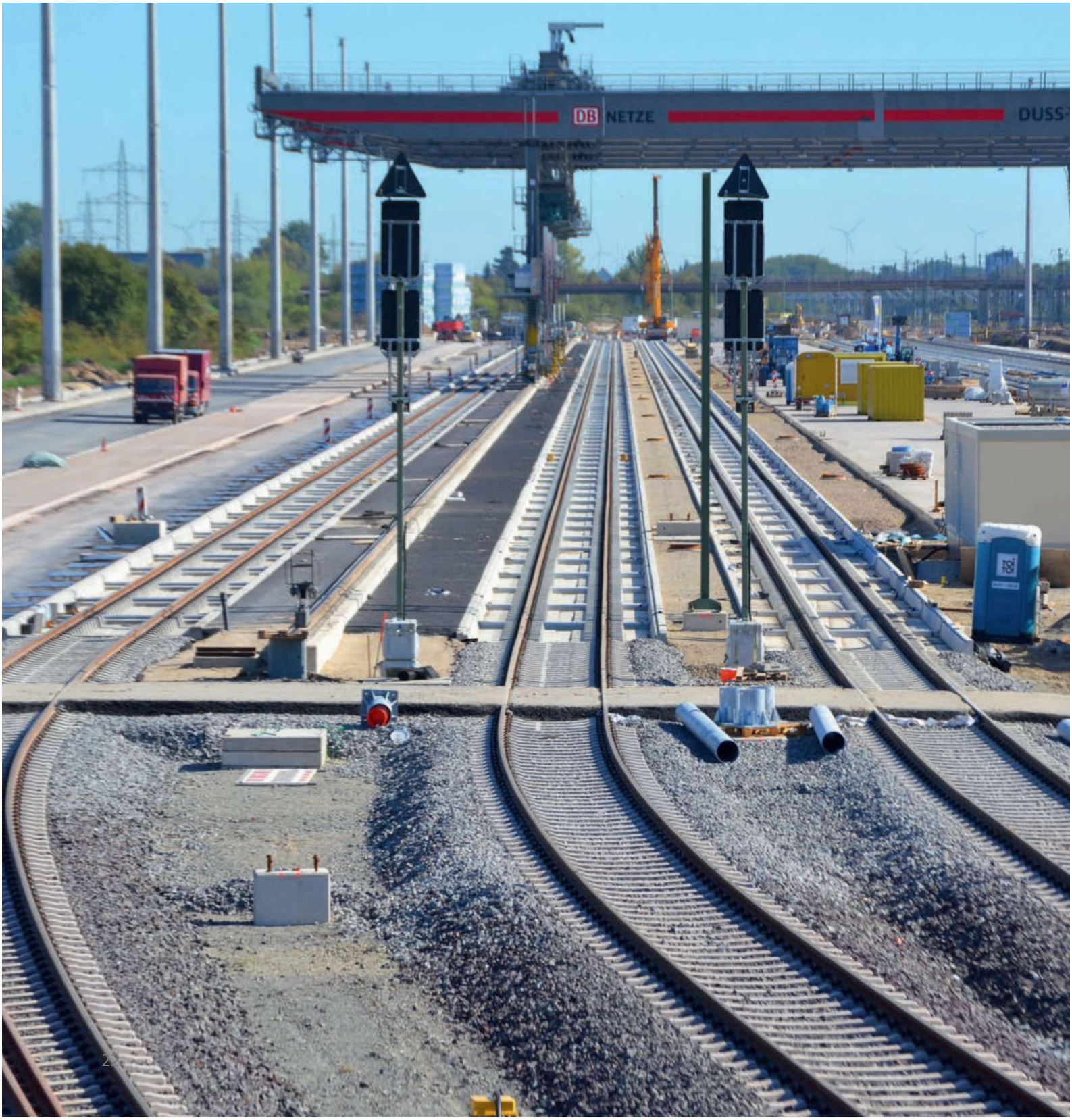
- Soil engineering / Geotechnics
- Contamination management
- Environmental engineering
- Civil engineering design
- Technical equipment
- Road engineering
- Railway engineering
- Port operations / Port logistics
- Project management / Construction management

Construction of Lomé's bypass road between the port and RN1 / General Planning

- Basic Evaluation
- Preliminary Design
- Environmental and Social Impact Assessment
- GIS/Surveying
- Detailed Design
- Soil engineering / Geotechnics
- Preparation of Tender documents
- Participation during the Bid Procedures
- Construction and Site Supervision

LEHRTE MEGAHUB FACILITY

A rapid handling facility for combined road and rail transport –
a unique project in Germany.



The MegaHub facility is being built 20 kilometres east of Hanover in northern Germany. Initial evaluations showed that the former Lehrte railway marshalling yard – a central hub on the German railway network, serving routes in the directions of Hamburg, Berlin, Braunschweig, Hildesheim and Hanover – was an ideal place to locate the MegaHub. The location is also already, or will soon be, comprehensively directly connected to the regional road and autobahn network in the region of Hanover. And a neighbouring cargo transportation centre will facilitate the establishment of new freight and transport companies in the area.

