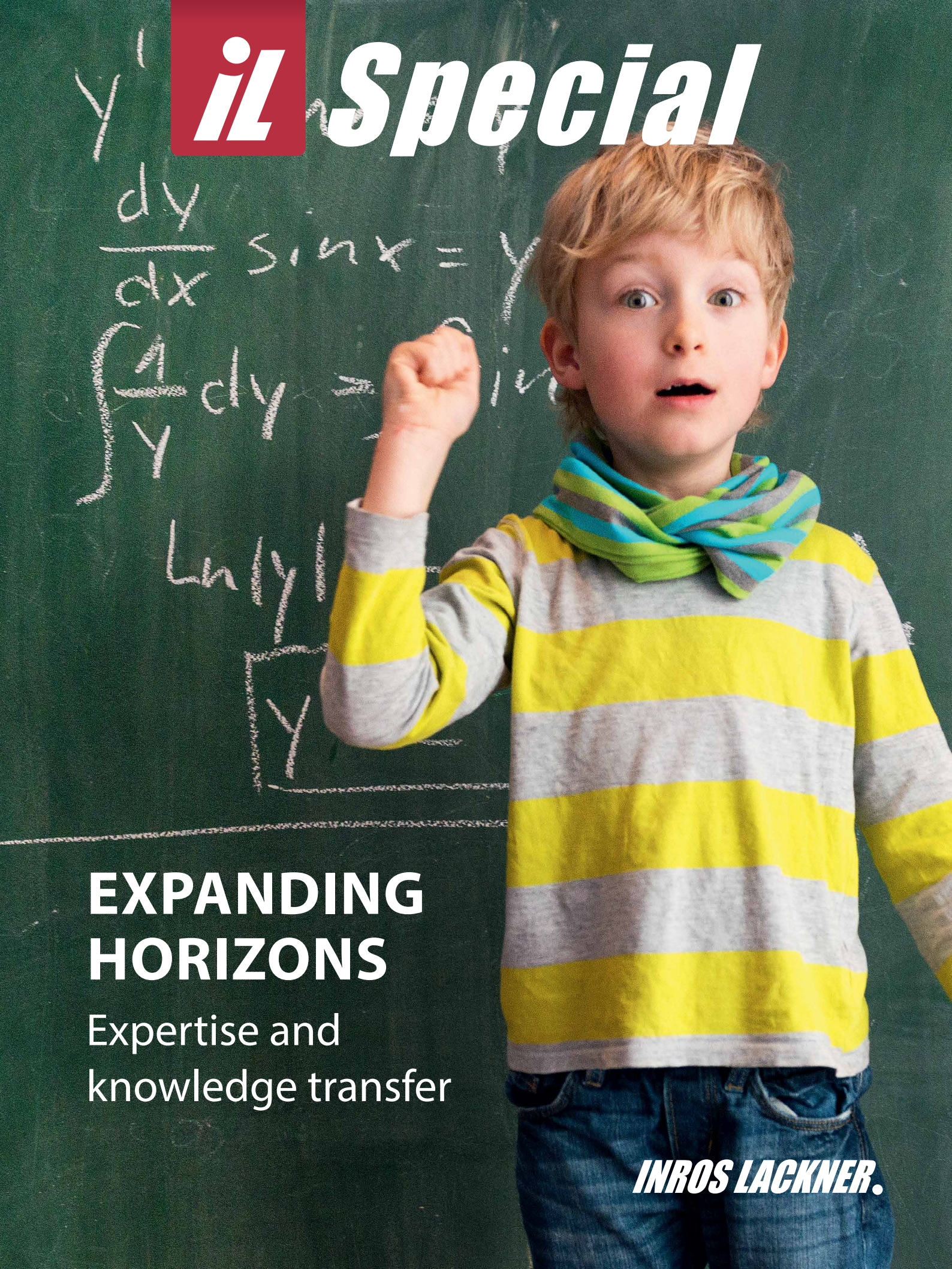
iL Special



EXPANDING HORIZONS

Expertise and knowledge transfer

INROS LACKNER.

Dear readers,

»Progress depends on the exchange of knowledge«, said the physicist Albert Einstein. This sharing of knowledge, this knowledge management, is crucial for corporate development. It is a success criterion that relies on the skills and competencies of employees and management. The diversity of technical expertise among our experienced and our young employees, and their willingness to expand and pass on their knowledge, are particularly important in this context. With digitisation and the much-changed world in which we live and work, we have new possibilities for knowledge transfer. Our new approaches include the establishment of our IL-Academy and the integration of online formats in our work. Read more about this in the interviews on the first pages with Professor Konrad Spang from the University of Kassel and our company director Ingo Aschmann.

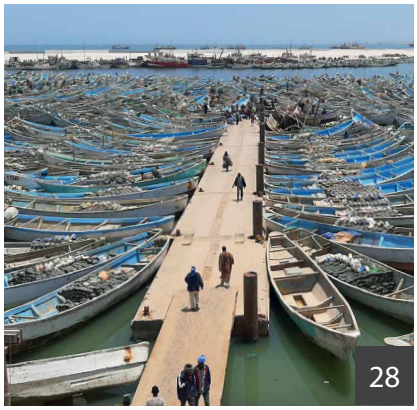
As General Planners, our future depends on the successful implementation of a wide range of projects. It is the project experience from past decades on which we build and with which we develop further. We report on this project knowledge and introduce the University of Wismar as our cooperation partner in this regard. Collaboration with universities is important to us. It enables us, for example, to contribute our practical experience by engaging our employees in teaching and research.

We do not want to leave unmentioned the coronavirus crisis we are all experiencing. These are challenging times. Acting responsibly and standing together are central to our activities, enabling us to continue to be there for our customers and partners – reliably and with the highest quality.

Keep well and stay safe!

Dr. Klaus Richter
Executive Director

Torsten Retzlaff
Executive Director



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New building for technological and commercial centre

4,000 square metres of business premises: Demand is growing for commercial space in northern Germany. A new building there will offer rental property with modern office and production space in the city of Schwerin's Technological and Commercial Centre (Technologie- und Gewerbezentrum [TGZ]). As General Planner on the project, Inros Lackner is responsible for the project's design, planning and construction aspects. The building complex will become the technology park's new entrance structure, and thereby a landmark for the entire area. The building is designed with four structurally similar parts, or modules, connected together. The design of the modules offers great flexibility for use, facilitating numerous floor plan variations for production and office areas. The connections between the modules accommodate washroom areas etc. Further individual service facilities can be planned separately for the four modules. The design thus creates space that can be flexibly used according to the needs of each individual tenancy in this lively technology centre. Should more space become needed in the future, the new building complex can be extended to the south by a further module and by an extra floor.

Official groundbreaking

New school campus for Mecklenburg-Vorpommern: The seven-hectare site will include a new secondary school, a primary school with an after-school care centre, a two-field sports hall with a cafeteria, and a sports field and outdoor recreation areas. The cost is estimated at approximately 40 million euro. As General Planner, Inros Lackner is responsible for the technical building systems and the technical outdoor facilities. Laying of the foundation stone took place in December, and the school should open in time for the 2022/2023 school year, with the overall project expected to be completed by the end of 2023.

Inauguration of Supreme Court building in Vietnam

Implementation completed in record time: At the end of October 2020, the new headquarters building of the Vietnamese Supreme People's Court was inaugurated in Hanoi. Collaborating in a joint venture with the Vietnamese company Coninco, Inros Lackner Vietnam took on the role of General Planner for the project. The new building, constructed on an area of 6,417 m^2, was completed in a record construction time of only 399 days. The total cost of the six-storey building with its additional four basement levels is approximately 30 million euros. The court building was designed in a contemporary »new classical architecture« style considering its historical significance and the character of the district. The new building is adjacent to the old, historic Palais de Justice with its French colonial architecture. The two structures together form a harmonious architectural ensemble with a green inner courtyard in which the balance between old and new is expressed in space and form.

The building was awarded the title »Building of high quality« by Vietnam's Ministry of Construction. Responsible for the design are Torsten Illgen (Inros Lackner Vietnam) und Nguyen Dang Quang (Coninco).

© Press office, Greifswald city administration

Foundation stone laid for Centre for Life Science and Plasma Technology

Design of technical building systems: In the presence of the German Chancellor, Dr. Angela Merkel, and the Minister for Economic Affairs of Mecklenburg-Vorpommern, Harry Glawe, the foundation stone was laid in February this year for the construction of the new Centre for Life Science and Plasma Technology in the Hanseatic city of Greifswald. This new laboratory complex is being built in the immediate vicinity of the university campus, in the courtyard-like area between the BioTechnikum and the Leibniz Institute for Plasma Science and Technology. Inros Lackner is responsible for the design of the technical building systems in all phases of the project, and also for the supervision of building construction. Following after the Institute for Plasma Science and Technology, the Centre of Drug Absorption and Transport, and the pharmacy and pharmacology laboratory and training building, this is already the fourth research and laboratory building on the university campus in Greifswald for which Inros Lackner has provided planning and design services.

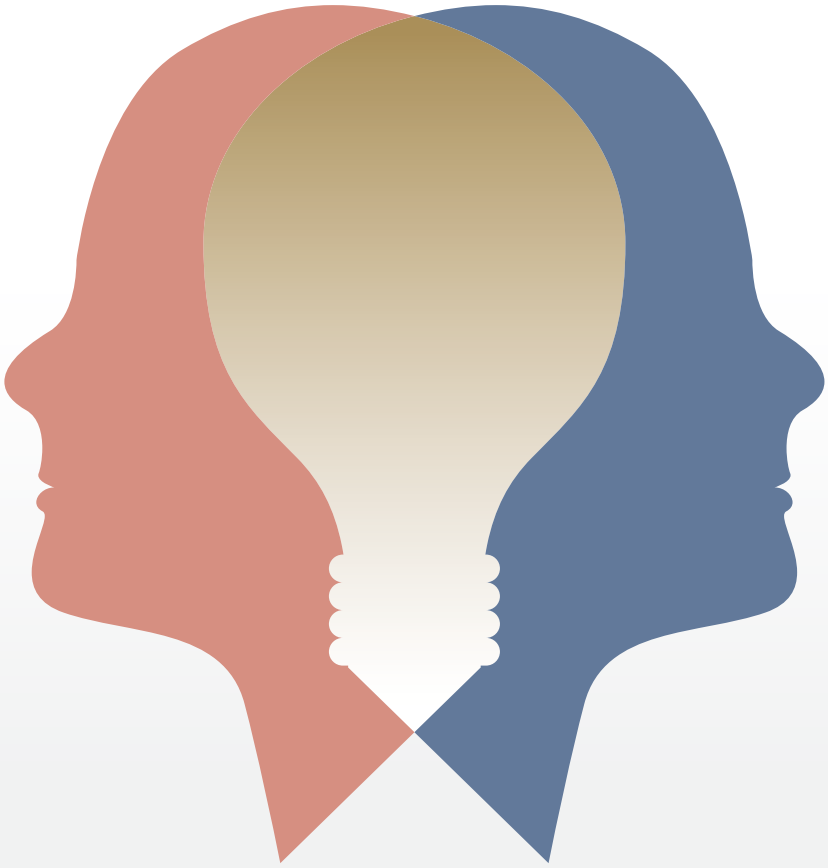
INROS LACKNER hilft

Social commitment

With the establishment of the registered society »Inros Lackner hilft e.V.« we are expanding our social commitment and activities in the countries in which Inros Lackner projects are implemented. Our goal is to support disadvantaged people in improving their long-term living conditions. Working in partnership with local organisations is important to us in helping to develop enduring and independent solutions. The contributions of hospital beds in Congo-Brazzaville or of computers for schools in Sierra Leone are good examples of the projects supported by »Inros Lackner hilft«.

