

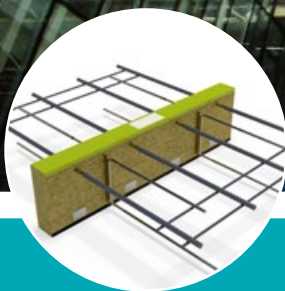
CONNECTIONS

Peikko guides you towards a faster, safer and more efficient way to design and build.

2*2019

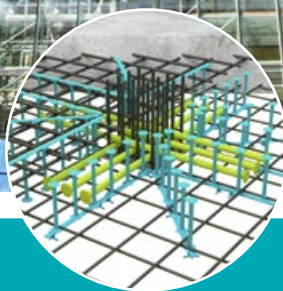
TAKING CARE OF BUSINESS THE S7 BUSINESS CAMPUS IN VILNIUS

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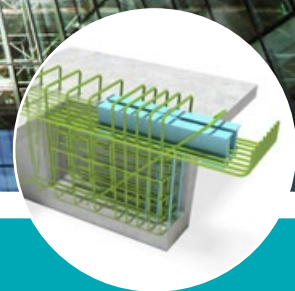
PEIKKO TO EXTEND
PRODUCT SELECTION WITH
**BALCONY CONNECTIONS
AND SHEAR DOWELS**

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PSB PLUS®
– NEW PRODUCT IN
CAST-IN-SITU PORTFOLIO

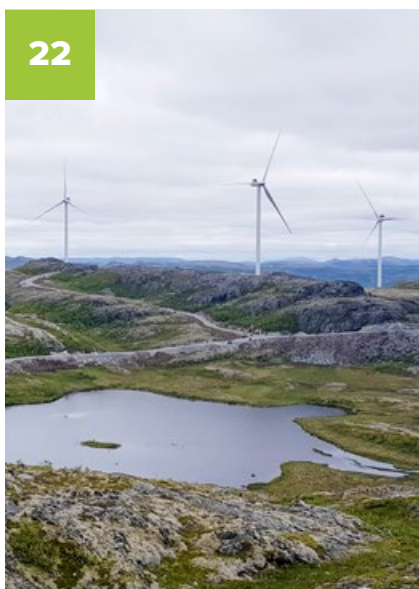
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– SUPPORT FOR TT SLABS
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CONNECTIONS

PUBLISHER:

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OFFSET:

Painotalo Plus Digital Oy
ISSN-L 2489-4516
ISSN 2489-4516 (Print)
ISSN 2489-4524 (Online)

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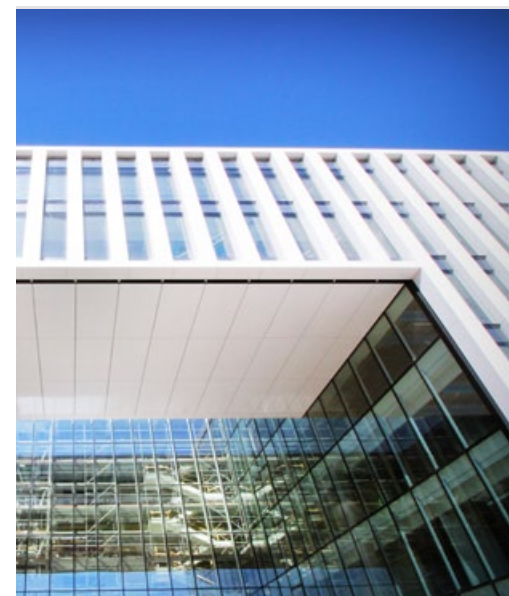
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DESIGN:

Peikko Group

ON THE COVER:

The S7 Business Campus in Vilnius is a high-class office complex for high-class companies, both Lithuanian and international ones. Peikko's DELTABEAM® was a natural solution for building frames. © M.M.M. Projektai



CONSTRUCTION IS A SERVICE BUSINESS

Construction is, deep down, a service business. Building professionals, no matter their specific job descriptions, are problem solvers. Our state-of-the-art products are vital, but at the end of the day, they are enablers of something even bigger.

We at Peikko work strenuously to be better **problem solvers** every day. That is why we develop our internal procedures, as well as the tools for our designers. That is why we continuously study our customers' needs and the construction industry in general; it is all about gaining a better understanding of the big picture. The world around us.