The MegaHub for combined transport – which involves at least two modes of transport – will optimise the transfer of cargo loads at night-time and conventional road–rail handling during the day, supporting the growth of combined transport. The current costly and time-consuming shunting of carriages will no longer be needed.

For long distances, transport of goods by rail is typically optimal, while trucks are more often used for short to medium distances. The combination of these different modes of transport optimises the transportation process from an economic, social and ecological point of view.

At the MegaHub, with its high-performance portal cranes and new type of sorting system, the handling of goods will be more efficient in the future. New customers will be attracted by the way different modes of transport are combined, by the resulting competitiveness and by the environmental friendliness of the rail transport. Incoming containers are now distributed, as full loading units, onto rail carriages to their destination. Freight trains do not require to be specially shunted or put together. A modern operating control system manages and optimises the interaction between the system's individual parts, e.g. the coordination between the control tower and the cranes.

Overview of construction site

»In road–railway handling of goods, the MegaHub is a project of the future in which digital models have been used to support such aspects as technical coordination and public relations work.«

Carsten Thümmel, Head of Railway Construction

Two things that make this General Planning project particularly special are its size and its duration. I was still a student during the initial planning phase, and since graduating I have been working on the project at Inros Lackner for eight years already – first as a project engineer, then as a project manager for the buildings, and for the past year I have been project manager for the entire project. An important aspect of the construction of the new MegaHub facility is the public participation. In particular, there were major concerns about noise. Through an intensive consultation process, it was possible to address all concerns and to involve the affected residents and the relevant action groups in the planning process. The diversity of the General Planning services required on this project necessitated intensive coordination of the involved parties, both internal and external.

