

PERI Infrastructure

BRIDGES Connecting People

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Publisher

PERI SE Formwork Scaffolding Engineering Rudolf-Diesel-Strasse 19 89264 Weissenhorn Germany info@peri.com www.peri.com

Important notes

All current regulations and guidelines applicable in countries where our products are used must be observed.

The photos shown in this brochure feature construction sites in progress. For this reason, safety and anchor details in particular cannot always be considered conclusive or final. These are subject to the risk assessment carried out by the contractor.

In addition, the computer graphics used are to be regarded as system representations. To facilitate understanding, these and the detailed illustrations

shown have been partially reduced to certain aspects. The safety equipments that are not shown in these detailed descriptions must nevertheless be available. The systems or items shown might not be available in every country.

Safety instructions and load specifications are to be strictly observed at all times. Separate structural calculations are required for any deviations from the standard design data.

The information contained herein is subject to technical changes in the interests of progress. Errors and typographical mistakes reserved.

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Bridges and Civil Infrastructure





PERI: This is who we are

We know what you are looking for

We make construction work more economical, faster, and safer. The best service for our customer is what drives us every day. This is the claim with which PERI was founded in 1969. It is the very basis for our success. This is also our driving force for the future.

The passion with which we bring innovations to life always has the benefit of you, our customer, in mind. As a family-owned company, we stand for reliability: Yesterday, today and in the future. Our customers can also rely on PERI during each phase of their projects and also on the quality of our solutions.

Our DNA

PERI is an international market leader with roots in Germany. Enthusiasm for technology and quality was and is the basis for our success. This basis has been a central driving force from the very beginning of our company, arguably shaped by Germany's role in civil engineering history.

Sustainability and Circular Economy as integral part of our business model for us is not a trend or something we started only recently. It is an integral part of our company from the beginning, it is also central to what we do every day.

Of equal importance is striving to improve the status quo. This means that we constantly evolve and look for improvements to find an even better solution.

Our solutions

PERI systems have brought and still bring innovative approaches to civil engineering sustainably and effectively. Around 2000 PERI engineers worldwide support your projects to make them a success.

You receive everything from a single source, in every phase of your project to its successful completion. Many of our solutions are rentable and reusable, fitting the needs of civil engineering projects today and in the future.



Connecting People

What makes bridges special?



Visit our website for further information:



When Architecture meets Engineering

In our everyday lives, we pass many bridges. Very often, these bridges are designed to meet their requirement connecting people. Some of them, however, are also iconic.

The Viaduc de Millau is but one example of a bridge that serving more than its purpose to connect people. It is an iconic structure designed by Michel Virlogeux and Sir Norman Foster spanning the gorge valley of the Tarn in Southern France.



Civil Engineering and Society

One of the central goals of civil engineering is solving problems of society and thus, to make life of people easier and better. Civil Engineering has a long-standing tradition of using scientific advances in physics and mathematics to reach this goal. Not surprisingly, advances in physics and mathematics have played an integral part in advances for civil engineering approaches.

In our everyday lives, civil engineering structures are indispensable yet very often, we take them for granted without actually thinking about the ingenious work that underlies them. Some examples of civil engineering, on the other side, are iconic, and come spontaneously to mind, when you think about tunnels and bridges, such as the Viaduc de Millau, the Golden Gate bridge or the Eurotunnel connecting England and France. Whether iconic or not, our lives would be different without them.

The construction of bridges and tunnels are two prime structures of civil engineering. The reason being their benefit for societies on the one hand, but equally important the fact that they, as probably no other civil engineering structures, combine advances of (civil) engineering with architectural aspects in a unique way. These structures do not only serve society with their purpose but are also built to please aesthetically.

The resulting structures – even if not being iconic – serve as landmarks being useful, remarkable if not breath-taking. Their purpose also expands to their role as lighthouse, in a rather literal sense as point of orientation, but also figuratively speaking as a structure other engineers or architects can lean on when creating new tunnels or bridges.