We provide financial support for humanitarian projects in the areas of healthcare and hygiene, nurturing and education, disaster prevention and development cooperation in regions with low to medium incomes. Our work is focused in countries in which Inros Lackner is already active from an engineering perspective, enabling us to help improve living conditions in those countries in more ways than one.

Engineering and helping with passion!



»The essence of management is to make knowledge productive.«

Peter F. Drucker

EXPANDING HORIZONS

Expertise and knowledge transfer

The ways in which civil engineering projects are structured have changed significantly in recent years. High technical quality alone is no longer sufficient to ensure success. What is needed is a holistic approach for structures to be designed and constructed in a customer-oriented, economical, sustainable and timely manner – a process that is influenced by new technical resources and by changes in values, thought patterns and behaviours. Companies are increasingly confronted with external expectations from stakeholders and political actors. What personnel is needed in the company, and what knowledge, to meet this mix of demands?

IN CONVERSATION

Univ. Prof. Dr. Ing. Konrad Spang
Head of the project management department at the University of Kassel

Professor Spang studied civil engineering in Stuttgart. He then gained his first work experience as a project engineer and project manager. At the same time, he completed postgraduate studies at the Technical University of Munich, and then obtained his doctorate at the Institute for Rock Mechanics and Tunnelling at ETH Lausanne in Switzerland. He then held management positions in various engineering companies, and from 1993 to 2002 was head of the Dresden project centre and authorised representative of Planungsgesellschaft Bahnbau Deutsche Einheit mbH (PBDE), which later became DB Projekt Verkehrsbau GmbH. Since 2002 he has been a professor at the University in Kassel and head of its project management department.

Expertise and knowledge transfer are central topics for project management and thus for company success. How can expertise be differentiated in companies today?
With the increasing complexity of the ways in which projects are structured, much broader interdisciplinary knowledge is required today than in the 1980s and 1990s. Back then, German engineering was primarily known and valued for its high technical quality. Topics such as costs and the law were not so relevant in university courses. Of course, technical quality is still very important, but that alone is no longer enough. We keep hearing about rising project costs. That is not acceptable – as engineers we must keep costs under control. The traditional German recipe for success, by (over-) engineering, must now be viewed in a more nuanced manner and requires project teams to also have economic, social and ecological expertise. Another part of knowledge management is dealing with stakeholder acceptance and the environment – fauna, flora and society. Biologists, geoscientists, lawyers and communication professionals increasingly strengthen the diversity of employee structures in architecture and engineering companies.

A lot has changed, especially in the areas of environment, law and communication. Is knowledge of such topics fundamentally important?
Today, it is essential to be sensitive to these issues. Architects and engineers must face the fact that their work is no longer just a matter of pure engineering, but rather, that structures must be compatible with the environment. Problems and challenges must be identified early and, if necessary, experts consulted. The Stuttgart 21 project showed that projects cannot be implemented against public resistance. That would not make sense anyway, because we build for society. In the age of digitalisation, communication also plays a central role. Today, for example, much is communicated via social media. We need to capture such information and commentary about our projects. For this we need specialists who know how to use these channels for communicating with the public. That way, information can be absorbed and integrated into our project work.

→

Can expertise be distributed within a company in a focussed way?
Employees vary greatly in their specialisations and project experience. This wealth of knowledge is distributed across various departments and administrative areas, between young, less experienced employees and older, more experienced ones. Every project, every structure is different. That is the key point. So, the aim should be more to network the available project knowledge, and less to distribute it.

Are you talking about knowledge transfer?
Yes, one of the particularly important issues in civil engineering is knowledge transfer. Unlike the auto industry with its automated production and fast learning curves, every construction project is different – starting with the customer requirements, the surroundings and the building site but also including such varied subjects as technical equipment and future maintenance. As an employee, I must use many sources of information and take advantage of the knowledge that is available from similar projects.

As a young engineer, I worked with experienced engineers in a construction company and learned a lot in the process. Although I came from university with a higher education, my knowledge was primarily theoretical. Back then, it was common for experienced and less experienced employees, regardless of their education, to work together and learn from each other. An important approach, which is not taken so much anymore.

»Project structures and corporate cultures that ignore the human factor will not be successful in the long term.«

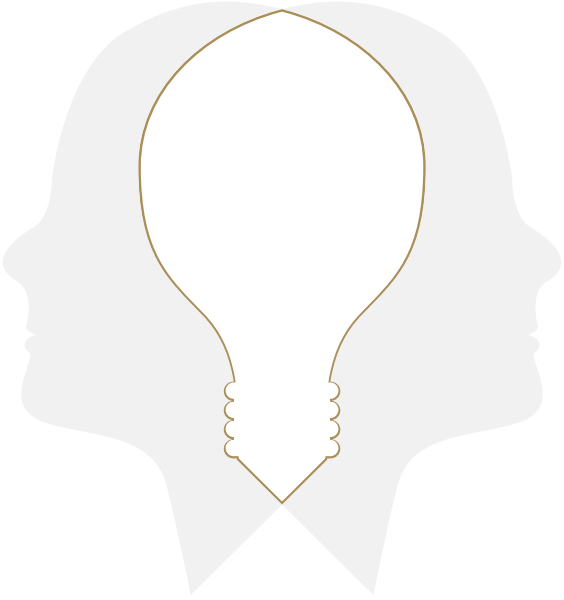
What criteria are critical for successful knowledge transfer?
Success depends very much on the corporate culture. The more open it is, the more comfortable the employees feel, and the more they are valued, the more they transfer their knowledge. A basic problem for knowledge transfer relates to power. A sentence I heard years ago still often applies: »Knowledge is power, and power is not readily shared«. If my position in the company depends on this power, then of course I will not want to share my knowledge. Project structures and corporate cultures that ignore the human factor will not be successful in the long term.

How do technology-based industry newcomers influence the knowledge culture of companies?
The younger generation shares its knowledge with greater openness. However, companies will only benefit from this if they are open to it. When young engineers are confronted with old, rigid structures, they will either quickly move on or adapt. But it must be understood that young engineers do not get very far just using what they learned in university. They need to benefit from the experience of older employees. In civil engineering in particular, a great deal of competence is based on experience.

How can the knowledge that employees and experts have acquired over the years be retained and shared? What would you recommend?
The range of possibilities is wide but, in my opinion, it starts with the integration of professional knowledge management into the corporate culture. In this way, topics such as diversity and transparency are specifically addressed and integrated into work models. This includes mixed project teams and small knowledge/working groups that exchange ideas and discuss technical topics on an interdisciplinary basis. In addition, further training such as workshops and project management courses can be used in a targeted way to support individual advancement and information exchange. For this to function well, the needs of the company must match the interests of the individual. If, for example, an employee is more interested in technology than in communication and dealing with people, he or she should not be put in the role of overall project manager.

»In civil engineering in particular, a great deal of competence is based on experience.«

For successful transfer of knowledge within a company and the nurturing and further development of expert knowledge among staff, these measures must be actively developed and implemented.



IN CONVERSATION

Ingo Aschmann
Director, INROS LACKNER SE

After studying business administration with a focus on law, Ingo Aschmann worked in KPMG's auditing department for a number of years. He has had a management role at Inros Lackner since 2007, and been on the company's executive board since 2011. He also leads the »Taxation in other countries« expert group of VBI (German association of consulting engineers), and is a member of the »International taxation issues« subcommittee of BDI (federation of German industries).

Why did you decide to establish the IL-Academy?
Over our almost 85-year company history, we have understood that well-qualified, high-performing employees with up-to-date knowledge are central to the company's success. Combining experience with new innovations and technologies has been a pillar of our success. Having the right qualifications is a significant competitive advantage, especially in times when the rate of technological change is only increasing. So it is important to us to identify the further training needs of our employees – comprehensively and at an early stage.

An in-house educational establishment can offer many advantages. It can ensure the transfer of knowledge as tailored to the particular company's needs, strengthen the feeling of togetherness among staff, and promote employee satisfaction. The IL-Academy was founded in 2019 to achieve all this and integrate it into our everyday work.

What training strategy do you apply to ensure continuous staff development and knowledge transfer within the company?
Since we continuously invest in further training, it is becoming more and more a natural part of our everyday work and staff development. In our mission statement we say: »We foster our employees by offering them possibilities to develop and to gain qualifications in an environment of equal opportunity«, and we try to always live by this. We offer an extensive training and further education program for professional and personal development. This includes individual training courses, special events for our project engineers and project managers, and training courses for our next generation of managers.

We also have various »onboarding« measures for new employees, such as our induction day and our mentoring program. It is important to us as a company that experienced and new employees can learn from each other. Every new employee is paired with a mentor who shares personal experiences and can explain things as they occur. This creates trust right from the start, and strengthens the sense of togetherness. In addition to technical and soft skills trainings, we also offer language courses. Our »internationalness« is important to us, which is why our German employees have the opportunity to learn foreign languages and our international employees can take German courses. Many of the questions we face in our everyday work can be answered better if we can look beyond national borders. Each individual training program is discussed and evaluated in the course of annual employee appraisals involving the employee and his or her manager.

»Having the right qualifications is a significant competitive advantage, especially in times when the rate of technological change is only increasing.«

What role do digital technologies play in this?
Digitalisation has become an indispensable part of our world and is already something we take for granted in many areas. We all benefit from it in our communications, in shopping online or in acquiring knowledge. Rapidly developing technology is changing not only our society but also our working world, and is constantly

presenting us – as a company, and as individual employees – with new challenges. But it also offers many opportunities. Among other things, digitalisation presents new and exciting possibilities in relation to professional development. Therefore, a combination of in-person formats and e-learning/online options is very important to us in optimising staff training.