Infrastructure

Approvals management

Foundation engineering/ Geotechnics

Civil engineering

Structural design

Railway engineering

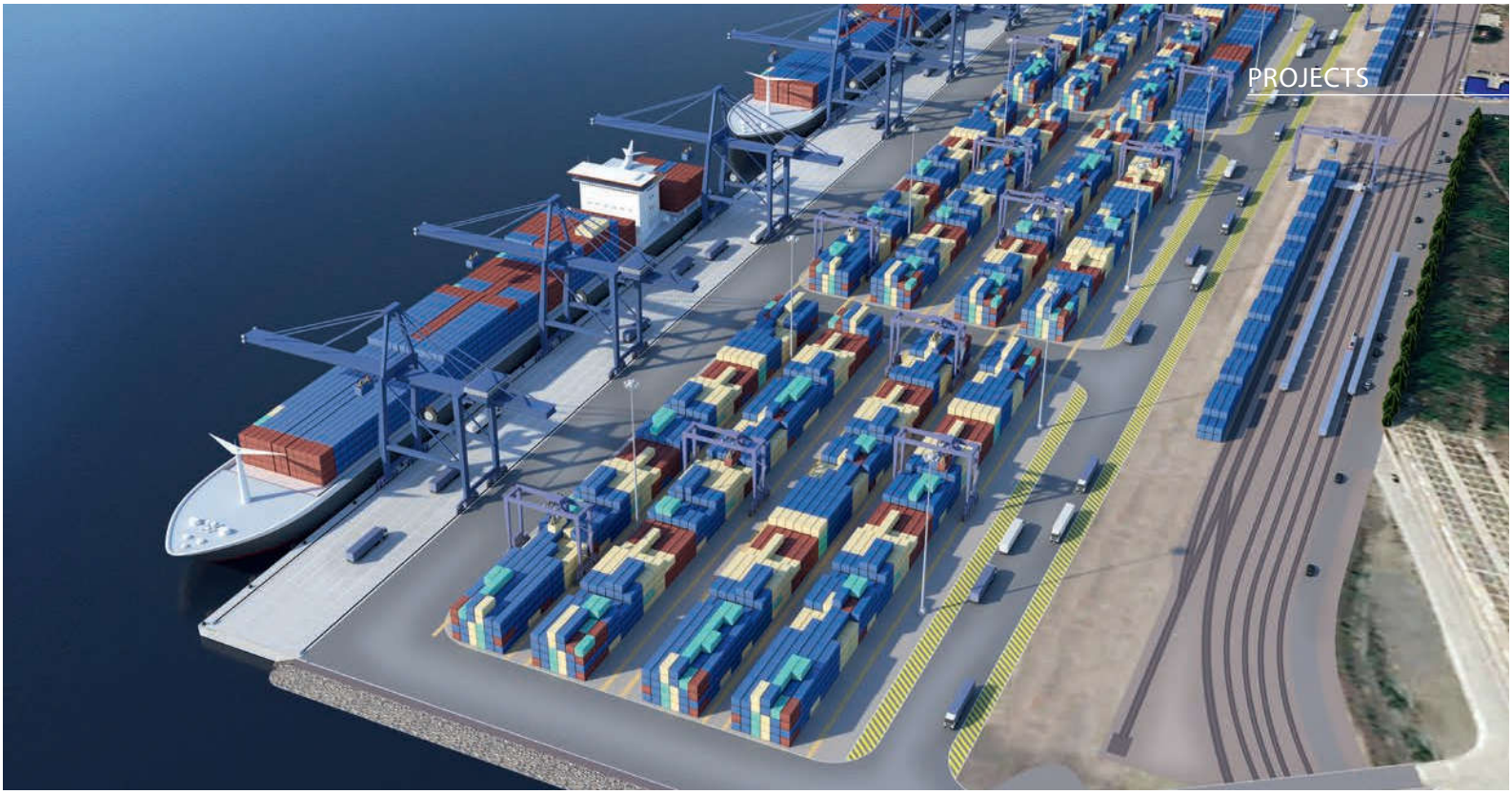
Project and construction management

On this project, a very strong emphasis has been placed on preventing noise – e.g. by minimising train shunting operations and by using a battery-operated sorting system. Soundproof windows are also being installed on houses in nearby residential areas.

Visualisation of handling operations

General Planning services on behalf of the client, DB Netz AG

- Site survey and soil contamination analyses
- Removal of approx. 6.6 km of ballast-based track
- Ground preparation work involving approx. 134,000 m^3 of soil exchange and the disposal of approx. 60,000 t of old ballast
- Renewal of approx. 1.5 km of ballast-based track
- Renewal of 13 switches
- New construction of 36 switches
- New construction of approx. 9.9 km of ballast-based track on water-resistant subbase in accordance with Ril 836
- New construction of around 22,600 m^2 of paved areas for containers, loading lanes and truck parking
- New construction of several buildings (terminal building with control room, and offices and staff facilities)
- New construction of a drainage system consisting of approximately 4.5 km of pipes with inspection shafts and a rainwater retention reservoir
- New supply lines for drinking water and firefighting water
- Coordinated ducting work
- Provision / adaptation of control and safety technology
- Comprehensive fire protection concepts for the stationary facilities



Visualisation of port development

EAST AFRICA'S GATEWAY TO THE WORLD

The Port of Mombasa is being expanded for post-Panamax ships.

The state-owned port operator Kenya Ports Authority (KPA) is investing in the future, expanding the Port of Mombasa and increasing its importance as a hub of East African shipping. It is the largest deep-sea port in the region, and a driving force for the development of the economy of Kenya and neighbouring landlocked countries such as Uganda, Burundi and Rwanda. The port's quay wall is over four kilometres long, and the port has 18 deep-water quays, including five berths for container handling. The volume of container ship cargo is growing sustainably, and currently accounts for about 70 % of the total volume. Estimates of future growth call for modernisation of the port's infrastructure and expansion of its capacity. In the future, ships with a draught of up to about 14.5 m will be able to dock in Mombasa Port. In addition to international maritime transport, the port also serves feeder ships and smaller dhows and boats that operate along the local coastline.

Dr. Klaus Richter, Executive Director

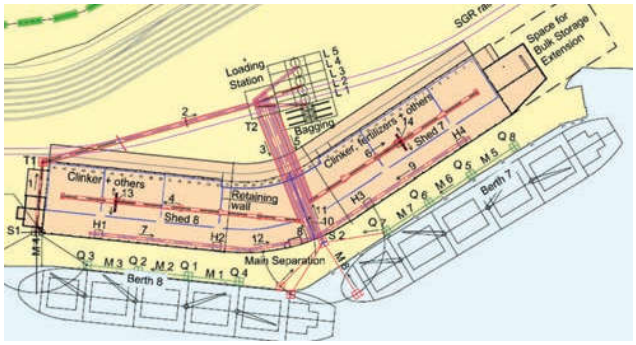
We have gained extensive experience in many projects around the world, including some of the largest port projects in East Africa, and can thus fully satisfy the expectations and objectives of our customers. Our multidisciplinary team develops optimal solutions for all aspects of a port development project – from logistics, planning, design and construction management to training and employee qualifications. We »live« this diversity, always taking all current technical and digital requirements on board as well as our clients' interests.

Dr. Karsten Galipp, International Head of Division

We have been working on Mombasa Port's modernisation project since 2014. Our services cover all aspects of port technology, such as transhipment, road and rail connections, simulations for the access channel, and the preparation of tender documentation for the construction work. We are involved in our capacity as a specialist planner and designer of maritime infrastructure, e.g. in relation to the modernisation of the quay walls and adjacent areas, and also as General Planner for both landside and waterside infrastructure. Together with local and international partners, we developed a traffic management plan, which includes the port's connection to the region's new standard gauge railway network.

Since 2014, Inros Lackner has been providing the port development project with General Planning services – ranging from preparation of master plan, through technical and specialist design, to construction supervision. The work has been carried out in three phases.

Phase 1: The condition of the existing port facilities was recorded, investigated and evaluated. The data obtained formed the basis for a feasibility study relating to possible renovation and expansion measures. Options were developed for rezoning the port with corresponding renewal and extension of the quay walls and the landside areas. Consideration was also given to the roads and railways in the port, the cargo handling equipment and the operation and administration buildings. Environmental impact studies were carried out, and the entire port property was resurveyed by means of aerial photography, supplemented by bathymetric methods on the quay waterside.