At PERI, we have a long-standing experience in civil engineering projects. We bring together innovative products with the knowledge of our engineers to create individual solutions for each project. Because each structure has its individual design, its unique geographical and geological conditions, each structure is different. Advances in physics in general and civil engineering in particular are one of the central forces for us to evolve constantly.

Examples of PERI's successful involvement in civil engineering construction projects is manifold. This brochure aims at sharing our love and fascination for civil engineering, as well as giving an overview over various aspects of how our solutions are a success factor for your project and show you some exceptional examples of projects, we helped to successfully complete.



PERI Locations The world is our construction site

For us, being international means that we want to be at home in our markets. We want to be close to you, our customers. Firmly rooted in Germany and with a strong local presence all over the world, we are convinced that this is the only way we can get to know and understand you, and your needs.

▶ PERI is represented in about 70 countries all over the world, and still expanding.

► In many countries, we are present at multiple locations.

► With over 160 rental parks we guarantee material availability and timely delivery to keep your project on schedule.

► No matter your location, PERI is there with a vast expert network, conveniently positioned to serve your project's unique needs.





PERI Quality Reliable solutions for your needs

Our production facilities – with the majority being located in Germany – are a key factor for ensuring the high quality you can expect from PERI.

We constantly invest in new production methods and monitor the quality of our products, so you can expect high-quality products for smooth and safe construction processes. With its efficient systems engineering, state-of-the-art manufacturing processes, fully automated welding robots and, last but not least, an outstanding production team, PERI's approach to production is in keeping with the times. By opening the galvanising plant at our scaffolding factory in Günzburg in 2020 and developing a highly automated frame production line and an innovative surface coating system at the formwork factory in Weissenhorn, we have been making great strides towards an even more sustainable and environmentally friendly approach to production.

At PERI, we believe that future viability goes hand in hand with investment in our workforce. After all, we are committed to providing competitive jobs for many people, for example through our modern training centre, where we prepare the next generation for the rapidly advancing process of digitalisation in the production sector, while also providing further training for our core workforce. Top quality and delivery reliability are our hallmarks, and they set you on the road to success – worldwide.







Our production facilities are state of the art and are setting new standards. However, what makes the difference are the people working for PERI, striving for the quality you can trust on.

TYPES & METHODS



The Craft of Building Bridges



The Bay R

Our solutions for your project

Balanced Cantilever



This is the method of choice in urban areas, for deep gorges and valleys, or over waterways. Span widths are usually between 70 m and 300 m.

Incremental Launching

Incremental launching is a method referring to a construction method where a complete bridge deck is built from one abutment of the bridge only. The superstructure of the bridge is manufactured in sections to the other side.

The incremental launching method is used mainly in urban areas, over waterways and for girder bridges. Span widths of about 50 m are ideal for this method.



Movable Scaffolding Systems

Movable scaffolding systems are self-launching forms, specifically used for prestressed concrete bridges with segments or spans that are cast in place. They are used to support formwork while the concrete is cured. Then scaffolding and formwork are moved to the end of the new segment and the subsequent segment is poured.

The use of these systems is rather independent of the height of the bridge, and is used economically for bridges with a length exceeding 300 m. Spans of up to 50 m are possible to be realized with this method.



Composite Bridges

► For the construction of composite bridges, bridge decks are poured on either steel or precast concrete beam structures. For long steel composite bridges, formwork carriages are used. For short composite bridges: brackets are the solution of choice.

Composite bridges combine advantages of steel bridges with those of concrete bridges: the main structure (built of steel) is easier to erect, the loads on piers and foundations is reduced, the concrete slab further reduces costs with fewer vibrations and noise, and is easier to be paved.



Precast Bridges

Precast bridges are constructed with parts that are completely fabricated before they are positioned. This can be done both at the construction site, or further away.

Precast Bridges are economical for bridges that are longer than 100 m. Their popularity increased notably over the last years



Falsework / Shoring

If the bridges are not too high, heavy duty shoring is a suitable construction method, especially if the nature of the soil is unfavorable for birdcage shoring. One of the advantages is that only a small area for foundations is required.

HD-shoring systems allow for an easy realisation of drive-through openings and the crossing of obstacles.