For example, our employees have the opportunity to learn foreign languages using the Babbel language app, enabling them to practice where and when they want. In order to continuously develop and improve, we use the Tweedback platform which facilitates anonymous, digital, interactive feedback. This enables us to implement suggestions for improvement immediately after any event. In addition to face-to-face training courses, we also offer online seminars and instructional videos. On our company intranet, our employees have access to training material and presentations from both internal and external courses, and they can put together their own individual training plans. We are currently working on the use of Office 365 programs such as Teams and SharePoint. Using Teams, employees can communicate with each other even faster and more easily than before. As well as enhancing efficiency, these technological possibilities help us to promote sustainability – an important goal towards which digital technologies support us, for example, by reducing travel and the use of paper.

»Digitalisation presents new and exciting possibilities. We support a combination of in-person formats and e-learning/online options.«

How do you go about identifying new qualification requirements at an early stage and developing corresponding opportunities for employees?
We continually re-evaluate our training and further education opportunities. Since many of our staff participate in professional organisations, associations or university institutions, we stay informed in a variety of ways about current developments in research, training and societal trends. And we ask ourselves questions such as: How is our market developing? How will the labour market and working conditions develop as a result? What technological and societal changes can we expect? What (new) skills will we need in order to remain competitive?

Developments such as demographic change and increasing digitalisation impact on our employees' work areas, prompting us to react. On the basis of our periodic formal discussions with employees, we adapt our training opportunities to match our current requirements. At the same time, we pay attention to our customers' wishes and look for further possibilities to develop. As an innovative company offering sophisticated architecture and engineering solutions, we are always open to new ideas.

How important are team development processes for knowledge transfer?
According to the Zukunftsinstitut, knowledge culture and connectivity are currently megatrends in Germany. By networking employees with one another, we can promote the transfer of knowledge. We achieve this not only by using workshops, but also by promoting team spirit at our various company events such as the annual company-wide party. We use the first part of this day to focus on training and education, with employees able to choose from a wide range of courses on our intranet. This improves communication, promotes capabilities and optimises external and internal interfaces, resulting in both economic and social benefits. Improved knowledge transfer accelerates the finding of answers to new questions. We also encourage communication among staff by creating spaces that people will find inviting in this sense. Modern meeting rooms, e.g. meeting rooms with the latest technology but without seating, are available to all. And diversity management is just as important to us. That is why we promote the building of teams whose members differ in terms of age, gender, religion or cultural/social origin. Over 20 nationalities are now represented in our company. The more interdisciplinary and diverse a team is, the better the solutions and the more innovative the ideas that will result. In order to combine knowledge from universities of the latest technical developments with practical experience from the successful completion of a wide variety of projects, a good balance between career starters and experienced engineers is very important to us. Knowledge and knowledge transfer will only gain in importance in the future, because know-how is already a decisive factor in determining how efficient and successful companies in our industry will be.

IL-ACADEMY

2019
Year established

Online course booking

General courses

- Technical training
- QM system
- Language courses
- Soft skill courses

Compulsory courses

- Occupational safety training (once a year)
- Driving instruction for employees
- QM training prior to taking on project management responsibilities

Training media

- Instructional videos
- Training material and presentations from internal and external courses
- Feedback surveys via Tweedback
- Online seminars
- Classroom courses

»Onboarding« process

- Welcome bag
- »Onboarding« brochure
- Mentoring programme
- Induction day
- 365 days at INROS LACKNER


INROS LACKNER.

IN A CLASS OF THEIR OWN!

A wealth of knowledge behind every door in the office.

Our company's employees have acquired a wide variety of educational and professional qualifications throughout their working lives. They also have skills that are not subject-specific but are relevant to their work and characteristic of the individual, both professionally and personally. It is important for companies to carefully consider how they can promote their employees' knowledge and skills in a targeted way, and optimally use them in projects.

Dr.-Ing. Heiko Spekker
Head of Hydraulic and Coastal Engineering

ACTIVELY ENGAGED IN PRACTICE AND TEACHING

»In my day-to-day work and at universities, I am fortunate to work with a young, motivated team of hydraulic engineers.«

Heiko Spekker studied civil engineering at the Leibniz University in Hanover, and then worked from 2002 to 2008 as a member of the research staff at the Ludwig Franzius Institute. In the course of a PhD scholarship from the German Academic Exchange Service (DAAD), he worked in research at the Coastal and Hydraulics Laboratory of the U.S. Army Corps of Engineers. In 2008 he received his doctorate on the subject »Controlling of coastal protection infrastructure on tidal rivers as a basis for flood and risk management«. Since 2008 he has been working for Inros Lackner in Bremen. After a few years as a project manager he became Head of International Projects in 2014, and has been Head of Hydraulic and Coastal Engineering since 2019. He is a member of the Bremen chamber of engineers (Ingenieurkammer), the German association of consulting engineers (VBI) and the German port technology association (HTG), and also teaches at several colleges and universities.

Christian Esser
Regional Manager Togo/Benin

RETURN TO AFRICA

»In 2009, after spending two years working as a project engineer in INROS LACKNER's Bremen office, I already got the opportunity to move to Togo with my wife.«

I grew up in Togo and Gabon, and have fond childhood memories of Africa. In fact, when my family moved to Germany at the age of twelve, it was already clear to me that I would return to Africa one day. After graduating from high school and then completing my German national civilian service duties, I studied civil engineering at the University of Applied Sciences of Lippe and Höxter, majoring in hydraulic engineering and water management. The subject of my diploma thesis was the planning of the Lomé seaport extension, which set the right course for a return to Togo. Then, in 2009, after spending two years working as a project engineer in INROS LACKNER's Bremen office, I already got the opportunity to move to Togo with my wife. My first project in the country related to the drainage and dredging of the Lomé lagoon, and I was fortunate to be able to work on the project through all its phases, including design, tendering, bid evaluation and construction supervision. I have now lived and worked in Togo for over eleven years. Our office in Togo has been contributing to improving the country's infrastructure since the 1960s, when it started supporting the long-term development of Lomé Port. After the resumption of international cooperation in 2008, we strengthened our local team to about 20 people and were able to expand our scope of activities significantly. During my professional career at INROS LACKNER, I have so far worked on and successfully completed about 40 projects in the field of infrastructure and coastal protection.

»Don't be afraid to share what you know, because you know it better than anyone else!«

Bob Buckman

Gesche Fremerey
Branch Manager, Stuttgart

FIRMLY ROOTED IN TRANSPORTATION

»In a team with a high level of personal commitment from young engineers, we have developed in recent years an innovative approach to generating imagery and 3D data using drones.«

Already during her civil engineering studies in Frankfurt, Gesche Fremerey was gaining work experience in various engineering firms. Today she is firmly rooted in Stuttgart and in transportation, especially in the railway sector. She has acquired the EURAIL-ING certificate, and has headed the Stuttgart region of the VDEI (association of German railway engineers) for many years. She is also actively involved in the transportation committee of the Handelskammer (chamber of commerce), in the VBI (German association of consulting engineers) and in the Ingenieurkammer (chamber of engineers). Since 2016, she has been heading Inros Lackner's Stuttgart office, where she and her team have been successfully expanded the company's regional presence. In recent years, working together with her team of young and committed colleagues, she has been able to develop a new range of services for clients, with drone flights used not only to provide video recordings of their projects but also to generate 3D data via automated flights, with algorithms used to read image data.

BIM LEARNED »FROM SCRATCH«

In 2009, Viktoria Graf started her training as a draughtswoman in civil engineering, road construction and landscape construction, with a strong focus on software skills from the start. She then benefited from these capabilities in her subsequent civil engineering studies. The topic of her bachelor's and master's theses was Building Information Modelling (BIM), exploring the limits of advanced IT-supported planning and design processes on a pilot project for the national railway company and a road construction project in Verden. She wrote both theses in collaboration with Inros Lackner as part of her work experience. After completing her studies she started working as a project engineer at Inros Lackner, where she is now a project manager and certified BIM modeller.

Viktoria Graf
Project manager

»I find technical progress very interesting. I like the dynamism of it, which gives me a framework for my professional growth.«

Dr. Klaus Richter
Director

AN ENGINEER AT HEART, EVER SINCE MY SCHOOLDAYS

Looking back, I think my career in civil engineering started already when I was a teenager, when I often spent my holiday time on construction-related activities. It was then an easy choice for me to study engineering when I finished school, which I did at the RWTH University of Technology, majoring in Soil Mechanics and Water Resources. My academic career continued in the UK, where I researched and did my PhD in water resources and where I taught Soil Mechanics. I then worked for a large German construction company. Since joining INROS LACKNER I have had great opportunities to work on interesting and challenging projects, both nationally and internationally. I have been fortunate to spend much of my time working on projects in Africa, and to also play a role, working together with my local colleagues, in establishing and developing our African subsidiaries. Outside INROS LACKNER I am a member of a number of professional organisations, including the German Association for Small and Medium-sized Businesses (BVMW), the German Association of Consulting Engineers (VBI) and the German Port Technology Association (HTG). For the last three years, I have also participated in the »Moving Rwanda« mobility partnership of the German Federal Ministry for Economic Cooperation and Development (BMZ). In my free time, I love to ride my mountain bike – a passion that led me to meet many wonderful people during my visits over the years to Senegal, Kenya and Eritrea.

Jort Wilkens
Project Manager

»My dad was a civil engineer, modelling rivers in Africa.«

FOLLOWING IN MY FATHER'S FOOTSTEPS

Already as a schoolboy, when asked what I wanted to be in later life, I would answer »the same as my dad«. He was a civil engineer, working in the field of physical modelling, mostly of rivers in Africa and Asia. The experience of living in Africa as a child and his many anecdotes certainly motivated me to follow a similar path. I completed my MSc in civil engineering at the University of Twente with a project on morphodynamic modelling of a Dutch barrier island. Thoroughly enjoying the subject, I continued with a PhD at Kiel University on the morphodynamics of the German Dithmarschen Bight. I then joined HR Wallingford in the UK, where I worked on many projects relating to ports, coastal protection and so on. Since joining Inros Lackner I have shifted my focus to planning and design of such developments and managing projects involving inland and coastal ports, as well as dredging and coastal protection works, in both Africa and Asia.

»Since joining Inros Lackner I have been fortunate to spend much of my time working on projects in Africa, and to also play a role in developing our African subsidiaries.«

Dr. Bärbel Kleinefeld
Project Manager

A CHANGE OF INDUSTRY FOR NEW PROFESSIONAL CHALLENGES

»At Inros Lackner, my wish to combine technical and professional challenges in an international environment is satisfied.«

My intention to broaden my horizons and my technical knowledge by managing large-scale international projects while building on my previous experience has brought me to Inros Lackner. I have worked as an executive and project manager in the international field of underground energy storage and solution mining of salt – a niche in the mining sector that combines expert knowledge with interdisciplinarity (e.g. rock mechanics, mining and plant engineering as well as drilling and completion technology). Bringing experts from a range of disciplines and cultural backgrounds together on complex projects to work towards a common goal demands good communicational skills, including conflict management and a certain sensitivity – technical, linguistic and interpersonal – which for me is the "icing on the cake" when it comes to describing my ideal work environment. After about two years at IL I can say that I have found what I was looking for, and I am looking forward to contributing to the management and realization of further diverse and challenging projects.

