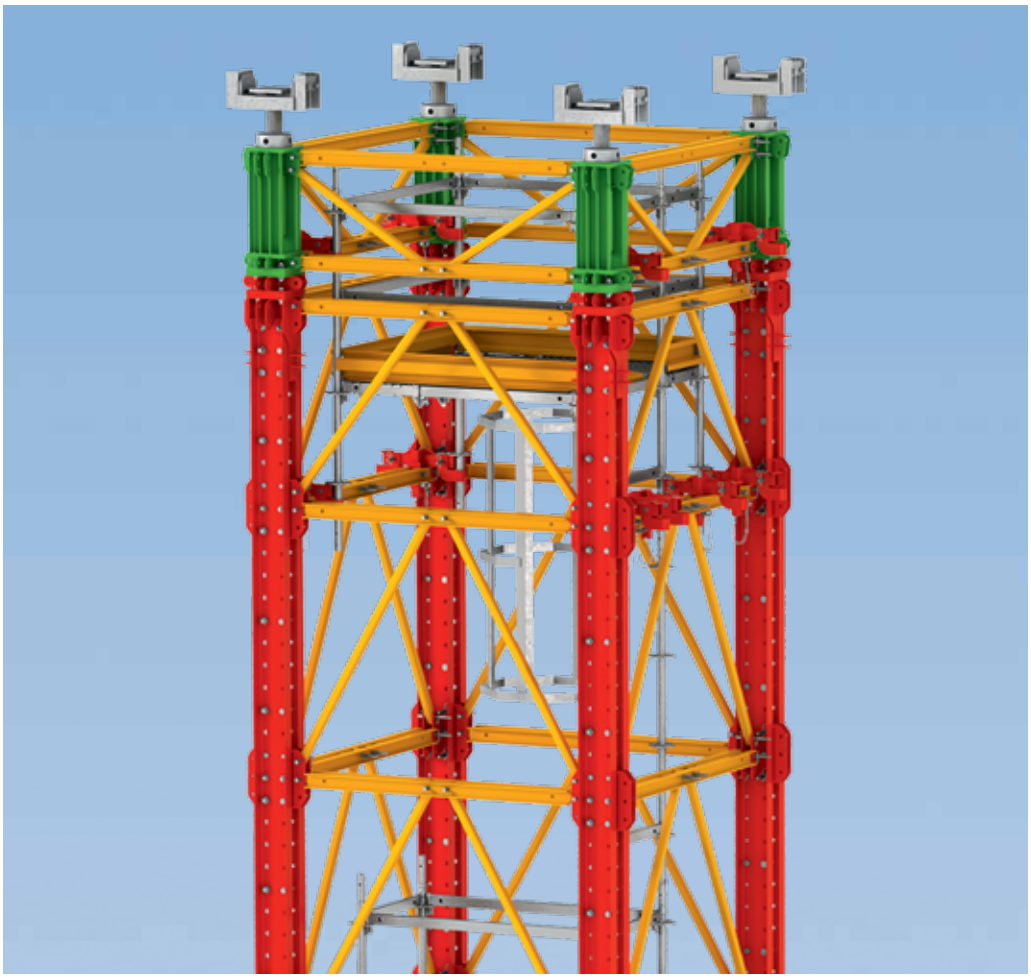
VST Heavy-Duty Shoring Tower and VRB Heavy-Duty Truss Girder

VARIOKIT system solutions for heavy-duty shoring

Product Brochure – Issue 07/2019



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PERI Civil Engineering Solutions

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Important information

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

The images 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, computer graphics are used which are to be understood as system representations.
To ensure a better understanding, these and the detailed illustrations shown have been partially reduced to show certain aspects. The safety installations which have possibly not been shown in these detailed descriptions must nevertheless still 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.

ΤΑΚΗΣ ΜΠΡΑΒΟΣ
P. BRAVOS S.A.

VARIOKIT system solutions

Cost-effective realisation of heavy-duty towers and truss girders

Engineering structures place special demands on formwork and scaffolding planning because the supporting structure, realisation solution and construction process influence each other. This requires intensive coordination of all project participants. Each of these structures is unique – regardless whether it is a bridge, tunnel or power plant. With modern construction methods and innovative formwork and scaffolding technology from PERI, this range of structures can be efficiently realised – within the planned time frame and, in particular, in compliance with economic efficiency, safety and durability.

With VARIOKIT core and system components, heavy-duty shoring towers and wide-span lattice girders for bridge construction can be systematically assembled. VARIOKIT is also the optimal solution for other construction tasks where high loads are to be transferred.

Due to the practical and innovative systems, it is possible to realise unique project solutions on the basis of the VARIOKIT Engineering Construction Kit. VST Heavy-Duty Shoring Towers and VRB Heavy-Duty Truss Girders can be flexibly configured in order to transfer loads where they occur.

PERI engineers take on the project-specific planning along with the static calculations of the complete solutions. All systems and processes are thus optimally coordinated with each other and facilitate on-schedule completion.

Providing the overall solution from one source ensures optimised processes during the course of the project. Thanks to the connection possibilities for the PERI UP modular scaffolding, it is easy to integrate secure access to all working areas and the required working surfaces.

VST Heavy-Duty Shoring Tower
The flexible shoring system for transferring high loads from great heights at the right place.

VRB Heavy-Duty Truss Girder
The high-performance and reliable lattice girder for transferring high loads across large spans.

VST system advantages and detailed solutions

Transfer of high loads with maximum flexibility

VST Heavy-Duty Shoring Towers are used in projects where large loads have to be centrally transferred. With leg loads up to 700 kN, VST Heavy-Duty Shoring Towers are particularly suitable as a shoring system for accommodating very large loads in bridge construction as well as for special applications in industrial construction.

The rentable heavy-duty shoring tower can be flexibly adapted to meet individual project requirements. Based on the VARIOKIT Engineering Construction Kit, it can be assembled and used either as a 4-legged tower, tower with legs, shoring tower frame, main beam frame or birdcage scaffold. As a result, load transfer always takes place at the right place.