Repair and Refurbishment

Once a bridge has been built, it is there to stay. However, this does not mean it lasts for eternity without being in need of repair or refurbishment. There is a growing demand for repair and refurbishment around the world, in particular in developed countries. This demand is growing rapidly.

PERI solutions are meeting these market requirements and well suited to be used also for repair and refurbishment projects. As in the process of construction, our customers can be sure to have their material from a single source. Our expertise and our solutions have proven to be pivotal in restauration projects in the past.

Again, safety, efficiency and speed are our main foci, this is true for workers and those possibly affect by the projects alike. For instance, many solutions have been developed in a way that traffic below bridges under repair can be maintained.



Many bridges have – apart from their architectural appearance – a historic value. Repair and refurbishment projects need to ensure to reinstall the integrity of the structures without reducing their historic value.

Our products are an important asset in succeeding in repair and refurbishment projects. For repair and refurbishment projects, we offer the same support as for new built structures: holistic solutions including engineering, project management, digital tools.

The uniqueness of each bridge is even more important in repair and refurbishment projects, because they are carried out to renew them without changing their appearance. Our solutions are tailor-made for your repair and refurbishment project.





Formwork Solutions The PERI standard: enormous versatility, extensive adaptability

Climbing Formwork

Adaptable, easy, combinable

- Various climbing solutions can be chosen to fit your requirements
- Depending on the system, crane free climbing is possible
- Concreting of straight and tilted sections can be realised
- Concreting for one-sided applications of up to 6.00 m
- Can be combined with various other systems, such as protection screens, or platforms

The PERI Climbing Formwork solutions are adaptable to the need of your project, are easy to install and can be combined with other systems.



Column Formwork

Economical, powerful, adjustable

- Standard solutions for maximal fresh concrete pressure of up to 150 kN/m²
- Variable standard solutions for rectangular crosssections for up to 225 cm x 225 cm, or circular cross-sections with a diameter of up to 120 cm
- Easy to install and combinable with other PERI Systems
- Solutions can be adjusted to your requirements

Depending on the size and height of columns, numerous PERI systems are available. Their ease of use and their economical material requirements are lending them additional benefits.



Wall Formwork

Formidable, alterable, clever

- Maximum permissible fresh concrete pressure of up to 80 kN/m² for standard elements
- Clever features to simplify concreting work
- Enormous porfolio allowing for adaptation to your requirements with standard elements and components
- Easy combination with PERI Scaffolding solutions
- Many systems can also be used for columns
- We also offer lightweight system solutions

If the standard solutions are not fitting your needs, we also offer custom-made Freeform Formwork.



Bridge Systems

Proven, cost-efficient, attuned

- Semi-automised construction systems, increasing the productivity of the works on the construction site by reducing labor time
- Based on standard PERI systems
- Solutions for various bridge construction methods
- Easy installation or preassembled units contribute to efficient processes
- Fitting with other PERI Formwork and Scaffolding Solutions
- In combination with PERI Engineering, the most effective solution for bridge projects

We offer solutions for various bridge construction methods. These are based on standard VARIOKIT elements and thus can largely be rented. They can also be combined easily with other PERI systems.



Access and Shoring Solutions Countless solutions with a low number of components

Scaffolding Solutions

Safe, fast, flexible

- Versatile systems with a low number of components
- Access technology with safe decking
- Permissible loads of 3.0 kN/m² for stairs and decks
- Fast and easy assembly

The PERI UP Scaffolding Construction Kit, the ALPHAKIT Shoring Construction Kit and the VARIOKIT engineering Construction Kit are the basis for our access solutions. Their combinability allows for an enormous range our access solutions can cover.



Shoring Solutions

Variable, high load-bearing, adaptable

- Standard solutions for light (< 100 kN), medium heavy (< 200 kN), or heavy (> 200 kN) shoring
- No limitation to a single PERI shoring system due to compatibility
- High efficiency of assembly components are lightweight and easy to install
- Easy combination with PERI formwork solutions

Our standard shoring solutions cover a wide range of load classes. Depending on requirements, multiple PERI Systems can be combined to match these requirements.