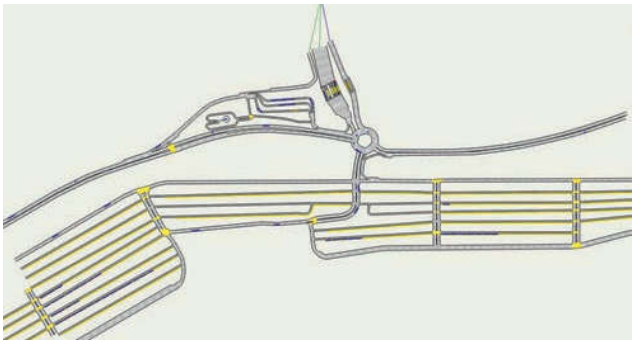


Concept of a new conveyor belt system

Phase 2: In the next step, the feasibility study was used as a basis for discussing and agreeing specific proposals with the client. Detailed design was then carried out for the quay wall and terminal infrastructure, including supply and disposal aspects, and the work was put out to tender. Some construction work has already been carried out, and rehabilitation work on existing facilities has been completed.

Phase 3: Under a separate contract, traffic forecasts for the future have been updated, and used as the basis for adapting the road and rail connections in the port area and for the local region. A concept was developed, using simulations, for optimising traffic flow on the port property, and supplemented by a traffic management and signage plan. For the transport of bulk materials such as clinker and fertilisers, new conveyor belt lines were designed to connect the quay wall in the port with silo facilities in the nearby industrial area.

Constructional traffic-optimisation measures



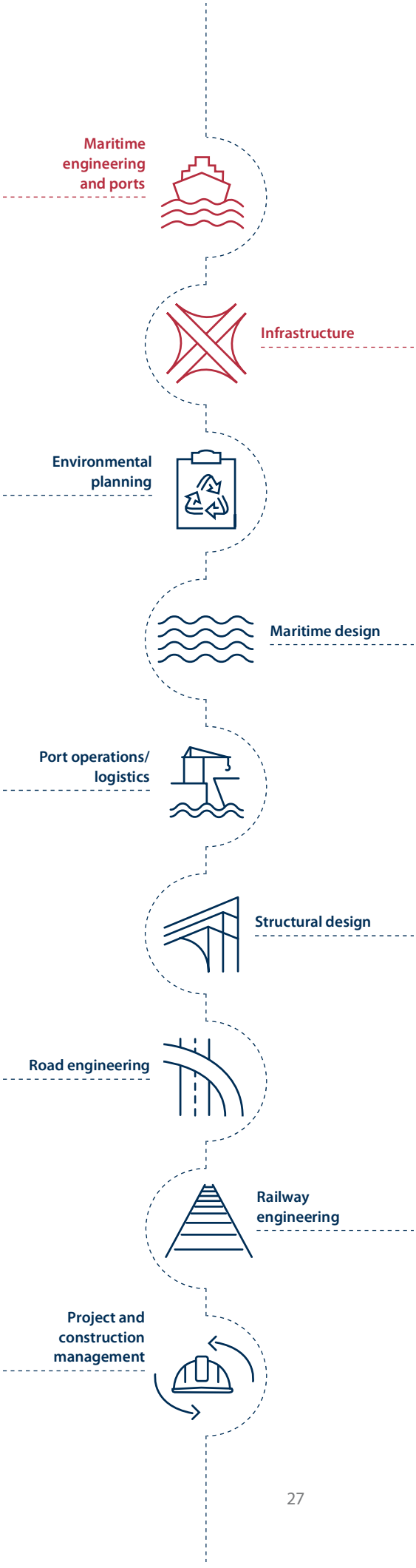
Traffic simulation

The various General Planning and consultancy services were provided by a multidisciplinary Inros Lackner team from Kenya and Germany, working in cooperation with a number of local and international partners.

Goods handling in the port

Johannes Augustin,
International Project Manager

In the feasibility study and the subsequent detailed planning and design, we brought together interdisciplinary expertise for the Mombasa Port development project. On this basis we have in recent years designed, among other things, a conveyor belt system for the Kenya Ports Authority, and completed a traffic study. Further complex construction projects in the future will continue to secure Mombasa's status as one of East Africa's most important logistics hubs.