Helpful functions such as height adjustment whilst under full load contribute to the success of the project. Working platforms and access options taken from the compatible PERI UP system ensure a high level of work safety.

Transfer of high loads
The VST Heavy-Duty Shoring Tower serves as load-bearing scaffolding and is used in projects where large loads must be centrally transferred.

Flexible configuration
With the staggered lengths of the RCS Rails, two spacers along with the height-adjustable head spindle, VST Heavy-Duty Shoring Towers can be continuously adjusted up to heights of 40 m.

Load transfer at the right place
For direct transfer of loads, 4-legged towers can be flexibly configured in any statically required dimensions up to a maximum of 6.50 × 6.50 m.

Flexible
Due to the variable leg positioning and continuous height adjustment

Quickly ready for use
Due to bolted connections and pre-assembled tower segments up to 10 m

Simple height adjustment
Thanks to the mobile hydraulics whereby the head spindle can be operated when under full load

Cost-effective
As no permanent investment is necessary due to all system components being available in the PERI rental parks

Maximum flexibility
In heavily loaded areas, the load-bearing capacity can be increased where required with the help of smaller leg spacings.

High level of working safety
The compatibility with the PERI UP scaffolding system facilitates effective work operations due to safe access means and working platforms.

Lifting and lowering when fully loaded
In order to ensure exact positioning, the heavy-duty shoring tower can be easily be spindled in both directions also when under full load - controlled and safely thanks to the head spindle and mobile hydraulic pump.

VRB system advantages and detailed solutions

Easy and reliable transfer of high loads across large spans

The VRB Heavy-Duty Truss Girder is used whenever high loads have to be transferred via large spans. Regardless whether it is new construction and bridge refurbishment or constructing skyscrapers. Developed for spans of 25 m to 40 m and featuring a permissible bending moment of 3,000 kNm, the VRB is characterised by an extremely high load-bearing capacity with a comparatively average low dead weight of 200 kg per linear metre.

The impressive ratio of load-bearing capacity to dead weight results in a low number of truss girders that are actually required. This likewise has a positive effect on assembly and crane times as well as on the required crane size – and this in turn saves money.

The heavy-duty truss girder is comprised of different load and length-optimised frame types. Through appropriate combinations and the telescopic function on the support, the system can be quickly, easily and continuously adapted to suit the changing spans. Thereby, every frame is coupled using two fitting pins only. This saves time and makes work operations more efficient and safer.

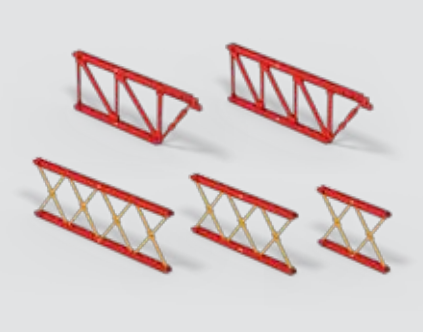
With system assembly being carried out on the ground and the possibility of connecting access means using components taken from the compatible PERI UP system, this ensures a very high level of work safety.

The combination of excellent PERI engineering, the practical and high-performance VRB Heavy-Duty Truss Girder along with its compatibility with the PERI UP modular scaffolding kit results in unique solutions for ensuring the success of every project. And this, of course, with rentable components from the PERI rental park.

Efficient use of materials
Thanks to the high load-bearing capacity with a low dead weight

Quick length adjustment
To suit changing span widths with a minimum of different frames and simple connection technology

High degree of safety
Thanks to bracing mounted on the ground and the easy-to-integrate PERI UP scaffolding solutions



Continuous adjustment to suit the respective span
With different frame types with lengths of 1.5 m – 6.75 m and a telescopic function on the bearing frame, the system can be continuously adjusted to accommodate the respective span.

Efficient assembly
Every frame is coupled using two fitting pins only. This saves time and facilitates fast work operations.

Safe assembly
All assembly work is carried out safely on the ground. All that remains is to couple the truss girders in their final positions using quick and simple fitting pin connections.

Reduced assembly and crane times
The VRB Heavy-Duty Truss Girder for large spans provides a high load-bearing capacity with a low dead weight.

Compatible with PERI UP
Safe access means with components taken from the PERI UP scaffolding system can be easily mounted between or next to the lattice girders.

Fast construction site assembly
As an option, pre-assembled units can be delivered thus facilitating even faster construction site assembly.

VST and VRB in use

Hvězdonice Motorway Bridge, Czech Republic
Flexibly adapted building safeguards taken from the modular construction kit

The D1 stretches eastwards from Prague via Brno and then on to Poland. With a length of 375 km, it is the longest but also the oldest motorway in the Czech Republic. The 90 m long structure was built in the 1970s using prefabricated components; accordingly some sections are in need of renovation. In order to safely maintain road traffic operations, a motorway bridge which had fallen into disrepair 30 km southeast of Prague had to be temporarily supported up to the time of the planned new construction.

Regarding building safeguards, the concept developed by PERI´s Czech engineers provided 44 VST Heavy-Duty Shoring Towers using components taken from the VARIOKIT Engineering Construction Kit. The system allowed flexible geometrical and load adjustments to suit the predetermined points of support with tower heights up to 11.30 m. For transferring the increased load concentrations in the bridging area of the main road, the load-bearing capacities could be doubled by means of additional legs. The fine adjustment of the head spindles and the activation of the support were carried out with the help of mobile hydraulic units while the pre-tensioning forces were continuously monitored.

VARIOKIT saved on both costs and time due to the availability in the PERI rental park: the rental of standardised system components provided, on the one hand, a cost-effective structural solution and, on the other, the required materials could be quickly delivered to the jobsite. Further time-savings could be achieved through the easy and simple VST assembly procedure using standardised fitting pin connections. In addition, the construction team was supported by an experienced PERI supervisor.