Props

Versatile, combinable, extendable

- High range of load bearing classes (35 kN – 200 kN)
- Many props can be used as shoring towers with few additional components
- Intuitive handling and installation
- Easy combination with PERI Formwork solutions

Our props can be used in many areas of operation. Their versatility and the easy combination with PERI Formwork Systems make them efficient for a broad range of bridge projects.



Working Platforms and Console Systems

Comfortable, safe, adjustable

- Based on standard PERI systems, allowing for safe comfortable working spaces
- Easy installation or preassembled units contribute to efficient processes
- Easy combination with PERI formwork solutions
- Adjustable to many project-specific requirements

Our solutions for working platforms cover a wide range of applications. What they do have in common is their intuitive handling, their safety, and their efficiency because they are based on standard components and easily combined with other PERI Systems.







If standard solutions are not meeting your requirements, we offer customized, special solutions for your project.

- ► Highest amount of standard components in combination with tailor-made special components.
- Engineering support to meet specifications.
- Preassembly of special solutions reducing time and storage costs.
- Site supervision by experienced experts.
- Everything from one source.



You have a project and would like to get in contact with our experts? You are no more than one QR code away!





Whenever your project demands increase, we will find a solution to ensure its success.

International Experience Network

Our experienced experts are located around the world and collaborate internationally. This network ensures an enormous amount of knowledge and makes it easy to have personal contact with our experts wherever your project is located.

Our experts will find a tailor-made solution for your requirements that is also economical, because they can rely on the standard components of PERI systems and only make adaptations when needed.

This holistic approach also ensures the compatibility with standard systems.





REFERENCES



Bridges and PERI Solutions

Neckarbridge, Germany

195 m long, elegantly curved composite bridge, crossing the Neckar, in conjunction with a 107 m long retaining wall.



Second Niger Bridge, Nigeria

Bridge consisting of three parts with a total length of 1,590 m; 630 m long main bridge, three spans with 150 m each and two spans with 90 m each.



Inn Bridge, Austria

235 m long bridge, located in an earthquake zone with a demanding schedule.









Schwelmetal Bridge, Germany

Construction of a 207 m long bridge, Replacement construction of the Schwelmetal bridge. Special feature: the steel structure of the new bridge was mounted on the old bridge and placed on temporary supports so that it lay above the old bridge and then served as a crane girder for the demolition of the old bridge segments.

S3 Expressway, Poland

Three bridges in Western Poland between Legnica and Lubawaka as part of the 480 km long S3 expressway.

Corridor VIII, Northern Macedonia

A 381 m long motorway bridge, being part of the Pan-European Transport Corridor VIII, between Albania and Bulgaria. A total of 14 viaducts were built around 10 km of the corridor, leading to a processing of 150,000 m³ of concrete and 15,000 t of reinforcement.



Filstal Bridge, Germany

A 485 m long bridge as part of the new high-speed Wendlingen-Ulm railway line with a height of 85 m. High bridge piers widening into a Y-shape at the top, with exacting architectural concrete requirements.



Sheikh Khalifa Bridge, United Arab Emirates

Construction of abutments, piers and superstructure of the 1,455 m long bridge, with a width of 60 m, for ten car lanes and two railway tracks.







Tekkale Viaduct, Turkey

Part of the Tekkale Dam project, bridge, the viaduct has a length of 644 m and a height of 270 m. PERI solutions were used for the construction of piers and superstructure of the viaduct.

Find out more about how PERI is pushing towards a more sustainable future





Viaduc de Millau, France

One of the longest cable-stayed bridge in the world with a total length of 2,460 m.



Your Project Our Support

As specific as the requirements are the solutions provided by our engineers.

Solutions provided by PERI Engineers are designed to meet your requirements.

PERI Engineering Individual planning and consulting for your project

- Around 2,000 PERI engineers around the world design and dimension formwork and scaffolding solutions.
- Main goal: to use our systems for all infrastructure project types in a time-, cost- and quality-optimized manner.
- Assistance from the concept stage, through elaboration of the execution stages, actual work execution until the final pour.
- ▶ We also support thereafter, if our customers wish us to do so.
- Use of state of the art tools and solutions: custom-made software (e.g. planning solutions), 3D renderings and visualisations, integrated BIM models, and many more.
- Plans drawn up by PERI Engineering are supplemented by verifiable static calculations as proof of stability.
- Project-specific assembly and joinery plans for the professional assembly of special applications.
- Assistance for even the most complex projects to find the right solutions.