»The empires of the future are the empires of the mind.«

Winston Churchil

Frank Bernhardt
Director

CERTIFIED AS A BIM VDI SPECIALIST ENGINEER

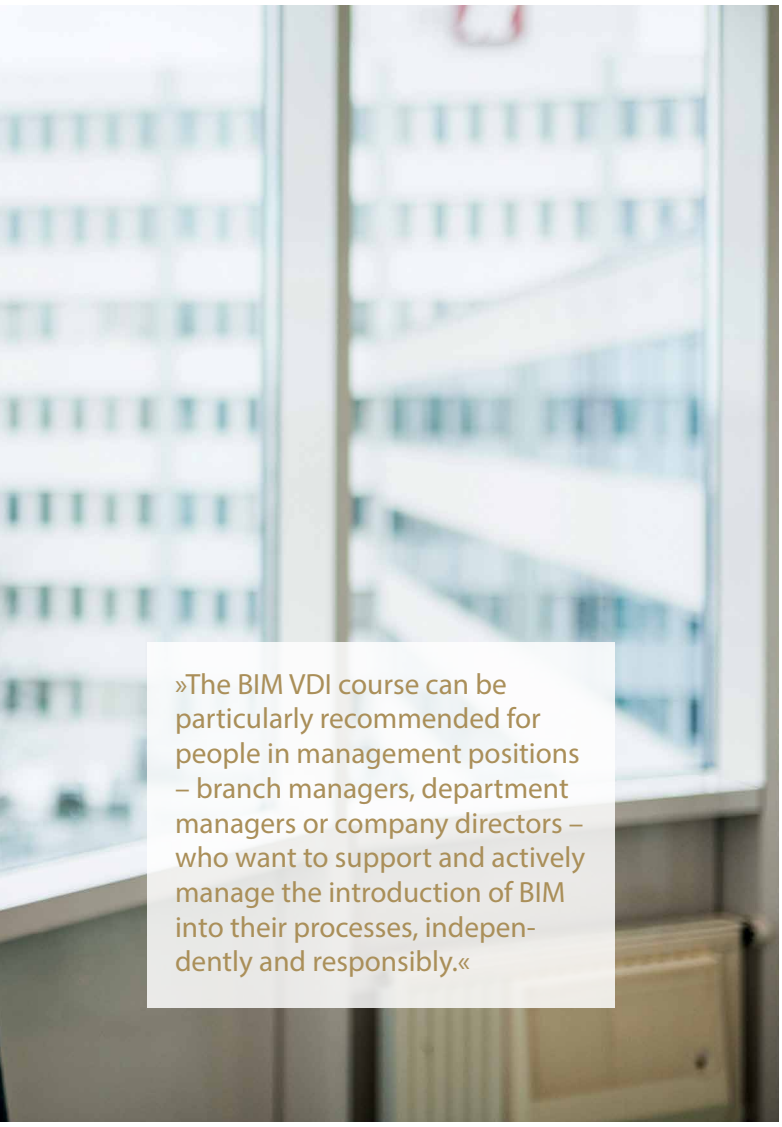
Last year, the experienced civil engineer Frank Bernhardt successfully completed his BIM course, earning the qualification »Fachingenieur BIM VDI« with a written and an oral exam. The course consists of seven modules, each lasting two days. These are divided into four compulsory modules (basics / introduction of the BIM method into companies; modelling / data management; life-cycle phases; and project management) and three elective modules. By deepening his BIM knowledge, Frank has prepared himself to better support and manage the growing use of BIM in the company, and is happy to use his increased knowledge of the subject in optimising the internal implementation strategy – e.g. when it comes to the requirements of BIM in relation to product data and software. Understanding the causalities of BIM in the real estate life cycle gives a better understanding of important client interests – in particular, relating to the future operation and use of what is being built. The gained knowledge of BIM process methodologies facilitates the logical creation of reference processes, especially for quality and further training purposes. And the use of Lean Construction can significantly improve the efficiency and organisation of the planning and design process, and thereby also the construction process.

Dr.-Ing. Meltem Sözüer
Project management

»I make use of the synergies between research and practice in my project work.«

PH.D.-THESIS: OPTIMISATION OF PROJECT STRUCTURES

Already at an early stage of her school career, Meltem Sözüer recognised her interest in and her passion for science and technology. So it was with confidence that she decided to study civil engineering at the University of Kassel, with a focus on construction and fabrication technology. After graduating, she worked at the university as a research assistant and PhD candidate in teaching and research in the project management field. She did her doctorate on the subject of »Approaches to optimising the planning process for transport infrastructure projects in Germany – with a special focus on road and rail projects«. Her expertise in both classic and agile project management is supplemented by her technical knowledge of the planning, design and construction process for building construction and transport infrastructure projects. The use of project management methods and tools to ensure successful project implementation is a matter of course for this PhD-qualified civil engineer.



»The BIM VDI course can be particularly recommended for people in management positions – branch managers, department managers or company directors – who want to support and actively manage the introduction of BIM into their processes, independently and responsibly.«

»An investment in knowledge always pays the best interest.«

Benjamin Franklin

Dorothée Strachwitz
Regional Manager Tansania

MOSTLY AT HOME IN AFRICA

»My work highlights include management of projects relating to such diverse subjects as medical infrastructure and measures for combatting poaching in nature reserves.«

For me, Africa means home. I grew up in Egypt and Kenya but also lived for long periods in Ethiopia and Yemen. In 1999 I completed my architecture studies in Dresden and then obtained my master's degree in Development and Planning at University College London (UCL). Immediately afterwards, I went to Mexico to learn Spanish. Then, back in Africa, I started my professional life in the consulting business in Zambia and Tanzania, working on projects in western and southern Africa. With an eye for detail, I was involved in the project implementation of a wide variety of architectural and engineering projects, mostly in cooperation with local engineers. Today I manage Inros Lackner's Tanzanian office. I love the sea and spend a lot of my free time these days at the Indian Ocean, often diving, swimming or sailing. My work highlights include management of projects relating to a wide variety of subjects, such as infrastructure for combatting poaching in nature reserves, medical infrastructure, regional airport development, waste disposal measures and local urban infrastructure.

Prof. Dr.-Ing. Volker Stölting
Senior Consultant

KNOWLEDGE TRANSFER FROM SCIENCE TO PRACTICE

»In addition to my lecturing work and my supervising of bachelor's and master's theses, I am able as a senior consultant to actively participate in projects and to apply and share my knowledge in a targeted manner.«

Volker Stölting is a professor at the Technical University of Cologne, working in its faculty of civil engineering and environmental technology. He teaches a range of topics including railway transport and public transportation systems, as well as traffic modelling, both macro and micro, using VISUM and VISSIM software. He graduated from the University of Hanover with a degree in engineering, specialising in transportation. He then obtained his PhD from the same university and worked there as a member of the research staff. At the same time, he began working as a senior consultant, creating traffic and transportation models for national and international projects. During his professional career, in research and practice, he has specialised in macro- and micro-simulations of motorised transport (both private and public), in railway construction, design and operation, in local transport planning, and in performance calculations and cost-benefit analyses.

»Sharing knowledge occurs when people are genuinely interested in helping one another develop new capacities for action.«

Peter Senge

Henny Bechert
Project engineer

»It was very important to me to have a job that I enjoy. The training period showed me early on what working life is really like and what project teamwork means.«

DISTANCE LEARNING WITH DISCIPLINE

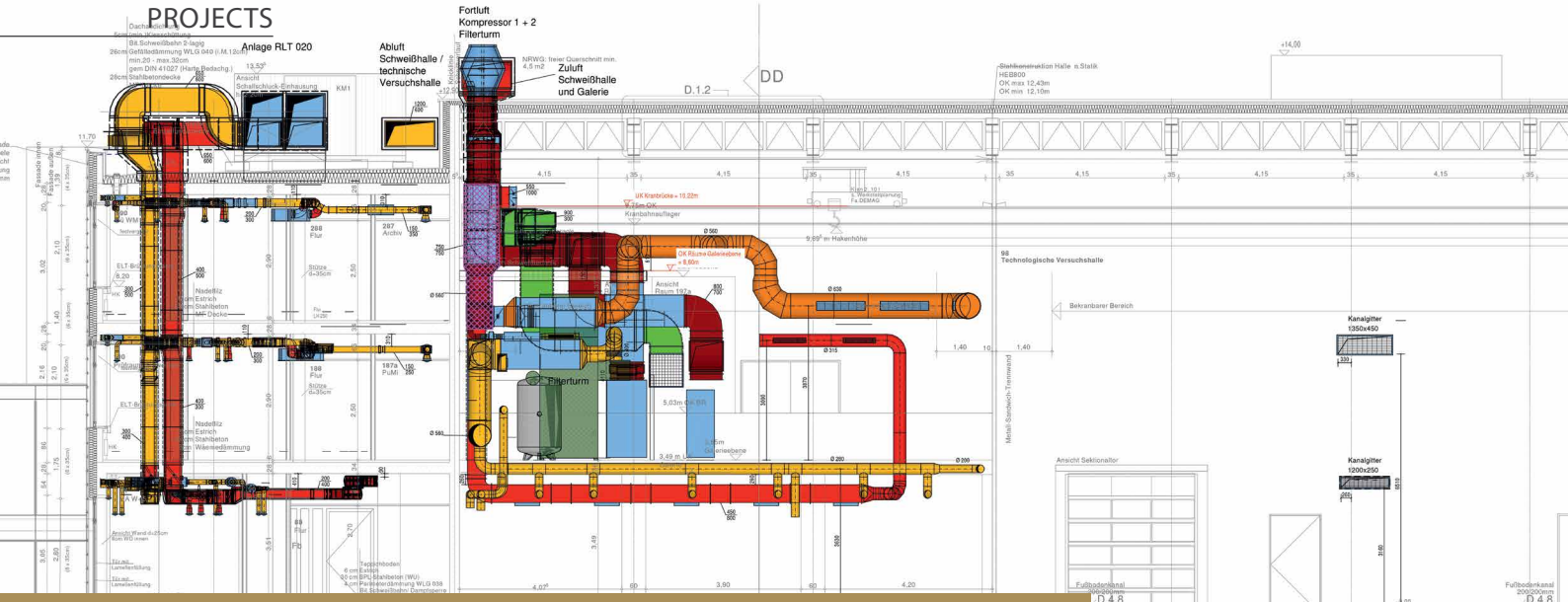
Henny Bechert pursues her goals assuredly and consistently. A former track and field athlete, she is quick and focused when it comes to completing her distance-learning master's degree while also working as a project engineer. Even as a young girl she was already interested in technology, and decided to train as a technical draughtswoman. After three years of professional experience her bachelor's degree followed, in the field of building plant and building services engineering at Wismar University. She has now been working at Inros Lackner for three years, and designs technical building systems for complex laboratory buildings, fire departments and schools with a strong focus on heating and sanitary engineering and on technical gases. As a technical draughtswoman, working with 3D programs is easy for her and she can also benefit from her experience in that role when dealing with the corresponding computation programs.