Smithland Hydroelectric Power Plant, Smithland, United States of America
Comprehensive engineering services for the power plant´s shell structure

For the Smithland hydroelectric power plant, PERI supplied a customised formwork and shoring solution. The extremely tight construction time, massive structural elements and in part multi-curved shapes required not only large quantities of system equipment but also countless, specially designed 3D formwork units. The prefabrication of the formwork elements as well as continuous coordination activities carried out by a PERI project manager on the construction site facilitated efficient, punctual and dimensionally accurate construction.

Many of the formwork units were only used once as the tight construction schedule required the simultaneous realisation of all three tubes. In addition, the high slab loads generated in up to four sections respectively required a long service life of both the formwork and scaffolding.

PERI also provided the VARIOKIT bracing and heavy-duty towers in pre-assembled units. The final assembly then took place on site in a similar way to that of system formwork or scaffolding, supported by site-specific assembly plans. This procedure minimised both the installation effort and the space required on the jobsite. Furthermore, the stationary prefabrication guaranteed the required, high dimensional accuracy of the structure.

The fact that the formwork and scaffolding technology used was extremely flexible and, at the same time, both simple and safe to handle made construction operations particularly efficient. For example, the system components from the VARIOKIT Engineering Construction Kit were used for all formwork units featuring a wide variety of shapes and loads as well as for the heavy-duty towers The project-conform connections and easy adaptation to suit different geometries and loads accelerated the work of the construction team.

VST and VRB in use

Motorway Bridge V12 over the Rio Sordo, Vila Real, Portugal

Construction kit solution for falsework and superstructure formwork

For construction of the 412 m long motorway bridge over the Rio Sordo, VST Heavy-Duty Shoring Towers were used as falsework – 30 m high and with leg loads of up to 600 kN. Through the use of rentable system components taken from the VARIOKIT Engineering Construction Kit for the superstructure formwork and shoring, the PERI solution was extremely cost-effective. The almost 20 m wide and 3.60 m high pre-stressed concrete hollow box girders were realised using two different construction methods: the three middle bridge spans with the balanced cantilever method and the respective edge spans formed on falsework.

As falsework, the contractor used heavy-duty shoring towers with components taken from the VARIOKIT modular system – 6 m to 30 m high with load-bearing capacities of 2,500 kN in each case. The VST Towers were erected as four-legged individual structures which supported the 72 m long superstructure formwork at defined load application points with axis spacings of between 10 m and 24 m. Transversely, the tower measured 2.00 m in each case and longitudinally between 2.00 m and 7.50 m – depending on the topographical and static requirements. In those areas which were subjected to particularly high loads, additional legs with axis spacings of 37.5 cm provided an increase in the load-bearing capacities. This minimised material requirements as well as reducing the amount of assembly work thus resulting in an optimised utilisation of the overall system.

The falsework was delivered to the construction site already pre-assembled as 1.25 m to 10.25 m high variable frame arrangements and further extended on the ground to form tower segments, and erected and extended with the help of a crane. Safe PERI UP Flex working platforms were used to ensure accurate and safe positioning whereby fixing in place was carried out using bolts and pins. Together with the VST Towers, these were continuously extended as required and were easily connected by means of corresponding adapter elements. In addition, both modular construction systems are based on a metric grid pattern so that the load-bearing system, working levels and access technology could be perfectly coordinated.

Brdjani Motorway Bridges, Čačak, Serbia
Modular falsework variants on a system basis

Construction of the two Serbian bridges was realised with the help of modular construction systems. As falsework, PERI UP and VARIOKIT were used according to project requirements.

The European Route E 763 was expanded as a motorway link between Belgrade and the border to Montenegro. For the new construction segment north of the central Serbian town of Čačak, two bridges were built within a short section: 232 m and 424 m long respectively, with individual spans ranging between 32 m and 42 m. Both structures have a 12.55 m wide and 2.20 m high superstructure with hollow box cross-sections which rest on massive reinforced concrete piers.

For the load-bearing system of the superstructure formwork, PERI Serbia combined two falsework variants.

As supporting scaffold for the standard fields, PERI UP framework units were used. Here, load-optimised adjustment within the shear frames could be realised with bay widths of 50 cm, 75 cm and 150 cm respectively. For the bridge sections in the area of the rivers, roads that were to be kept free along with ground of an insufficient load-bearing nature work was carried out with heavy-duty falsework. Here, VST Heavy-Duty Shoring Towers based on the VARIOKIT Engineering Construction Kit transferred the high, concentrated loads into the ground.

All the customised formwork elements for the superstructure – as done previously for the bridge piers – were pre-assembled by the PERI formwork assembly team at PERI Serbia´s Simanovci facility near Belgrade and delivered ready-for-use to the bridge jobsite. This saved time-consuming assembly work on the construction site and ensured compliance with the extremely short construction schedule as well as a high quality of workmanship.

VST and VRB in Use

Motorway Bridge T4, Paradisia-Tsakona, Greece
Supporting system solution – individually adapted

A huge inclined pier supports the motorway bridge on the Greek peninsula of Peloponnese. The 160-km long A7 motorway connects the towns of Kalamata and Corinth. The principle element being used to close the gap between Paradisia and Tsakona is a 390 m long arched bridge. Two-thirds of the 22 m wide bridge superstructure is suspended on a steel arch and was constructed using the steel composite construction method. For the northern bridge section, a pre-stressed concrete superstructure variant was selected which features a twin-cell hollow box cross-section. The supporting element of the bridge is a huge, almost 30 m high, inclined twin-pillar pier with an asymmetrical V-shape. On the one hand, this serves as an intermediate support for the in-situ concreted carriageway and, on the other, as support and starter section for the steel arch.