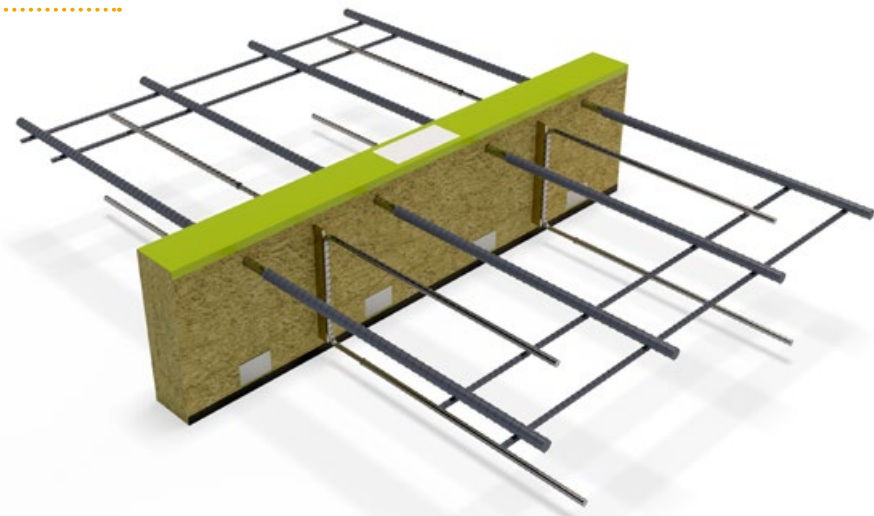
We take pride in our ability to provide **a comprehensive product portfolio** as you never know in advance what will be required for the next optimal solution. We train and educate ourselves and our partners to ensure that every decision can be backed up with uncontested facts.

And, what's perhaps the most important thing of all, we systematically strengthen our global presence to be as **close to our customers** as possible. Even during this time and age of digitalization – or perhaps just because of it – that is the best possible way to guarantee a genuine top-notch service, wherever your next building business may take place. After all, as I mentioned, this is a service business.

This issue of Connections presents examples of the above-mentioned topics. Do not hesitate if we can be of service. Have a pleasant read!

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PEIKKO TO EXTEND PRODUCT SELECTION WITH BALCONY CONNECTIONS AND SHEAR DOWELS

Peikko's product range offers a wide selection of connection products for precast and cast-in-situ structures. The product range has now been expanded with new balcony connections that offer great properties from thermal breaks to moment-resistant connections. Shear dowels are a solution for transferring shear loads in movement joints.

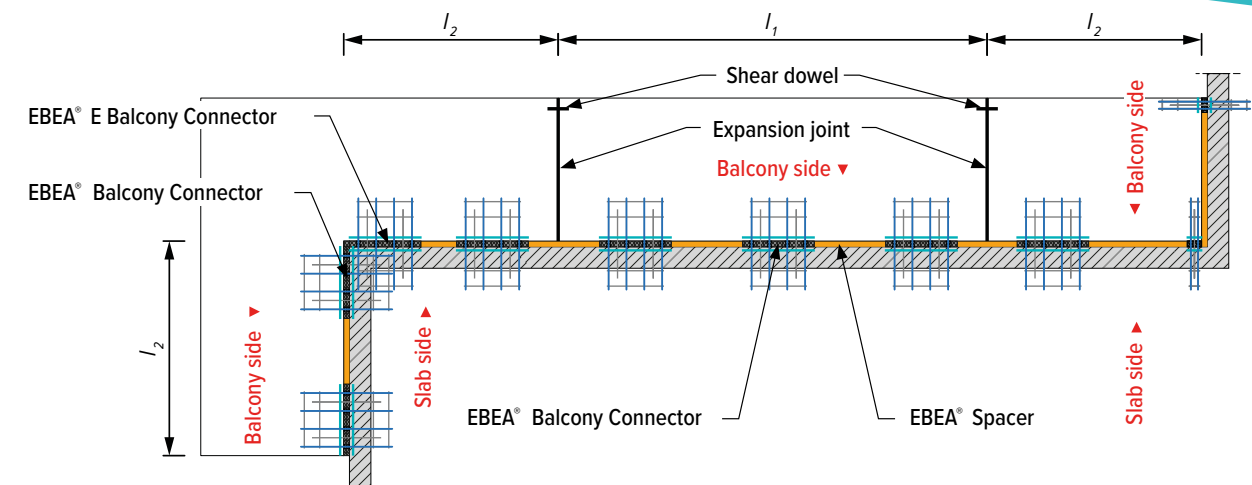
Peikko purchased a Hungarian company Ebea during spring 2019 to add competitive balcony products into Peikko's product portfolio. This transaction included a factory as well as various trademark and product rights. The company was previously owned by a Swiss company RUWA, a subsidiary of Spaeter AG, with most volume delivered to Swiss customers. According to the agreement, RUWA and Spaeter will continue to exclusively sell EBEA® Balcony Connectors in Switzerland, while Peikko now starts the sales work of EBEA® products for all other countries.