The basis is formed by sets of execution plans, which are in turn based either on 2D views and sections or on realistically visualised 3D building models. As a result, technical solutions are developed together with you that optimise the use of materials and the construction process itself.



Project Management We are with you the whole way

Our goal is being there for our customers during their project. They receive everything from a single source. Apart from our products, we also offer support during each phase of your project, starting at the concept elaboration until the final stage of the construction process.



Bespoke Solution Project Success

Products, Planning, Logistics and Availability

Your project never runs out of PERI material

High-performance, modern production facilities coupled with a strong, global logistics network

The interplay of efficient and highly automated production and a dense network of warehouse locations ensures material flow and availability. Even across national borders, PERI is therefore able to produce large quantities of material in a short time and pull it together from several warehouse locations. These availability advantages, coupled with professional planning, contribute to the success of PERI projects worldwide.

Planning for smooth material utilisation

The basis for optimal material utilisation is professional planning. Our project managers are happy to assist you with planning material usage efficiently, or find solutions if plans have to be adjusted during the project.



Production of our products is setting standards ensuring the highest quality.



PERI

Project-specific planning as key factor for success.

We make sure you receive your material with our highest level of quality, wherever you need it when you need it. You have many options: Renting or Buying? Preassmbled or in parts? Our goal is to make your job easier.

Logicstics you can count on

We deliver the material needed on the construction site exactly when you need it. Logistics services allow for a right amount of material at your disposal when you need it. The material, rented or bought, in parts or pre-assembled, will be delivered on time reduce the storage space on your construction site. The high versatility of the core components, the ease with which they can be combined with each other and the additional functions already integrated, are another important factor. This not only saves time and effort, but also space on site.

Availability you can count on

An international network of more than 160 logistic sites and PERI warehouses creates an impressive amount of material that can be delivered to your project. Even high short-time demands can be handled due to the international cooperation between our sites.



Product logistcs ensure reliable delivery of material to your project site.



PERI's international network of logistic facilities ensure high material availability.



PERI Slot Management Info film (EN)





Building Sustainability The future is ours to build

The PERI approach to Circular **Economy, Carbon Footprint** and Productivity

Since our founding more than 50 years ago, we have embraced the concept of sustainable entrepreneurship and made it the basis of our corporate activities. These activities are not limited to our own company. Sustainability, as we have and continue to implement it, also adds value for our customers.

Circular Economy to many is a recent development. For us, it was always a key aspect of doing business. Rental models, for instance, are a very good possibility enabling us and you, our customers, to use and reuse what is needed for your project instead of producing material that is needed only once, reducing your costs and contributing to a more sustainable future at the same time.

Furthermore, in production, for materials like aluminium and steel we reach recycling rates of almost 100 percent. Our DUO formwork system, made of Technopolymers, we created a recycling process allowing for an almost complete reuse of the material.

We buy plywood and sawn timber from suppliers bearing the PEFC or FSC seal, they guarantee sustainable forestry. Wood waste created in our construction process is used in our combined heat and power plant. With all these initiatives, PERI became climate-neutral in 2021.

For us, this is only the beginning. Further steps need to be taken. A sustainable future is only possible if all of us work together, with PERI you can be sure to already go into the right direction.



Find out more about how PERI is pushing towards a more sustainable future

What, on first sight, seems like waste, to us is very precious, as either being the basis for production (left) or an invaluable source of energy (right).





3D + 5D

Building Information Modeling (BIM)



When it comes to BIM, PERI has been one of the leading companies in the industry for many years now. With software support, the method optimises the planning and execution of projects. The most important benefit of BIM lies in the fact that planning and design variants of the 3D building model can be simulated at a very early stage of the project. In this way, it is visible to all parties involved where, when, why and at what cost interface problems can arise – at the structure planning stage and in the subsequent construction work. This future-oriented optimisation of the construction process provides transparent project management and a high level of planning reliability. Through the additional integration of the time and cost factors, the three-dimensional visualisation of the planning gradually turns into a 4D or 5D model.