PERI developed a comprehensive formwork and scaffolding solution – for constructing the pier structure and reinforced concrete superstructure as well as providing temporary support for the bridge during the entire building project. Essentially, two modular construction systems were combined with each other in order to transfer the high loads safely into the ground. With help of PERI UP Flex, a spatial load-bearing structure for the piers and superstructure formwork was formed, gradually increasing up to the total support height of over 20 m to the rear and upwards respectively. Trusses consisting of rentable VARIOKIT standard elements supported the obliquely-positioned VARIO GT 24 Girder Formwork and transferred the formwork and concreting loads of the inclined piers safely into the scaffolding.

In addition, the VARIOKIT modular construction system formed the basis for the heavy-duty shoring. In the connecting area between the cast-in-place bridge and steel arch, two 17 m high, 42-leg heavy-duty shoring towers were used to accommodate the high loads – until the inherent load-bearing capacity had been reached. Due to the long utilisation period, each tower was designed to carry loads of 1,200 t as well as high earthquake and horizontal loads. For load concentrations, four standard towers respectively, each with 2.00 m by 2.00 m axis dimensions, could be bundled by means of 37.5 cm additional frames – using only rentable system components and type-tested connection means.

Fv251 Hellefoss Bridge, Norway

Accelerated construction process due to a complete solution consisting of heavy-duty shoring, formwork and engineering

The Fv251 Hellefoss Bridge is part of the Tonsasen infrastructure project - Bjorgo in Etnedal, Municipality of Valdres, in the Norwegian mountains region. The project is part of the modernisation plans for District Road 251 where traffic currently crosses the Lunde Bridge, an old stone vaulted bridge dating back to 1827, that was not designed to handle today's volume of traffic.

Due to the imminent flood of snow melt in the spring, it was important to finish the construction of the bridge during winter. The bridge span is 70 m long in total. This was realised using the VRB Heavy-Duty Truss Girder with a span of 30 m above the river along with MULTIPROP scaffolding units in the foreland areas. For shuttering the superstructure, PERI provided dimensionally accurate formwork units for mounting on GT 24 Formwork Girders which were then covered with formlining. In addition, PROKIT ensured safe working conditions on the bridge. With the help of PERI's comprehensive solution comprising of formwork and heavy-duty scaffolding and engineering services, interfaces were avoided so that the entire construction process was accelerated and the tight construction schedule could be maintained.

VST and VRB in use

Mur Bridge S 35, Frohnleiten, Austria

Large span with low weight and high load-bearing capacity

For the construction of the Mur Bridge, the modular VARIOKIT Heavy-Duty Truss Girder stood out through its extremely high load-bearing capacity along with a comparably low weight. In addition, the system components could be quickly installed and had a very flexible use.

The altogether 406 m long new bridge construction near Frohnleiten is the centrepiece of the S 35 motorway modernisation project between the Bruck/Mur and Graz intersections. The new structure completely replaced the existing 60-year-old bridge which runs alongside. The pre-stressed concrete superstructure was designed as a 11.75 m wide T-beam cross-section complete with 2.50 m web heights.

In spite of every respective 40 m spans of the two main bridge sections over the Mur, the construction of the superstructure on heavy-duty falsework by means of framework units was the most cost-effective solution.

For this, a German-Austrian team of PERI engineers designed a customised project solution on the basis of standardised, rentable system components taken from the VARIOKIT Engineering Construction Kit. The truss girder arrangement was flexibly determined in accordance with static requirements and featured truss spacings of 50 cm and 150 cm.

In addition to the benefits of the project-specific planning and verifiable static calculations, the rapid availability of materials along with the briefing of scaffold erectors on-site by a PERI supervisor ensured short assembly times from the beginning onwards. In spite of the difficult boundary conditions – assembly and storage areas were extremely limited – this still allowed the tight construction schedule to be maintained. The lifting of the more than 37 m long coupled trusses by means of a mobile crane parallel to the existing bridge also required an experienced assembly team and perfectly coordinated working steps. A big advantage here was the low weight of the VARIOKIT Heavy-Duty Truss Girder. This resulted in time and cost savings especially during the lifting procedure.

nhow Hotel, Amsterdam/RAI, Netherlands

Groundbreaking architecture for Amsterdam trade fairs

With 25 storeys and 650 rooms, the nhow RAI is the largest and tallest hotel in the BeNeLux region. Its bold architectural design was realised cost-effectively with the help of the PERI formwork and scaffolding concept.

The design for the new nhow hotel bears the signature of the renowned architect Rem Koolhaas. The iconic 91-m-high structure at Amsterdam's RAI trade fair centre is divided into three blocks, each with a triangular ground plan and arranged obliquely in relation to each other. On the 10th and 17th floors, the storeys cantilever outwards up to 12 m.

In order to safely transfer the loads of the cantilevered building segments, PERI developed a supporting structure based on the VARIOKIT Engineering Construction Kit. Here, the VRB Heavy-Duty Truss Girder, which is mainly used in bridge construction, transferred the high loads until the level of self-supporting capability was reached in the completed storeys of the building shell. The cantilevered support and working platforms meant that a complex birdcage scaffold solution was not required and accelerated the construction process.

The core of the building was constructed in advance using the ACS and RCS Self-Climbing Systems – crane-independent and, in combination with MAXIMO Panel Formwork thus ensuring a fast climbing sequence. SKYDECK Panel Slab Formwork provided twin benefits when forming the floor slabs: the systematic assembly sequence with lightweight system components accelerated shuttering and striking operations. Furthermore, the slab soffits could remain visible thanks to the uniform panel grid arrangement.

VST and VRB in use

M8 Road Bridge, Neustettin Bypass, Poland
Large spans realised within the system

For the challenging 160 m long bridge construction in the wetlands area near the town of Neustettin, PERI engineers planned a formwork and scaffolding solution based on the VARIOKIT Engineering Construction Kit.

Difficult ground conditions required a non-standard construction method that could not be realised using conventional support due to the large spans and high loads. PERI provided a very efficient solution to meet these requirements based on the VARIOKIT Engineering Construction Kit which included planning, pre-assembly and delivery as well as on-going project support.

The best solution proved to be a shoring construction with large span widths of 20.50 m and 25.50 m respectively, positioned on the foundations of the fixed bridge supports and without any intermediate supports in the bridge segments.