The new Peikko factory in Hungary is located in Pilis, near the capital Budapest. The company also had an engineering team in Budapest, and this team has now been integrated with the existing Peikko Hungary team. At the start of the last quarter of 2019, Peikko had about 45 persons in operations in Pilis and about 10 persons in the technical and sales team in Budapest.

EBEA® Balcony Connectors are state-of-the-art products, and they have now become available to all Peikko customers in all countries. Peikko has already started in multiple countries the work of updating technical

documentation in local languages, including attaining all necessary local approvals.

Peikko Lithuania has been one of the first ones to offer EBEA® Balcony Connectors for our customers. "The news that Peikko started selling Balcony Connectors was very welcome to all our customers. The balcony connector market is extremely competitive, but with EBEA® we see great opportunities in Lithuania. We can offer fast support to our customers, a huge assortment and the most effective solutions from one supplier," says **Arnoldas Tumenas**, Sales Engineer, Peikko Lithuania.



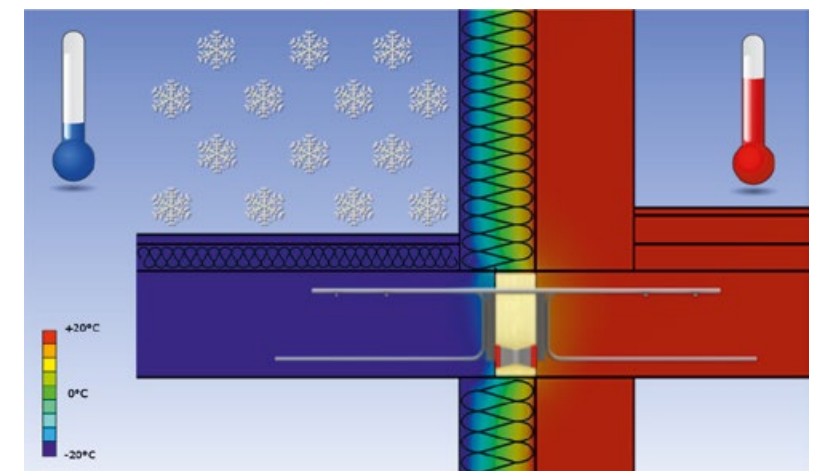
An example of intermittent installation of EBEA® Balcony Connector elements

BALCONY CONNECTIONS WITH THERMAL BREAKS

EBEA® Balcony Connector is a load-bearing insulated connection element for concrete structures that minimizes thermal bridges between structures. It is designed for balconies, but can be used in other applications as well, such as walls and slabs.

The EBEA® system minimizes heat losses and prevents visual and structural defects in concrete structures. It is very versatile with many types to choose from. The wide range of models provides an optimal solution for transferring all transverse forces, horizontal forces and moments reliably to the main slab.

The EBEA® system is cast together with floor and balcony slabs or can be prefabricated with a precast balcony slab and attached to a cast-in-situ slab.



Balcony connectors consist of thermal insulation, bending reinforcement, shear plate with anchor bars, and accessories.