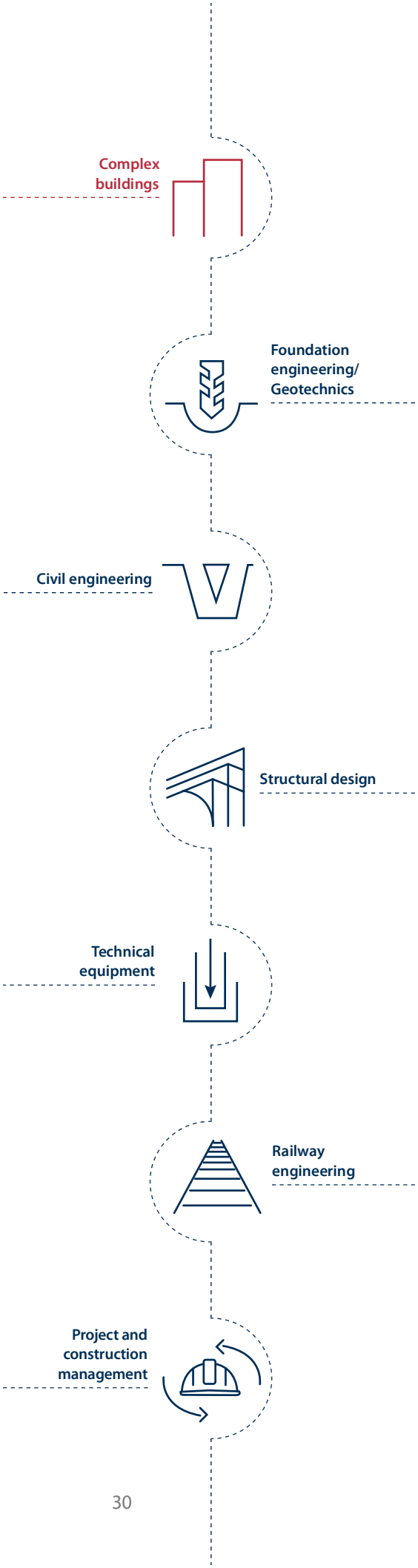
VOLKSWAGEN LOGISTICS CENTRE

After just 15 months of construction, VW's new factory building near Braunschweig in Lower Saxony, Germany has now opened.

In order to bring together the 13 various storage facilities of the Volkswagen plant in Braunschweig, a new centralised warehouse has been planned and designed on a site with an area of 142,500 m². The new logistics centre manages the flows of vehicle components for VW in an economical and environmentally sound manner – a task which has very particular requirements and which places high demands on the design and construction processes. The single-storey hall, of dimensions approx. 260 m x 180 m, has an area of roughly 50,000 m². With two delivery halls, noise is reduced for both incoming and outgoing goods since loading and unloading takes place inside the building. There are also 1,500 m² of office space and employee facilities on the premises, and approx. 33,500 m² of external paving including roads and car parks.

»A special feature of the storage facility, with its white floors, concrete elements and roof sheeting, is the very high standard of cleanliness.«

Internal view of hall



The logistics hall is divided, in accordance with its fire protection partitioning concept, into four »warm halls« (heated) and four »cold halls« (unheated but fully enclosed for noise protection reasons). The central part of the building, used for general storage, is heated, while the east and west ends of the building are unheated. The unheated sections each house sawtooth-shaped delivery ramps designed to accommodate ten truck deliveries at once, making it possible to process about 25 trucks per hour. With its railway track connection, consisting of a newly reopened existing track and a new line with shunting tracks, the logistics centre can also process a 360 m-long train each day once split between two tracks for unloading. In the heated hall where empty packaging is processed, six parking spaces are available for loading of used packaging onto trucks.

Access to the warehouse facility

A special feature of the storage facility is its extra-high standard of cleanliness, with floors, concrete elements (columns, girders, wall slabs, etc.) in the hall and roof sheeting all coloured white. In two halls, the LED lighting is combined with so-called »light cubes« for improved use of daylight.

Handling/disposal of drainage water takes place on the premises, without burdening the local public drainage system. The building is heated using modern, environmentally friendly gas-fired condensing technology, and roughly 60,000 m^2 of the property's total area of 142,000 m^2 are green, planted with bushes and trees. In total, more than 13,000 tonnes of reinforced concrete were used in constructing the building complex, and approx. 90 km of electrical and data cables were laid. The façade's total surface area, at about 9,300 m^2, is roughly 25 % greater than that of a football field. About 180 employees work on the premises, six days a week.

Karsten Lübke, Project Manager – Construction Supervision

It is always exciting to be able to work on a construction project like this. A complex building ensemble is created where nothing existed, meeting all the requirements of a modern logistics centre. The project's 15-month construction programme, involving many trades and specialisations that depended on each other in terms of scheduling, was very demanding. A highlight for me at the end of the construction phase was to see the building's whole interior gleaming white.