Lutz Bernsdorf
Senior Consultant

VALUABLE PROJECT AND WORK EXPERIENCE

»My work as an engineer has always been associated with a great fascination for port facilities and hydraulic structures. That has not changed with age and experience, and I am happily still committed to the job.«

Lutz Bernsdorf has been with Inros Lackner for 54 years, having joined the company as a draughtsman on 1st September 1966. On his first major project, he created the formwork and reinforcement drawings for the pump house of a dry dock in Karachi. The experienced civil engineer has specialised in hydraulic structures and port facilities, and worked as a head engineer, for many years. His profession is his passion, and he still works in an advisory capacity – where possible, passing on his knowledge to younger employees. One of the most interesting projects of his career was the Kaiser Lock project in Bremerhaven, with its diverse and highly demanding challenges relating to planning, design and construction. The size of the lock is very impressive, with its enormous sluice gate: 23 m high, 55 m wide and weighing 2,200 t. Over the years, Lutz has worked on a wide variety of national and international projects, gaining a wealth of experience along the way.



Expertise in technical building systems for research buildings

Extract from ventilation design drawing

LABORATORY AND OFFICE BUILDING FOR FRAUNHOFER INSTITUTE

Research buildings such as that being built for the Fraunhofer Institute for Large Structures in Production Engineering (IGP) in Rostock place special demands in relation to their technical building systems. The Inros Lackner team has specialised in this area, with extensive experience from a wide range of projects.

The Fraunhofer IGP institute, located on the university campus in Rostock Südstadt, has state-of-the-art facilities for application-related research and development. These include laboratories for fabrication, automation and robotics as well as a climate-testing chamber and a virtual reality section. Research at the institute focuses on the engineering industry's requirements, including fabrication processes, automation technologies and product developments – e.g. for ships and offshore, the building industry, steel construction, and aircraft and rail vehicle fabrication. It was decided to construct a new building because the institute's 2,545 m² of office and laboratory space is already fully occupied, leaving no room to expand. The new laboratory and research building, currently under construction, is being built on a total area of around 2,000 m² (igp.fraunhofer.de).

Awarded the contract by the Fraunhofer-Gesellschaft, a world-leading organisation in the promotion of applied research, Inros Lackner is responsible for the new building's structural design and technical building systems. The total costs for the new building and its laboratory equipment will be approximately 13.8 million euros. In addition to the conference and office rooms, a test hall with an area of over 1,000 m² is being built for use in relation to large robots, »sighted« welding robots, driverless transport systems and tracking technologies for optimised materials flow and warehouse organisation. The laboratories will be used to develop human-robot collaborations, smart maintenance systems and intelligent assistance systems, e.g. for the aviation industry.

Self-sufficient and sustainable power supply

The office building will be constructed as a reinforced concrete structure, and the adjacent test hall as a steel frame construction with an indoor crane for flexible organisation of processes. The power supply for the entire building complex is provided by a self-sufficient transformer station with a cost-efficient medium-voltage feed from the Rostock city power supply company. The network optimisation required for this is being carried out in the course of the construction project. In addition, a photovoltaic system on the roof of the new building, with a capacity of approx. 50 kWp, will supply approx. 30,000 kWh of cost-free energy into the institute's power system per year, thereby avoiding annual CO_2 emissions of around 15 tons. The entire building will also be equipped with a long-life LED lighting system to save energy. This will offer optimal comfort and, together with the district heating supply via the combined heat and power system with a power input of 420 kW, will help maximise the building's energy efficiency.

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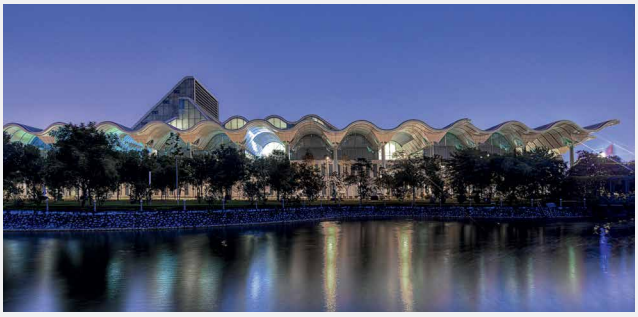
Laboratory equipment
In the institute's specialist laboratories – including e.g. robotics, welding technology and industrial technology as well as scanning electron microscopes and electrical measuring rooms – a sophisticated building technology concept with high-precision air conditioning and power supply systems will ensure that testing of products can be carried out under the prescribed conditions.

»Crucial on this project is the smooth interaction of all technical systems – for ventilation, air conditioning, uninterruptible power supply, ICT and building automation.«

Project manager Markus Hartwig

Project and experience insights

Max Planck Institute for the Structure and Dynamics of Matter, Hamburg (in progress)



National Convention Center Hanoi, Vietnam

Hanoi City Museum, Vietnam

Bauhaus Museum Dessau, Germany

SupraFAB research building, Freie Universität Berlin (in progress)

TURKMENBASHI INTERNATIONAL SEA PORT

After a construction period of only 3.5 years, Turkmenbashi's International Port on Turkmenistan's Caspian Sea coast was opened to shipping traffic. This marked the completion of a key project in the revival of the historic Silk Road from Asia to Europe.

The port was designed in accordance with »Green Port« standards, in order to appropriately consider the fragile ecosystem of the Caspian Sea, the world's largest inland sea. On a total area of over 130 hectares, five new terminals were built – for ferries, passengers, general cargo, bulk goods and containers – as well as a whole new shipyard, complete with a ship lift. In addition, complete new transport connections to the port were created, with railway track and shunting facilities and a connection to the M37 motorway. Port-related service buildings such as a hospital and a fire brigade building were also constructed. The expected goods handling capacity of the port is approximately 17 million tonnes per year. As General Planner, Inros Lackner prevailed in the international tender process and was appointed by Turkmenistan's Ministry of Marine and Inland Transport to provide planning, design, tendering and construction supervision services for the new port. With a total investment of approximately USD 1.5 billion, it is the largest port construction project in Central Asia – this new transport hub between Asia and Europe. After completion, the project received two entries in the Guinness Book of World Records, and several logistics and environmental protection awards.

»This major contract is a significant success and proof of our company's international reputation as a provider of planning and design services for complex port construction projects.«

Project manager Tobias Günzl

General Planning, Port Construction

Ro-Ro Terminal

- Area: 28.7 ha
- Two berths for ships with a load-carrying capacity of 5,400 dwt (railway ferries)
- Handling of up to 300,000 passengers and 75,000 truck trailers per year
- Terminal building for 400 people, shopping and entertainment centres, motel with approx. 50 beds

In the course of the port development project, passenger traffic capacities were increased. The new ferry and passenger terminal will handle approx. 300,000 passengers and 75,000 truck trailers each year. As a landmark structure, the new multifunctional reception building of the passenger terminal has an appropriately distinctive design.

Container terminal

- Area: 24.8 ha
- Three berths for ships with a load-carrying capacity of 5,000 dwt
- 400,000 TEU/year (cargo handling in multimodal operation: rail, road, sea)
- Administration building, workshop, storage and auxiliary building, container freight station (50 containers per day)

In the new container terminal with its three berths, up to 400,000 standard containers can be processed per year, transhipping between rail, road and sea. Up to three container ships can be simultaneously loaded and unloaded on the 480 m-long quay, with the latest control technology facilitating real-time monitoring and control of all operations in the port.

General cargo and bulk goods terminals

- Area: 46.3 ha
- Seven berths for ships with load-carrying capacity of 7,000 dwt
- 7,000,000 t/year (loading and unloading of building materials – including in particular iron, steel and wood products – and of raw metals, agricultural/construction technology, motor vehicles, chemical products and consumer goods, and transhipment of bulk goods such as grain, animal feed, cement, fertilisers, coke and salt)
- Ro-Ro ramp for transport of heavy goods and project cargo

The new general cargo and bulk goods terminals, each with a handling capacity of around four million tons per year, are among the largest terminals in the port. Both are equipped with special systems for loading and unloading of building materials such as iron, steel and wood and of agricultural and construction machinery. The quay of the two terminals has a total length of approximately 1,000 m.

Shipyard

- Area: 17 ha
- Building each year of up to six new ships with load-carrying capacity of up to 7,000 t
- Repair of up to 20 ships
- Shiplift (150 x 22 m) and two fitting-out quays

The construction of a competitive shipbuilding and ship repair dockyard was one of the central aspects of Turkmenbashi's port development project. All types of ships operating on the Caspian Sea can be maintained and repaired here. The German company IMG Ingenieurtechnik und Maschinenbau GmbH, based in Rostock, was responsible for the technical planning and the organisational concept of the shipyard, under the direction of Inros Lackner. Working together, a complete shipyard was planned and designed – starting with the initial technological concept and going on to include the construction and infrastructure solutions, right up to finalising of equipment details. Construction supervision services were also provided, up until turnkey handover to the client.

Modernisation of port infrastructure

- New marshalling yard (six tracks, one bypass)
- Rail connection to the container terminal (three tracks)
- Rail connection to the Ro-Ro terminal (five tracks, one bypass)
- Rail connection to the bulk goods terminal (three tracks)
- Rail connection to the general cargo terminal (three tracks, two Ro-Ro tracks)
- Rail connection to the shipyard (two tracks)
- New port road

Considering Turkmenbashi's strategic location and connections to Turkmenistan's motorway and railway networks, the construction of the port was used by the country's government as a motivation to renew the infrastructure of the entire region, with other work including the construction of connecting roads, motorway bridges and a new railway freight depot.