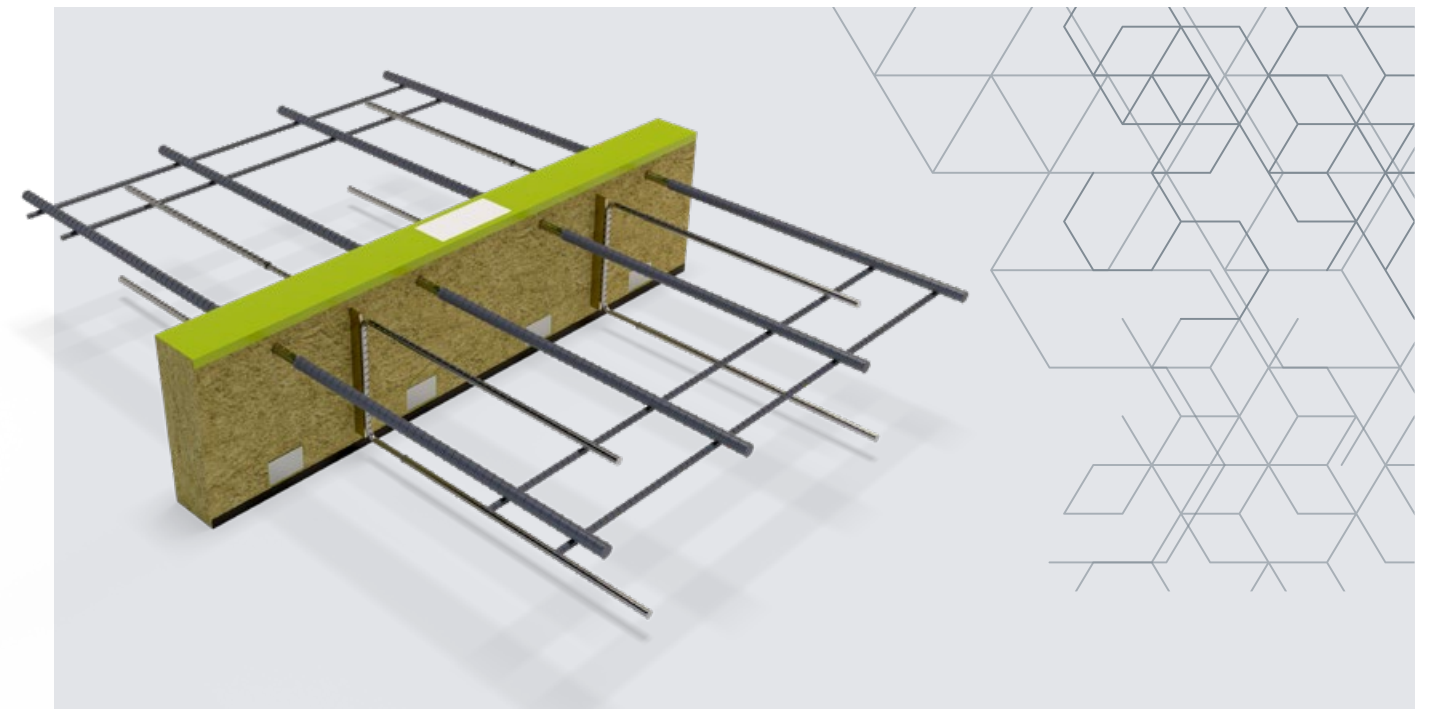
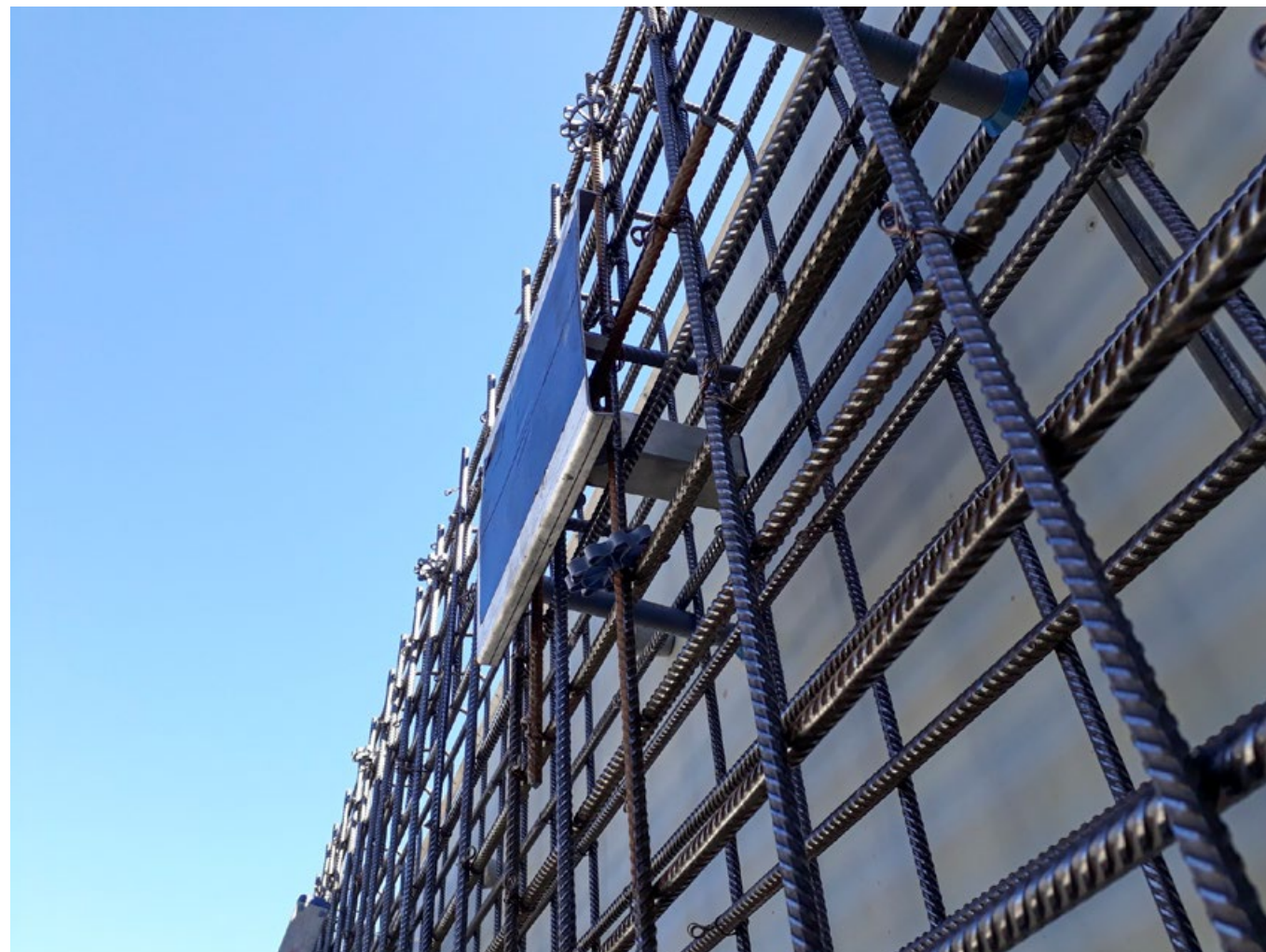
SHEAR DOWELS FOR STRUCTURES