NEW WATERFRONT IN BERLIN

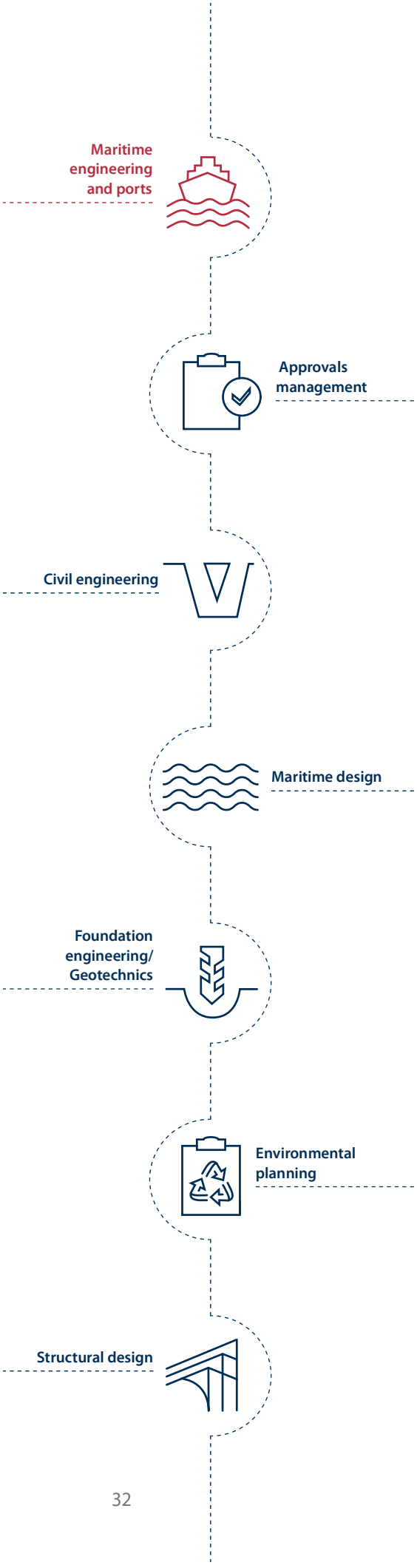
The heritage-protected »Viking Bank« of the River Spree in the German capital's Moabit locality is currently getting a new waterfront wall, and will soon be accessible again to pedestrians and cyclists after being closed for several years.

Installation of sheet piling on the Viking Bank

Already in 1911 – during the time of the last German Kaiser – people used to stroll along the Viking Bank, but after a century of use the bank wall was no longer adequate in terms of structural safety. Considering the risk of collapse, the Viking Bank was closed to the public. On the water below, the Spree-Oder waterway was also constricted for passenger shipping. The historic structure, and the waterfront path on top, are approx. 400 m long and part of the heritage-protected Spree Canal in Berlin's Mitte district.

On behalf of Berlin's Senate Administration for the Environment, Transport and Climate Protection, the Viking Bank is currently being reconstructed. The project's goal is to replace the existing structure with a new one in the very same location, with a design life of 80 years and meeting all applicable technical and conservation requirements. Particular challenges on this complex planning and design project include the need to retain existing trees where possible, the inadequate stability of the old construction, the heritage-protected status of some structures, the existence of pipework and ducting in the area to be excavated, the nearby Gotzkowsky Bridge and the need to maintain shipping on the river.

Inros Lackner, in the role of General Planner, is responsible for the design of the new waterfront wall and has been supporting the client for four years already, with responsibility for preliminary planning and design work, preparation of planning approval documentation, clarification of planning approval issues and preparation of tender documents. The construction contract was awarded in 2018 on the basis of the attained planning approval and the detailed tender documentation, with construction expected to require approximately two years. Structurally, the new waterfront wall is a simply anchored sheet pile wall with a reinforced concrete capping beam. Considering the heritage value of the structure it is replacing, the design includes cladding with high-quality precast elements. Stairways and emergency exit ladders are integrated in the waterfront design, as is the promenade area on top, complete with seating.



Visualisation of the new easy-access Viking Bank waterfront

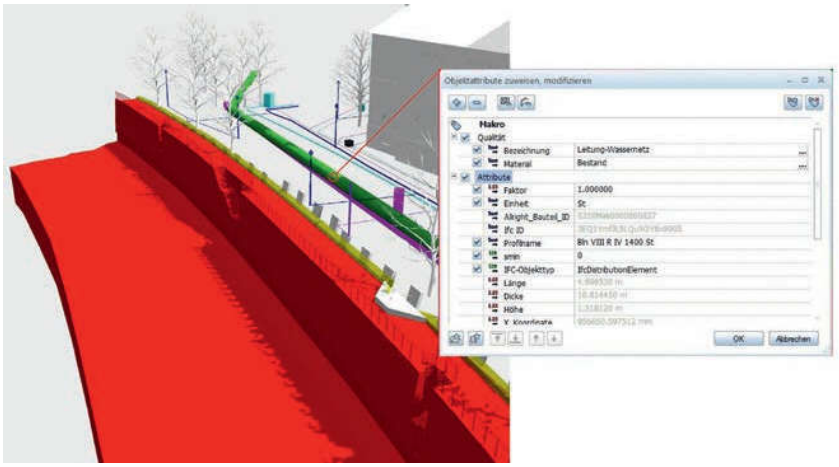
Complex overall model

The various General Planning tasks were brought together with the help of a multi-disciplinary BIM model. The model was created using Allplan Nemetschek software and based on the completed preliminary and design planning. As well as providing 3D design representations, the model also enables interfaces to be defined, collisions to be identified and quantities to be calculated. Time attributes were then used to develop construction scheduling (5D model) and to support the creation of bills of quantities (BoQ). CPI and IFC were generally used as interfaces, as well as additional interfaces for rendering. In order to avoid collisions, a strong focus was placed on ensuring the appropriate minimum distance of the new anchors from the existing pipework and bridge structures.

In visualising the construction scheduling, various possible construction processes, and their impacts on the existing structures, could be readily evaluated. This enabled, for example, any need to provide temporary support for structures to be easily recognised. The BIM model was also very helpful in dealing with the public, with the 3D models used to explain the proposed construction work very clearly to local residents and action groups, and to present and illustrate the impacts of the work throughout the project.