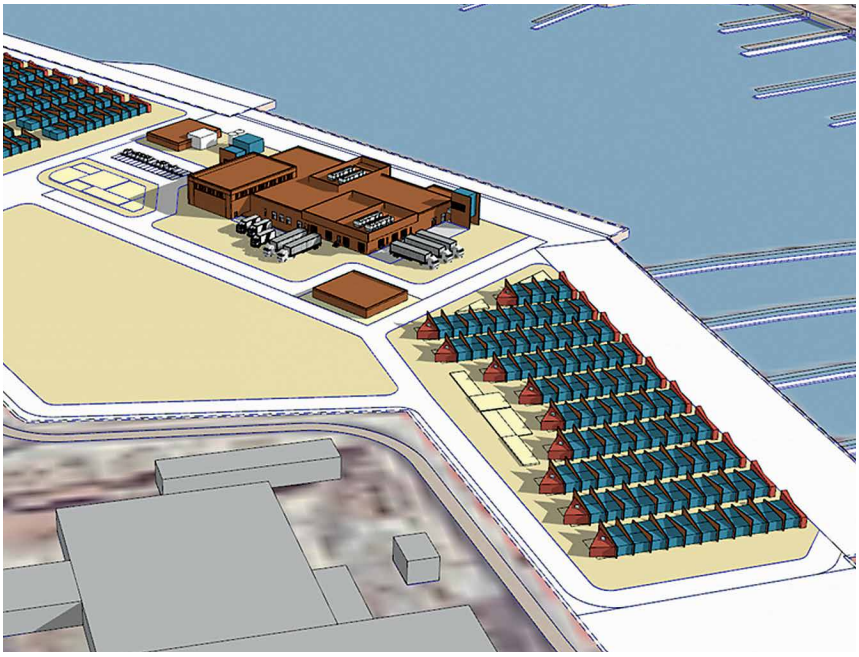
General Planning, Port Construction

MODERNISATION OF FISHING PORT IN MAURITANIA

A port development project on Africa's Atlantic coast showcases the collaboration between Inros Lackner's international offices.

The West African country of Mauritania, on the edge of the Sahara Desert, has afishing industry which has great potential to play a bigger role in developing the country's economy and raising living standards. A key part of this relates to the sale and processing of the fish caught off the country's coast, only a small percentage of which has been done locally in the past. Inros Lackner is contributing to this effort by providing consulting engineering services for the current project to modernise the artisanal fishing port of Nouadhibou, Mauritania's second biggest city. The project involves the review and updating of previous studies, preliminary and detailed design, preparation of tender documents, environmental and social impact assessments, assistance during the tender phase, and supervision of construction work. It was launched by the Mauritanian Etablissement Portuaire de la Baie de Repos (EPBR), with financing from the German state-owned development bank (KfW). The central element of the modernisation project is a state-of-the-art fish auction hall including cold storage facilities with the capacity to handle up to 120 t of fish per day. It will provide all the required services (e.g. fresh water, ice and electricity), and ensure much better protection of the product against heat, sand, insects and toxins by setting up a controlled transfer of product between the boats and the auction hall. An uninterrupted cooling chain ensures higher hygiene standards during storage, trade and processing and will promote the establishment of new industries and national as well as international markets. The project will also include the development of local infrastructure such as roads and wastewater system, approx. 680 storage sheds for fishermen, designation of future areas for small industry, and fencing of the port's perimeter.

The project is a very good example of the valuable collaboration between Inros Lackner's Bremen office and the company's international subsidiaries in Togo, Vietnam and Cambodia, who are responsible for the topographic survey, the innovative architectural design of the fish auction hall and the storage sheds, and the structural engineering work.



The port premises

Design of port infrastructure

Project and experience insights

Phased expansion of Rostock Port, Hanseatic City of Rostock, Germany

New construction of Cai Mep deep-water port, Vietnam

Phased expansion of Lomé deep-water port, Togo

Port development, Pointe-Noir, Senegal

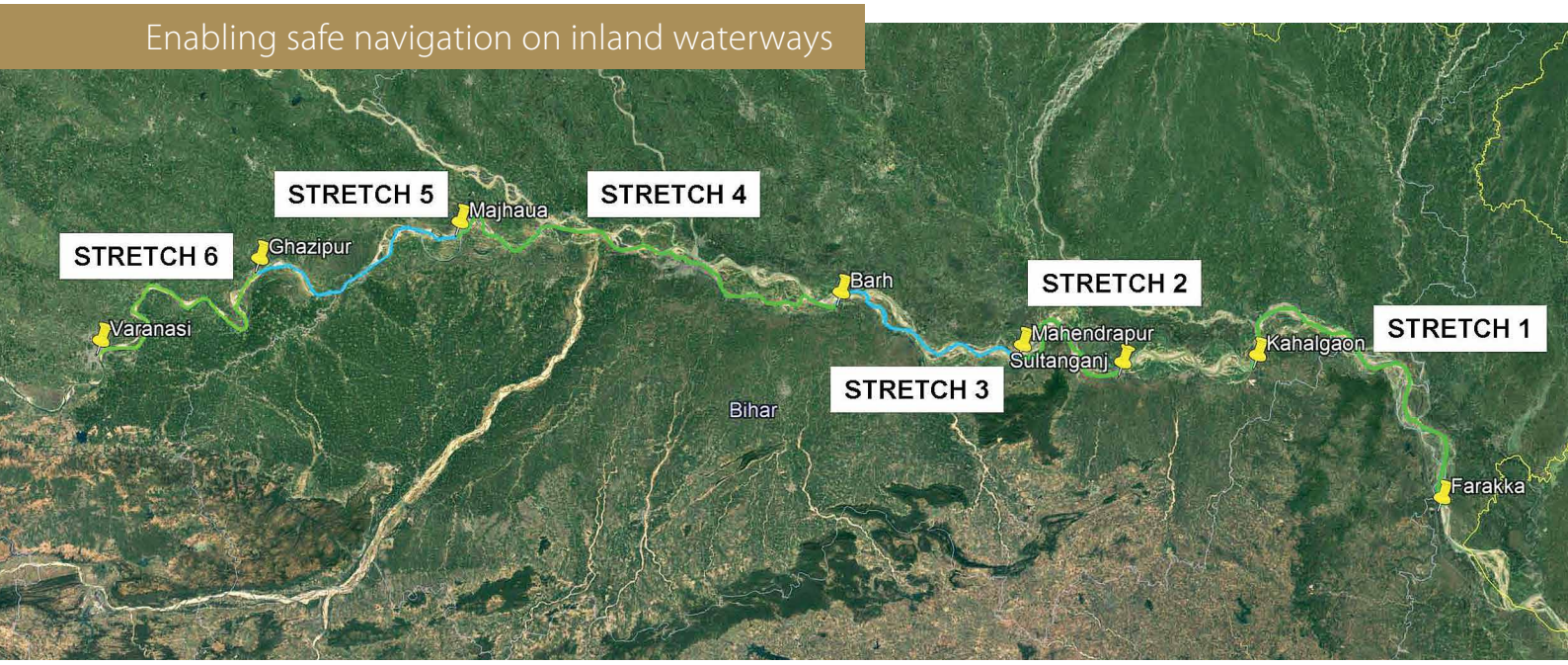
Modernisation of the Port of Dar Es Salaam, Tanzania

Planning and design services for JadeWeserPort, Wilhelmshaven, Germany

DEEPENING OF THE HOLY GANGES RIVER

India's longest waterway is being deepened to meet the needs of inland navigation: On behalf of the Inland Waterways Authority of India (IWAI) and the World Bank, a team of 40 German and Indian engineers are managing this extensive public works project.

Enabling safe navigation on inland waterways



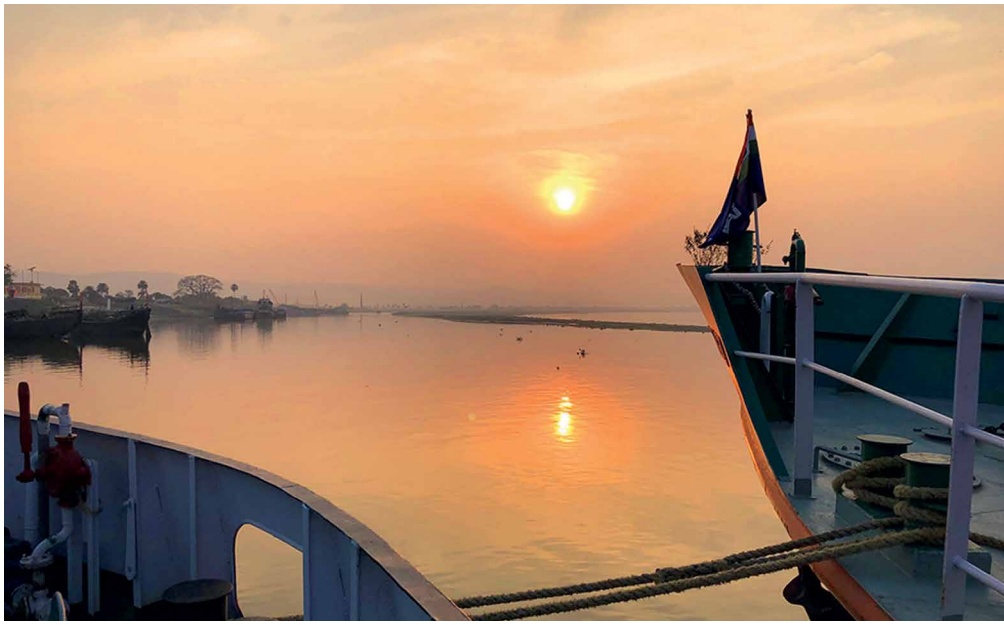
The project involves maintaining minimum water depths along six stretches of river with a total length of 711 km.

National Waterway 1 along the River Ganges is of national significance to India, passing through the states of West Bengal, Jharkhand, Bihar and Uttar Pradesh. It runs from Haldia to Allahabad across the Ganges, Bhagirathi and Hooghly river systems. This waterway serves industries located right along the Ganges Basin, including various major cities and their industrial hinterlands. With the aim of better connecting the rural economy with the river system, a project has been launched to keep the river navigable, over a distance of 711 km, as an alternative and environmentally-friendly means of transport.

To improve the waterway's navigability, the Inland Waterways Authority of India (IWAI) has defined Least Available Depths (LAD) – typically between two and three metres – for six stretches of the river between Farakka and Varanasi, to be available at least 330 days per year. Over a period of five years, the main shipping channel is to be kept navigable by continuous maintenance dredging, with over 250 workers involved on site. IWAI has already appointed dredging contractors for three stretches, and the appointment of contractors for the other three stretches is in progress. The contractors are responsible for maintaining the respective LAD, the minimum channel width and the appropriate navigational aids at each location along the waterway, thereby providing a safely navigable waterway while minimising adverse environmental and morphological impacts.