Planners combined VARIOKIT formwork units with components taken from the VARIO 24 Girder Wall Formwork system to form the superstructure consisting of bridge beams and the adjacent carriageway slab. The respective sections of the two parallel superstructures were alternately concreted, whereby formwork and shoring were placed in an offset position from one bridge segment to the other.

PERI ensured timely pre-assembly of the 12.50-m-long VRB Heavy-Duty Truss Girder segments at the PERI plant. Subsequently, several material packages – consisting of braced birdcage scaffolding with truss girder frames – were delivered just-in-time to the construction site where they were connected to form girder pairs and mounted on the VST Shoring Tower Frames. In this way, the truss girders could be assembled at the same time as the shoring towers were erected.

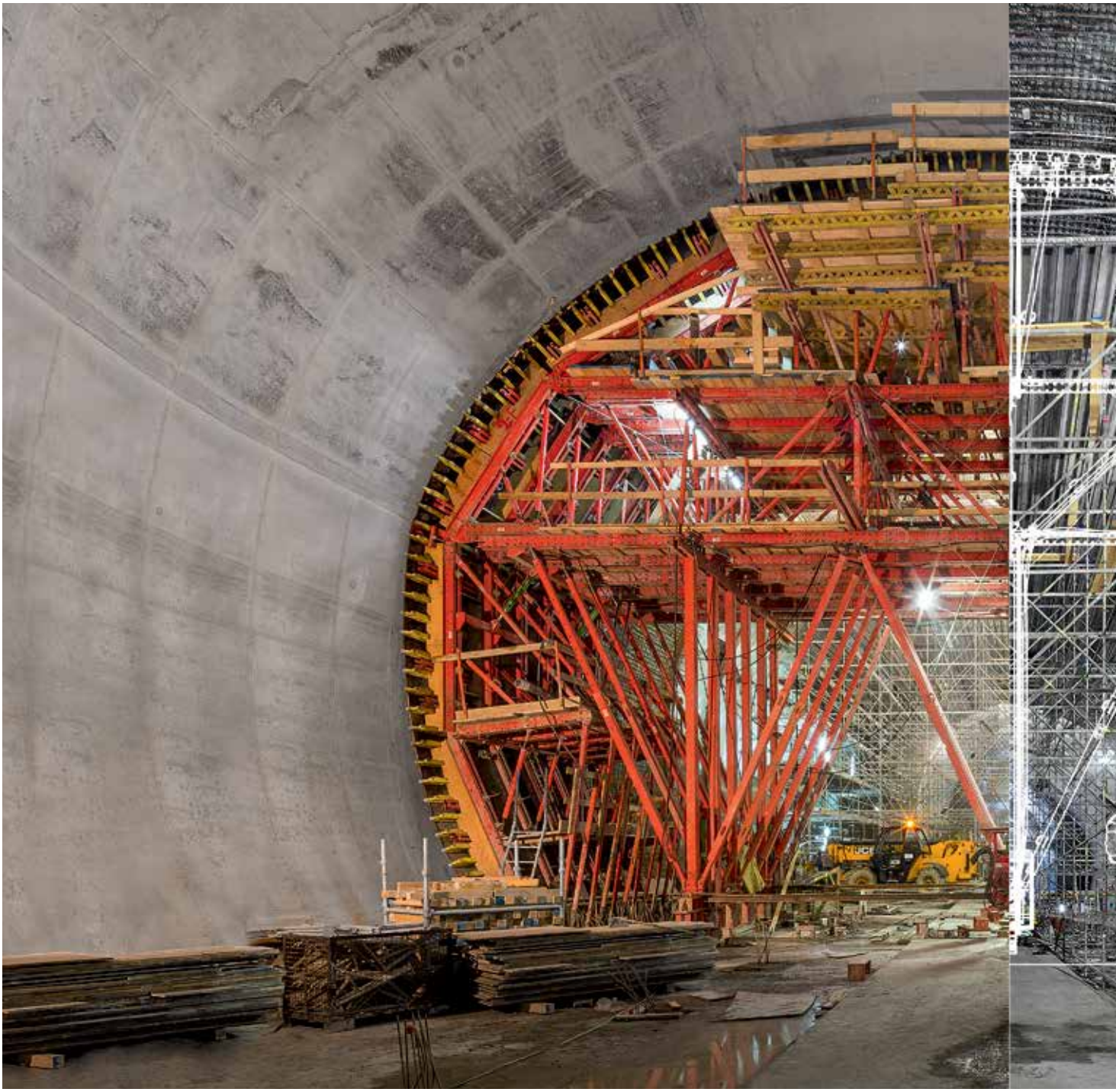
PERI engineers supported the contractor's team throughout the entire construction process with punctual logistics and on-going project support. This meant that all requirements were met and the tight construction schedule could also be maintained.