Structuring the BIM model

- All critical elements of the existing waterfront, such as pipelines, buildings and the bank wall, were included in the model as separate objects.
- All elements of the new construction were also included as separate objects in the model, with 13 waterfront blocks each assigned ten construction phases and the associated scheduling.
- All included individual objects were designated as belonging to one or more of the model's three main layers: existing, new construction and demolition.
- Each object has the following attributes as standard: Geometrical properties (length, surface area, volume); designation (e.g. terrain, retaining wall, filling); object name (type in CAD context: 3D surface, 3D element); and material (structural steel, concrete, sheet piling). Additional attributes indicate to which of the 13 waterfront blocks each object belongs and define the associated construction phases.

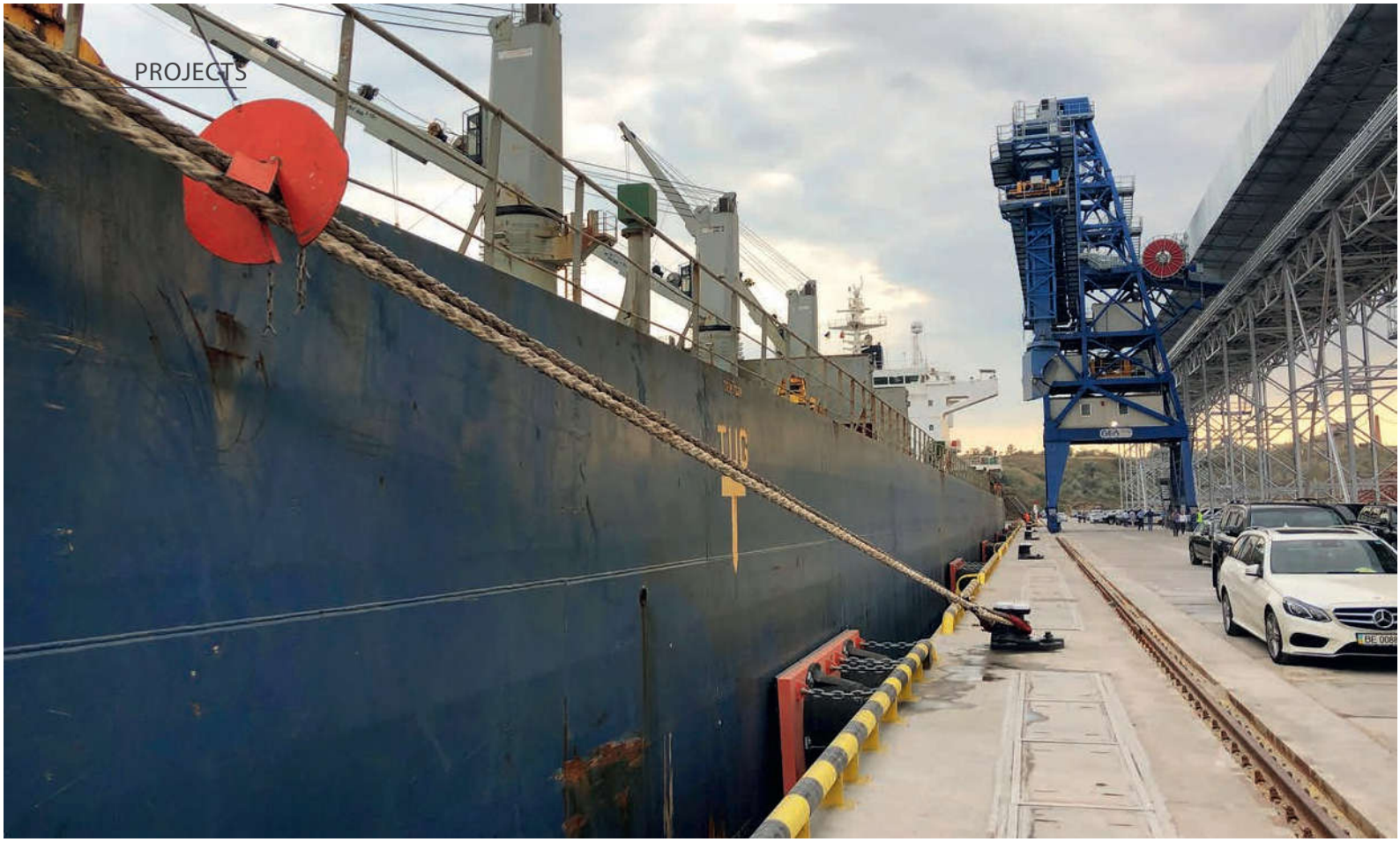


Sheet piling was installed along the edge as a retaining wall

»The ongoing digitalisation of project work is resulting in increasingly comprehensive interlinking of all disciplines. 3D models offer a very flexible basis for General Planning work to be carried out.«

Oliver Loebnitz, Deputy Head of Maritime Engineering

This pilot project has given me good opportunities to have a real influence, for example, on the structural design, on the design of the promenade area and on the appearance of the waterfront wall in the heart of Berlin. I am also drafting, in close cooperation with the Berlin Senate Administration, design guidelines for upcoming waterfront construction projects. In the use of BIM, we are also developing new capabilities – e.g. in now determining quantities, for the first time, on the basis of a 5D model, and using time attributes to develop a construction programme.