Constantly controlling the water depth in the shipping channel is a particular challenge considering the strong seasonal fluctuations in water level. The total volume of excavated material is expected to come to around 35 million cubic metres. Since early 2020, Inros Lackner has been supporting the project in the roles of Technical Service Support Consultant and Project Management Consultant, with extensive responsibilities in the areas of construction supervision and project control. The company presently has a team of over 20 experts located at Sahibganj, Patna and Noida (near New Delhi). The team includes hydrographic surveyors and dredging experts, who monitor contract compliance on a daily basis. Further experts on environmental issues, morphological design, navigation and river safety monitor the contractors' planning and execution of the dredging work, ensuring that the works are continually adapted to the evolving river (»working with nature«) and that they minimise any adverse impacts.

Dredger in action on the Ganges River



A view of India's »National Waterway 1« on the River Ganges

Project and experience insights

Beira flood barrier, Mozambique

Navigable waterway connections, Germany

4th Lake in the lagoon of Lomé, Togo

Expertise in the field of traffic concepts and traffic planning

SMART CITIES, MAURITIUS

What is a »smart city«? This holistic visionary concept represents the city of tomorrow, with its technical, economic and social innovations.

The African island republic of Mauritius is located about 1,000 km east of Madagascar in the Indian Ocean. Compared to other African countries, the newly industrialising country, with its democratic and multicultural atmosphere, has a higher quality of life – and better infrastructure, the development of which does not rely on foreign aid. In the future, Mauritius also intends to increasingly get its energy from renewable sources such as solar, wind and wave power. The country has around 1.3 million inhabitants on an area of 2,040 km², which is slightly less than the area of the German state of Saarland.

Sustainable land development projects

Against the background of declining sugar cane production, the large producers and landowners are now looking for alternatives, supported by land development projects which the state requires to be implemented in a sustainable way. Various »smart city« projects have developed from this, with »autonomous« towns built on allocated plots of land, each with its own power supply based on renewable energies, state-of-the-art telecommunications, and its own water supply and wastewater networks. It should be possible for the mostly short distances to be travelled by foot or bicycle.

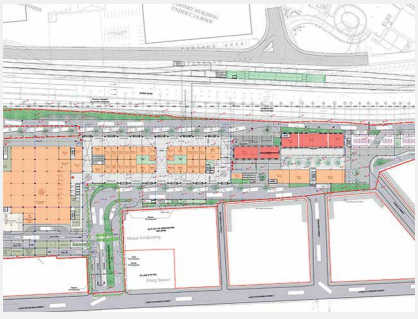
Visionary planning

Inros Lackner has been involved in two »smart city« projects to date, »Mont Choisy« and »UNICITI«. From 2018 to 2019, the transport-related work has been done in cooperation with the engineering firm Servansingh Jadav + Partners. The »UNICITI« project began in 2016 and is currently being implemented on the ground, with some facilities having already been built – including the campus of a private university, some small office complexes, an international school, a sports centre and a small park. The new, sustainable multi-generational city for around 20,000 inhabitants, providing employment for 5,000 people, is being built around a shopping centre which has already been newly built. The Inros Lackner team is responsible for developing a sustainable and climate-neutral transportation system for the new »smart city«. The transport networks, especially for the environmentally friendly modes of transport, are being designed in such a way that they will be successful in attracting people away from motorised transport. The planning is currently in the initial stages, and will be implemented in collaboration with partner firms.

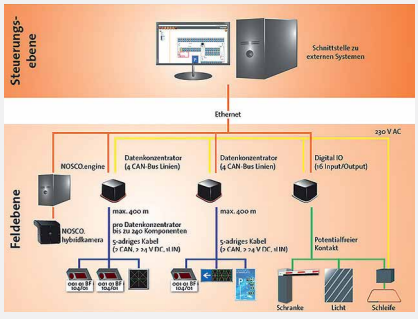
»Planning a »smart city« is always a special challenge, as every project is different and new solutions are always required. Sustainability is very important to me in my work.«

Project manager Dr.-Ing. Volker Stölting

Project and experience insights



Victoria Bus Station in Port Louis, Mauritius



EU »Parking gets smart« project, Usedom, northern Germany

Complex traffic signals control, re-design of Ferdinandstor junction, Hamburg

Experience in infrastructure and BIM

Existing bridge (Spans: 42m, 57m, 57m, 57m, 72m, 57m; Total length 342 m)

REPLACEMENT OF MULDE BRIDGE

This motorway bridge across the Mulde River – a tributary of the Elbe in eastern Germany – was opened to traffic in 1970, together with the A14 autobahn that it carries. Increasing heavy goods traffic and the severe regional flooding of 2002 resulted in serious damage and the need to carry out extensive repairs and, in the medium term, replacement of the structure.

The existing bridge carrying the A14 autobahn over the Mulde river, north of the city of Grimma, was built as a composite steel bridge with a total length of 342 m and with separate superstructures for each direction of travel. Extensive repairs have been carried out on the bridge since 1994. Most notably, the summer flooding that devastated much of the region in 2002 caused substantial scouring, which was addressed thereafter. But despite continuous maintenance measures in recent years, the condition of the bridge has deteriorated considerably. Furthermore, the width of the bridge's driving surface is insufficient for maintaining four lanes of traffic during maintenance and repair work, making the bridge a traffic bottleneck that affects the entire section of motorway. The costs of the increasingly required maintenance, and the steadily increasing traffic volumes – especially HGV traffic – made it necessary to replace the structure. There was simply no alternative.

In 2008 a feasibility study was carried out in relation to the proposal to replace the bridge, along with any necessary route adjustments for the A14 autobahn, with various options considered. It was concluded that the bridge should be replaced by a new structure at the same location. In 2018, Inros Lackner was awarded the contract to provide the required planning and design services for the new bridge, and also for upgrading one of the existing bridge's superstructures as necessary to accommodate traffic during the construction period. A particularly notable part of the project is the nature conservation aspect, as the bridge crosses sensitive, protected habitats for birds and other nature.

Structural design

The new four-lane structure will have a length of 361 m, and the length of autobahn to be adapted is approximately one kilometre in total. To the west and east of the structure, over a distance of about 170 m, it is proposed to construct 4m-high collision protection walls and fences for bats on both sides of the motorway.

Client: DEGES on behalf of the State of Saxony's office for road construction and transport, Dresden

New five-span structure to replace existing bridge:
Spans: 52 m / 65 m / 75 m / 106.5 m / 62.5 m. Total length 361 m
Height above valley floor: approx. 30 m
Construction type: Steel composite box girder
Standard section: RQ 31 b
Width between railings: 31.3 m

Design representation of the new structure

Based on initial design work it was concluded that a structure with a main span of 106.5 m would be the preferred solution. With this solution, the number of bridge piers in the river's flood plain could be reduced from five to three, minimising the amount of structure that will be affected by future flooding. For the superstructure, it was concluded during extended preliminary planning that this should take the form of a single-cell steel composite box girder with a rounded underside. The preferred design option offers the following key advantages:

- Optimal adaptation of the varying superstructure height to the proposed spans
- Avoidance of uplift forces on bearings
- Suits the landscape well with a good balance between clear height, span and superstructure height
- Uniform construction process based on the incremental launch method, with the prefabricated superstructure pushed into position from one end of the bridge – with a launching nose at the front and without any need for temporary construction supports in the valley, thereby minimising impacts on the river environment
- Less structural steel required for the superstructure
- High degree of fabrication in the workshop, facilitating largely weather-independent and high-quality production
- Avoids the use of large cranes with their risk-prone, long-term advance planning and narrow available time slots
- Minimises the risk of flooding affecting the work, and faster evacuation in the event of flooding (possibly at short notice)

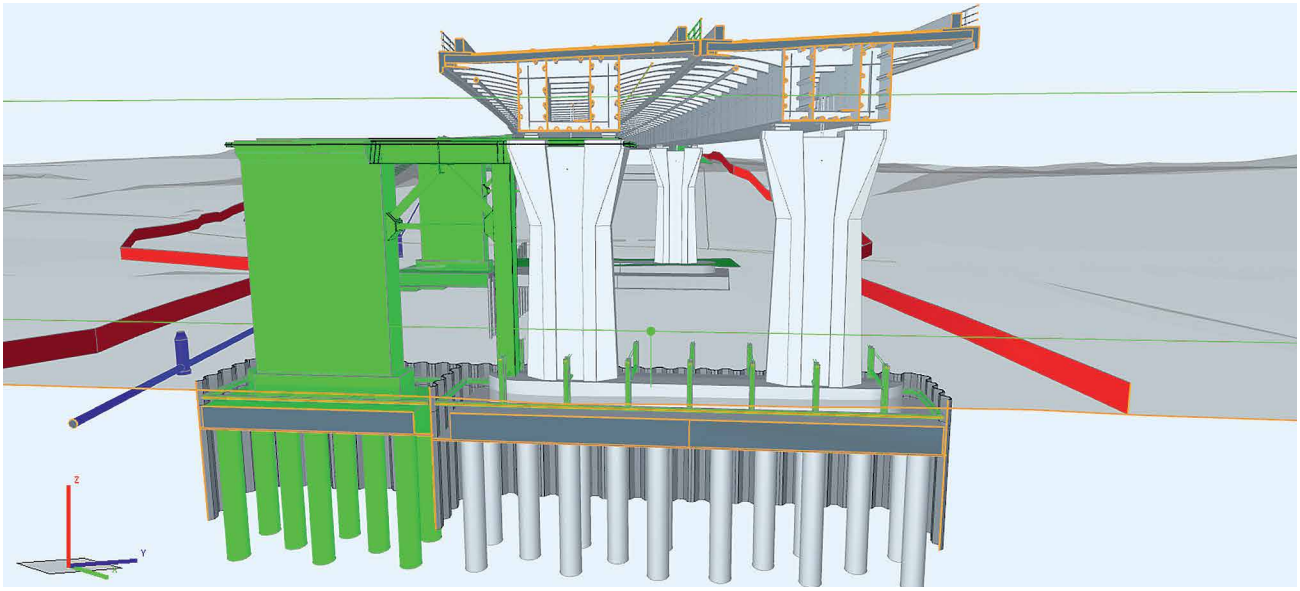
Coordination of planning and design work using BIM

Once the preliminary planning and design work had been carried out, with evaluation of alternative options, the client (DEGES) placed great value on the use of BIM in all remaining planning and design work. Accordingly, well-founded specifications – in the form of client information requirements – were already supplied with the contract to perform the design work. These were integrated into the BIM project development plan in several coordination steps. A particular challenge was posed by the 3D modelling of the two superstructures. In addition to the respective radii in plan and elevation of each structure's axis, a circular rounding of the underside also had to be taken into account. The resulting structure, with a height of 5 m at mid-span and 2.80 m at the abutments, resembles an inclined »banana«. As a result, each of the 220 transverse beams is unique. From a static point of view, the application of the »Obmannsschreiben« design note to control crack widths in the support areas resulted in the addition of two extra longitudinal elements. Working with our trusted CAD programs, All Plan for structural engineering and CARD/1 for road and landscape design, numerous points of intersection were identified, enabling adjustments to be carried out during quality checks of the various design models. Numerous geometric discrepancies were found between the archive documents and the modelling of the existing structure as surveyed, enabling these to be clarified and addressed in the design phase already. For the demolition work too, and for the complex steel assemblies required for longitudinal and transverse movements, detailed specifications for the necessary technologies and construction aids had to be defined and modelled already in the design phase.