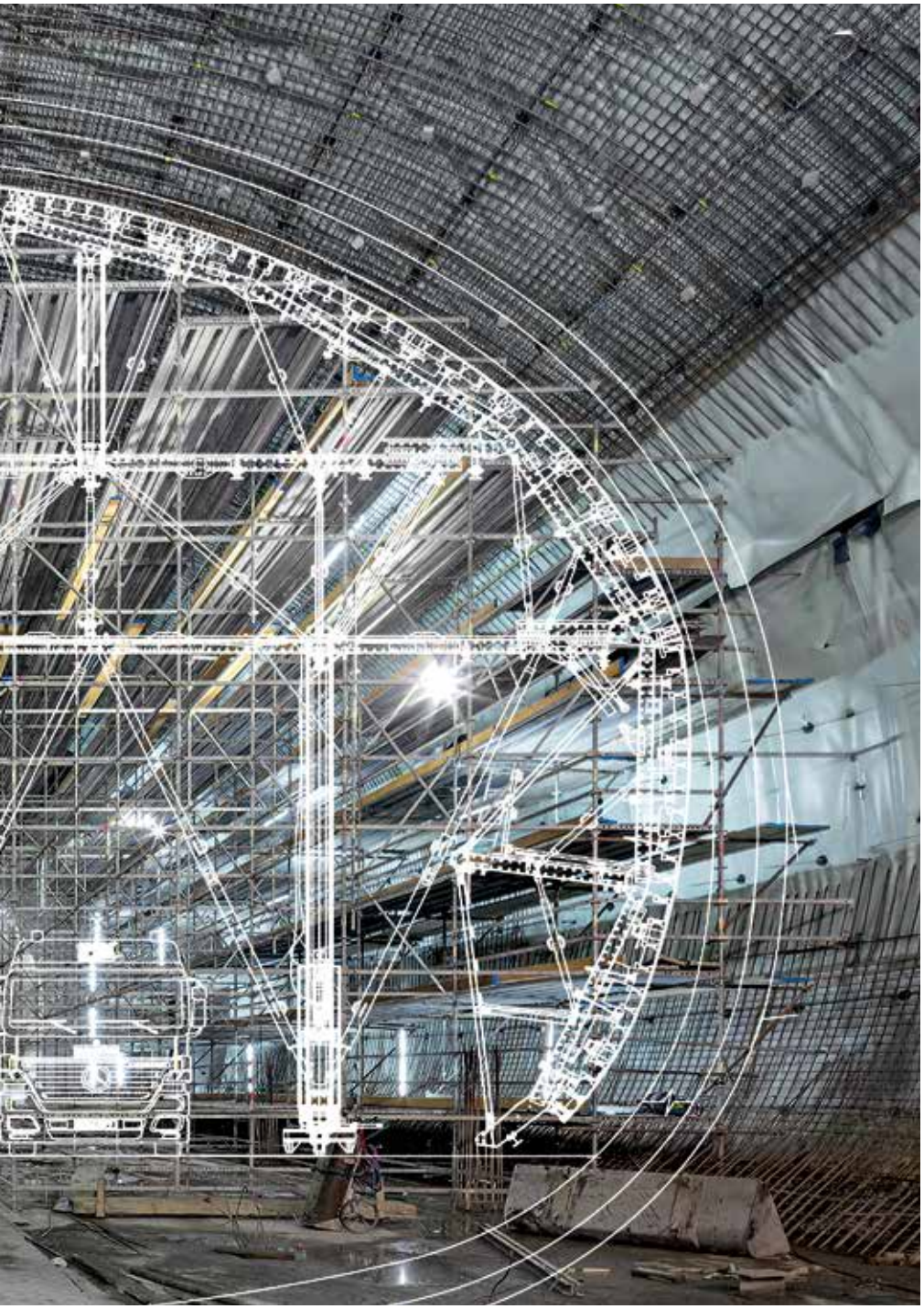
Williams Bridge Refurbishment, Rotterdam, Netherlands
Combined systems for challenging pylon scaffolding

Situated in the centre of the Dutch metropolis Rotterdam, the Williams Bridge is one of the most important road connections between the northern and southern parts of the city. The striking cable-stayed bridge over the River Maas with its two red, 60 m high steel pylons had to be renovated which involved sandblasting and repainting operations. The pylon refurbishment was carried out by the specialist company, Venko, while Steigerbouw Van der Panne was responsible for the scaffolding work. One of the special project features was that all scaffolding and painting work had to be carried out without any major negative impact on the flow of traffic through the city. As the entire superstructure is only freely suspended by means of the stay cables, it was also not possible to set up the approx. 200 t scaffold construction for each respective pylon on the carriageway slab. Together with the scaffolding specialists from Steigerbouw Van der Panne, PERI engineers designed an overall solution that was optimally adapted to fully meet the project requirements, and which was based on two combinable modular systems. The PERI UP Flex Modular Scaffolding System provided flexible adaptation possibilities to match the pylon geometry thus ensuring safe working levels including access technology.
A combination comprising VRB Truss Girders and VST Heavy-Duty Shoring Towers taken from the VARIOKIT Engineering Construction Kit carried the high loads across the entire width of the carriageway which were then laterally transferred via the pylon foundations.

On the basis of the detailed joint preliminary planning along with the possibility of seamlessly integrating VARIOKIT into the PERI UP scaffolding solution, only one night was required for assembling the truss girders for bridging the carriageway of the structure. The truss girder package was pre-assembled with each girder having a length of 21 m, and then transported to the site on a heavy-duty truck. On reaching their destination, these units were quickly lifted by a mobile crane onto the VST Heavy-Duty Towers positioned on the sides and coupled by means of bolts.

VARIOKIT system solutions and services from one source





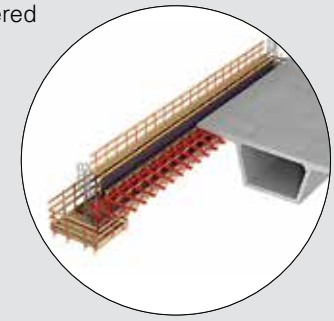
Every bridge and tunnel construction requires project-related planning. With its extensive know-how and expertise, PERI not only provides the required materials but also the complete planning services from a single source.

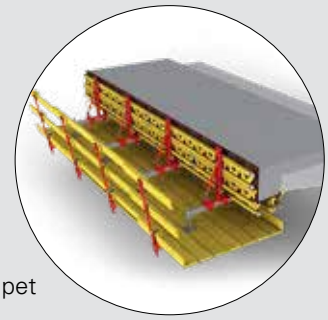
PERI solutions take into account building and assembly processes along with the maximum functionality for the construction work. With well-engineered technical planning, PERI provides cost-efficient solutions that are optimised on a project-specific basis and are precisely tailored to meet the requirements of the jobsite. Technical project solutions with VARIOKIT and services from one source accelerate the work process enormously.