Additional process data relating to scaffolding technology, such as required plan changes, automated collision checks, safety checklists and QR codes for object navigation, are documented in a mobile building information management system. All relevant data is available on the construction site via app solutions for day-to-day operations.



Platform-independent planning makes work easier and results in fewer interface losses. At PERI, the BIM method is more than just an idea. We have lived and breathed this approach for a long time now, and it is producing impressive results.

Sensor Solutions Knowing, not guessing

The ISC Hub collects and sends the data directly to the cloud



ISC sensors are easy to install and help you to improve concreting results

With PERI InSite Construction (ISC), you have a constant real-time overview of the concreting process on your construction site. Around the clock, around the world. No need for you to guess anymore.

- The solution is designed to collect data from a variety of sensors.
- PERI ISC provides an intuitive web application to effectively analyse the collected data.
- Various aspects of concrete can be monitored, such as temperature for concrete maturity, concrete pressure, concrete fill level, and water-cementratio.
- Intelligent sensor technology can lead to shorter concreting cycles and reduce the need for formwork materials.
- PERI ISC facilitates faster and safer construction processes and high-quality concrete results, ultimately increasing safety by minimizing the risk of formwork breakage and deformation.



More information about InSite Construction Solutions can also be accessed 24/7 with this code

Reach the next level of efficiency and safety in concerting with cuttin-edge sensor technology



Pressure Monitoring



Temperature and Concrete Maturity



Concrete Detection and Compaction



Water to Cement Ratio



Digital Planning Solutions Intuitive apps that make a difference

Our portfolio of planning tools is manifold. There are planning tools for specific products, such as the PERI QuickSolve Bridge Planner, or the VGK Design App. They allow you to plan your project based on these PERI products. However, some of them are also more general so they can help you track the amount of material on your site, or calculate what is missing. Static calculations are also an important aspect, our digital tools can be of help for.



Having information about the materials improves the work processes on every construction site. Using various identification technologies, both active and passive ones, it is possible to track the materials from the stockyard to the construction site and back again.



PERI Planning Solutions cover a wide range of use cases.

We 💛 Bridges

Our experience, our enthusiasm, our solutions – it is all there for you, for your project, for your bridge. That was true yesterday, it is true today and it will be true in the tomorrow.



Taking a step back from a bridge and looking at it rather technically, it is a structure of concrete, steel, or wood. It can be categorised as cantilevered bridge, suspended, cable-stayed, or arch bridge. You can also distinguish it according to its main purpose, such as being built for pedestrians, car traffic or trains.

However, this is not what we see when we look at bridges. We see the work and effort that construction workers have put into the bridge being built. We see the planning engineers and architects have done before the project was realised.

And we look back onto countless projects we have successfully completed with our customers. Projects too numerous to individually mention them in this brochure, yet each of them unique to be memorable to us.

We also look into the future and see the bridges which will be built, we know that we will have innovative solutions for building bridges then, even though we do not know all the developments that we will encounter.

Bridges have been built for thousands of years. Their main purpose has not been changed. However, the way they are built has undergone dramatic changes. These changes will occur also in the future. The way we build bridges today may be outdated in the near future. Technological change has always occurred and will be having an effect also in the times to come.

Stagnation to us is like stepping back. A reason for fearing what is to come? By no means. We are not only looking forward to these changes. With our innovations, we are actively shaping the future solutions for constructing bridges.

Our drive to become better every day prohibits us from being satisfied with what we have and getting caught in the past.

One of the central goals of bridge construction and a central reason for their existence is bringing people closer together enabling them to improve their lives. If you like, this is also central to our fasciation of bridge construction and the very reason we love what we do.

Bringing people together and improving their lives is also our goal when collaborating with you on your bridge project.



Engineering **Partnership Logistics Expert Network** Digitalisation Training **Rental Parks Sustainability Customised Solutions**



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