Visualisation of port development

NEW GRAIN TERMINAL IN YUZHNY PORT

Significant investments are being made in the development of Ukraine's seaports – including in relation to transportation of bulk goods thanks to increasing volumes of agricultural exports.

In the Port of Yuzhny, near the city of Odessa located at Ukraine's Black Sea coast, a state-of-the-art grain terminal with an annual throughput capacity of up to 5 million tons has been built. Grain is one of the seaport's main type of bulk cargo, and the development project has created approximately 500 new jobs. The construction of the new terminal, a joint project of MV Cargo and Cargill, has been one of the largest foreign investment projects in Ukraine in recent years. The opening of the entire terminal complex, including ship berthing areas and silos, was celebrated in autumn 2019 with a »Port Fest«. For the construction of the new grain handling facilities, which are concentrated at Berth 24, Inros Lackner provided the associated planning and design services, right up to and including detailed design. In addition, Inros Lackner designed three additional berths – nos. 14, 15 and 25 – as deep-water berths for bulk cargo and container handling.

From a construction point of view, the design of the deep-water berths, with water depth of 21.66 m and quay wall height of 1.71 m, was a particular challenge. Such a large difference in ground level is exceptional, and was unprecedented in Ukraine from a marine construction point of view. It required not only element lengths and construction types to be adapted to the design depth, but also the corresponding piling and dredging technology. In the end, the design was based on a combined crane way and piled wall cross-section, with piled steel pipes and rear anchoring – a solution that had already been successfully implemented several times in Yuzhny Port.

The project implementation required the planning of the heavy marine engineering work to be coordinated with the dredging work. As General Planner, the team provided the associated planning and design services, continuing to serve the client as technical consultant throughout the construction phase until acceptance and handover.

Tobias Günzl, Head of Maritime engineering and ports

In the design and construction of the berths, Inros Lackner played a significant role in the expansion of Yuzhny Port. We are proud to have been able to advise the project team on site, and grateful for the client's trust in the competence and capability of Inros Lackner – and the project team in particular – to plan, design and move forward these complex berth construction works within a very short period of time.

Notable construction aspects:

- Construction of a 400m-long retaining wall with a reinforced concrete structure on top
- Retaining wall height of 23.37 m, with rear anchoring
- Permissible traffic loading of 100 kN/m² (= 10 t/m²) on the quay above
- Piling in rock-like ground
- Dealing with port-typical soft soils in the course of the dredging work

Berths 14/15 and 25 were designed on a similar basis, completing Yuzhny Port's quay renewal with deep-water berths.

Maritime engineering and ports

Port operations/ logistics

Maritime design

Civil engineering

Structural design

Project and construction management

HAMBURG PORT AUTHORITY

Important economic engine for the whole of Germany

Since 2005, the Hamburg Port Authority AöR (HPA) has been the Port of Hamburg's control centre where everything comes together – an expert port manager, a public-law institution and a modern service enterprise with around 1,800 employees, all in one. On the port property of more than 7,000 hectares, the HPA gets goods and people moving by sea, road and rail. Together with its subsidiaries, Flotte Hamburg GmbH and Cruise Gate Hamburg GmbH, the HPA relies on innovative technology and intelligent solutions in implementing its pioneering port concept with greater safety, efficiency and ease of operation on all transport routes. As a real estate manager and client of important infrastructure construction projects – such as the globally unique Rethe double bascule bridge or the new Kattwyk railway bridge – the HPA contributes to the design of the cityscape and makes the port, over the entire value chain, an important economic engine for the whole country.

The duties of a port operator are many and varied – the HPA oversees and manages all shipping traffic in the port around the clock from the port's Nautical Headquarters. It also provides high-quality infrastructure, e.g. in operating and maintaining bridges, locks, tunnels, roads, railway tracks and quay walls. Another important task of the HPA is the dredging work required to keep the port's shipping channels navigable at all times. The authority also markets its expertise in port management, and promotes Hamburg's port interests at national and international level.

HPA Hamburg Port Authority

© Hamburg Port Authority/Andreas Schmidt-Wiethoff

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www.hamburg-port-authority.de

Services provided for the HPA

Inros Lackner has provided various planning and design services for the HPA and has been supporting projects in the Port of Hamburg for many years. These include, among others, the supervision of bank strengthening works at Lotsenhöft, the design and contract award of the Ellerholz lock bridge, and design services for the locomotive servicing area. Currently, we are assessing the condition of quay and banks walls, and supervising the renaturation of the Spadenlander Busch/Kreetsand disposal site for dredged material.

ENGINEERS WITHOUT BORDERS

Improving living conditions, sustainably

We are glad to support the work of 'Ingenieure ohne Grenzen' (Engineers without Borders, Germany) in Tanzania. This year, our donation goes towards a project that promotes the expansion of basic school infrastructure in Mashati, east of Kilimanjaro. Using participatory methods, it is aimed to improve education levels in the region and thereby also the economic situation of the people.

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