Applications with the VARIOKIT Engineering Construction Kit

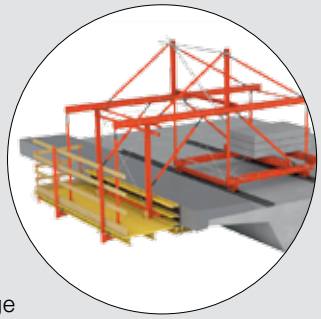
VARIOKIT solutions are typically comprised of around 95 % rentable core and system components. In order to fulfil specific project requirements, only a few special components are needed.

VGB Cantilevered Parapet Track





VGK Cantilevered Parapet Bracket



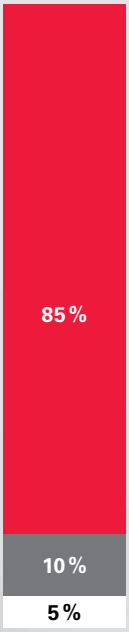
VGW Parapet Carriage

VCB Cantilever Brackets

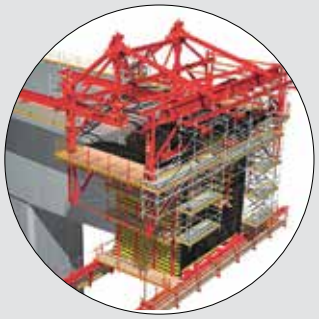
VTC Tunnel Formwork Carriage

VRB Heavy-Duty Truss Girder

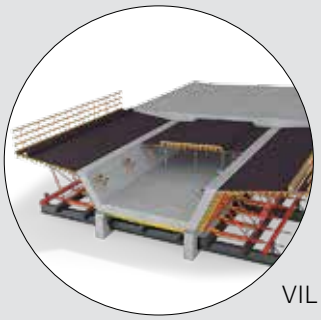
VST Heavy-Duty Shoring Tower



85 % core components
10 % system components
5 % special components



VBC Balanced Cantilever Equipment



VIL Incremental Launching Facility

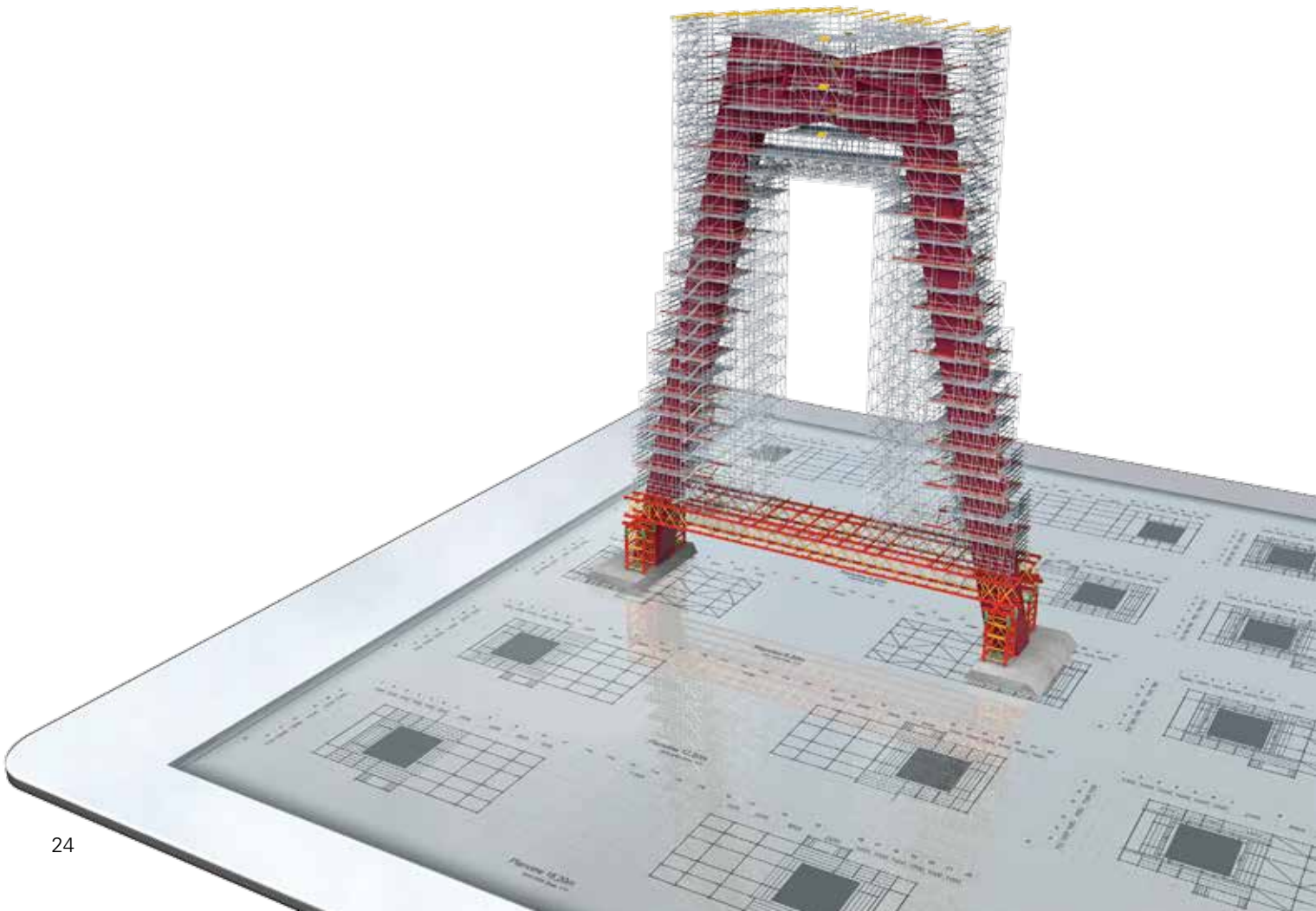
VCC Composite Formwork Carriage

Individual services for customised bridge and tunnel construction

In addition to the required materials, PERI also provides a comprehensive range of expertise as well as the complete planning services from a single source. PERI solutions take into account building and assembly processes along with the maximum functionality for the construction work. For the planning, PERI pays great attention to maximising utilisation of the rentable core and system components in order to provide customers with particularly cost-effective solutions.