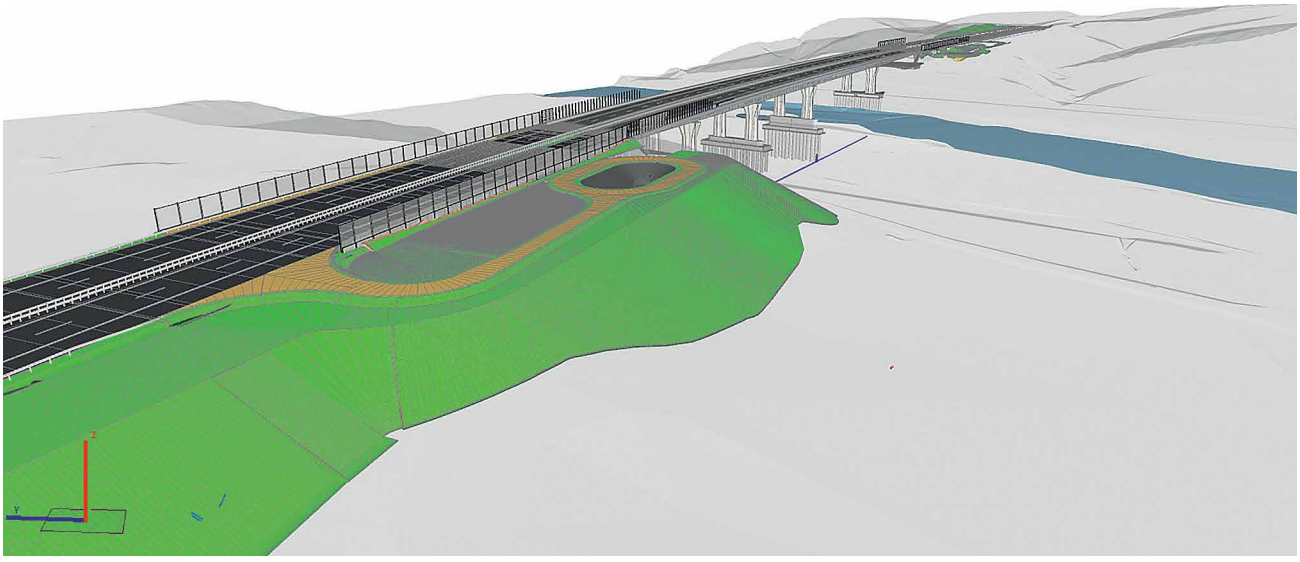
A total of 13 different construction phases, including material placing and removal for the ramps and all associated soil management, were modelled and measured in terms of quantities and time (4D modelling). The creation of other 3D design models – e.g. for pipework routing, drainage, subsoil (including homogeneous areas), excavations, temporary ground supports, earthworks and vegetation – was also a valuable learning experience. The entire attribution of the various elements was repeatedly optimised to facilitate proper adjustment of the interfaces between CAD and AVA software (RIB iTWO) for the model-based calculation of quantities and costs and for the creation of the bill of quantities (5D). In this, the software suppliers also played a part.

»With this complex bridge structure, we were able to draw on extensive experience from previous projects and at the same time integrate new developments. It is one of the first projects for which we have applied BIM methods with respect to all engineering specialisations right from the design stage.«

Project manager Olaf Wingess



Cross-section following transverse displacement of the bridge structure



Isometric as-built view of bridge (structural and transportation)

4D simulation of construction process by incremental launch method

Project and experience insights

Womey Bridge Crossing, Benin

Bridge over the Sewa River, Sierra Leone

Uttrichshausen Valley Bridge on A7 autobahn (preferred option showing ground modelling and the city in the background), DEGES, Hessen, Germany

Institute of Civil Engineering, Faculty of Engineering / © Wismar University

WISMAR UNIVERSITY

University of Applied Sciences, Technology, Business and Design

Wismar University can look back on more than one hundred and ten years of history. Its unique »three-pillar profile«, incorporating the three faculties of engineering, economics and design, is one of its main characteristics. Through numerous interdisciplinary projects and collaborations in teaching and research, these three pillars are closely interconnected, generating valuable synergies. Teaching, learning, research and fabrication are also carried out at the university's secondary locations in Malchow on the island of Poel and in Rostock-Warnemünde. At the certified »family-friendly university«, numerous progressive measures aimed at students/employees with children make study or work compatible with family life. The university sees itself as a modern teaching institution, characterised by its competitive educational spectrum with an international focus. It also places high value on the development and use of up-to-date and future-oriented teaching methods and technology, with competencies beyond the campus boundaries. For this practice-oriented university, the balance between learning in the classroom and applying what is learned in real applications plays an essential role. The university commits itself to helping its students choose a career path and supports them as they transition to their career – as an employee, in self-employment or in their alternative endeavours. More than half of the students study by distance learning, for which the university's WINGS office (Wismar International Graduation Services GmbH) is responsible.

Wismar University
University of Applied Sciences,
Technology, Business and Design

Technology transfer information
hs-wismar.de
hs-wismar.de/forschung
hs-wismar.de/vernetzung

Cooperation partner

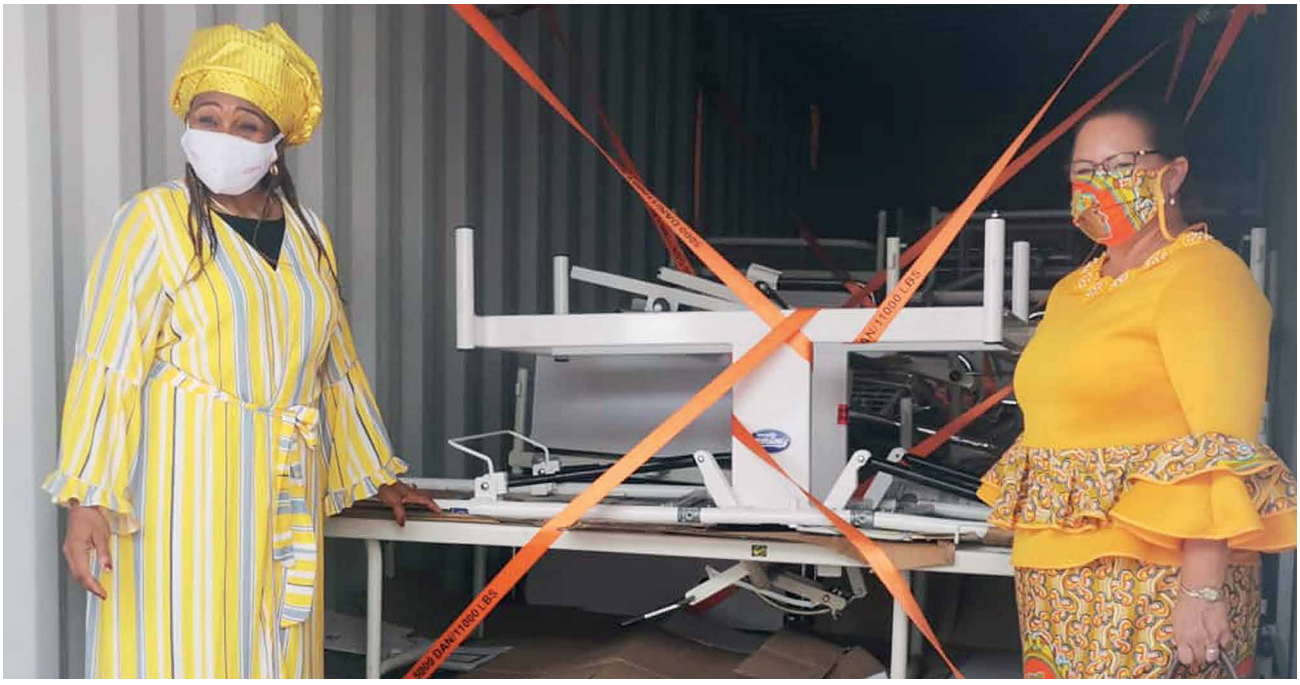
Inros Lackner's ongoing cooperation agreement with Wismar University brings academics and practice closer together. Inros Lackner staff take on lecturing responsibilities and make presentations at the university, introducing a more practice-oriented focus to the civil engineering curriculum. And students can work on real projects and get subjects for their final thesis work. Inros Lackner is also playing a part in introducing a new course on technical building systems and building automation, and the expertise of Inros Lackner staff is contributing to the development of the curriculum for a new cooperative work/study Master's programme relating to hydraulic and port engineering. On top of all that, two students are supported with »Deutschlandstipendium« scholarships each year.

BEDS FOR A HOSPITAL

Social engagement: Trees planted in Congo-Brazzaville and donation made to support construction of a new hospital.

Inros Lackner has been implementing projects in the Republic of Congo-Brazzaville for over twelve years, and opened a subsidiary there, in the city of Pointe-Noire, in September 2017. Initially, the focus of our activities in the country was the expansion and rehabilitation of Pointe-Noire's port, but our work now includes infrastructure projects nationwide. In addition to our involvement on these projects, it is important to us to contribute to the local society in other ways as well. For example, Inros Lackner actively supports »Tree Day«, a national holiday on which every citizen should plant at least one tree. The aim is to maintain and increase the number of trees across the country, protecting the environment and the ecosystem. This year the Inros Lackner team planted 70 trees. Another good cause that we support is the »Fondation Rosalie Matondo pour le bien-etre de tous«, which works to improve the well-being and quality of life of the Congo's rural population. One of the foundation's projects this year has been the construction of a new hospital in the rural Luomo district (near the town of Boko, approx. 85 km southwest of Brazzaville). Following completion of construction work on this maternity hospital, equipping it with beds remained a particular problem, and Inros Lackner offered to help. 28 hospital beds were purchased in Germany, and shipped to Pointe-Noire via the port of Antwerp. The shipping company BOCS from Bremen was engaged as a partner for the initiative, providing free sea transport of the beds – including the organisation of waybills and customs clearance in the destination port of Pointe-Noire. The beds arrived in Pointe-Noire in mid-May, making a small but important contribution to the medical care of the people of the Congo.

»Day of the Tree«: Simone Urmoneit, head of INROS LACKNER Congo



Minister Rosalie Matondo, foundation president, and Simone Urmoneit receive the hospital beds

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Publisher
INROS LACKNER SE
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Telefax +49 381 4567 899
rostock@inros-lackner.de
inros-lackner.com

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info@in-punkto.com

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