Around 1,300 PERI engineers worldwide plan and design formwork and scaffolding solutions for cost-effective executions. All PERI engineering planning services are aimed at ensuring that PERI formwork and scaffolding systems in construction operations are always used in line with time, cost and quality standards. The basis for this is the execution plan records which are based either on 2D-views and sections or realistically visualised 3D building models. As a result, technical solutions are developed with customers that optimise the use of materials and the construction process itself.

These planning-related services from PERI Engineering are supplemented by verifiable, static calculations as proof of stability for formwork and scaffolding operations, as well as by project-specific installation and assembly plans for the professional implementation of special applications. Construction site personnel can use the plans to assemble the individual PERI components correctly and prepare them for use.



A consistent CAD planning process is realised by bundling the formwork and scaffolding planning.

Implementation plans are coordinated, and it becomes much easier and quicker to organise subsequent plan changes and put them into practice.

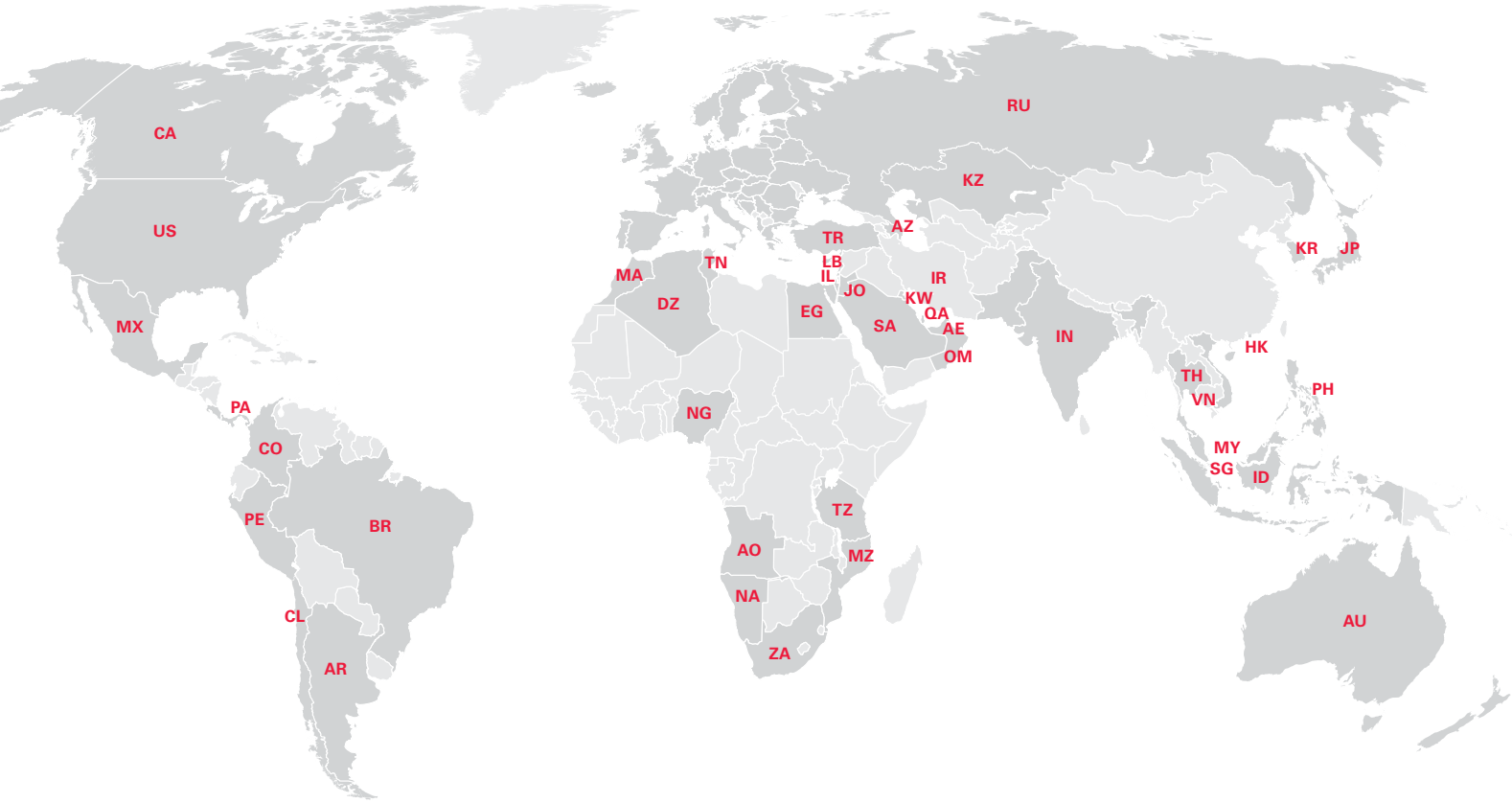
PERI supervisors also explain plans and parts lists along with providing information on the maintenance, cleaning and storage of PERI materials. If required, they will provide the construction team with comprehensive on-site support to ensure efficient use of PERI system equipment from the very start.

In order to minimise on-site assembly times and maintain tight construction schedules, PERI also provides – if required – pre-assembled units to the construction site. VARIOKIT is extremely cost-effective, especially with short utilisation times, thanks to the rentable components and assembly advantages.

When it comes to BIM, PERI has been one of the leading companies in the industry for many years now and can already show a number international project references that have been successfully developed with customers using BIM principles.

Through the additional integration of the time and cost factors, the 3-dimensional visualisation of the planning gradually turns into a 4D or 5D model. Additional process data relating to formwork and scaffolding technology, such as required plan changes, automated collision checks, safety checklists and QR codes for object navigation, is documented and tracked in a mobile building information management system. All relevant data is available on the construction site via tablet solutions for day-to-day operations.

PERI International



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