STRIFF® Shear Dowels, currently known as QDs, are a solution for transferring shear loads in movement joints. It is a versatile connection that offers load-bearing properties with easy installation and without disturbing cracking noises during longitudinal or transverse movement of structures by e.g. temperature differences.

The heavy-duty dowels are designed to meet the requirements of high loads and wide joint widths. The option of wide joint widths enables using shear dowels with components that have high temperature differences. The special shape and the steel-concrete composite structure of heavy-duty dowels enable these special properties.

STRIFF® Shear Dowels consist of two parts that are cast either to prefabricated elements or on site to structures and joined together on site.

These new heavy-duty dowels will be available in 2020. ●



EBEA® BALCONY CONNECTOR LOAD-BEARING THERMAL BREAK

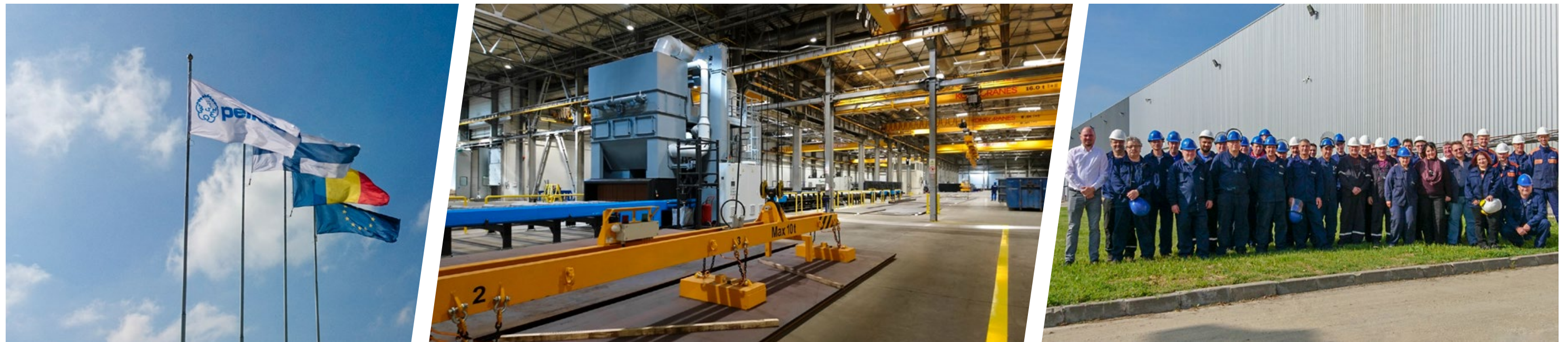
- Effective elimination of thermal bridges for concrete balcony structures
- Efficient installation
- Robust construction with fire protection up to REI120
- Wide range of models for different applications



STRIFF® SHEAR DOWEL

- High load capacity with wide joint openings
- Easy installation
- Eliminates deformation noises

Read more about our solutions www.peikko.com



PEIKKO'S ROMANIAN MANUFACTURING UNIT

– ANOTHER STEP TOWARDS GETTING CLOSER TO EUROPEAN CUSTOMERS

Establishing a new manufacturing unit near Bucharest is a significant step towards preparing for the increasing European demand for advanced building solutions such as DELTABEAM® Frame. After six months of renovating and preparations, the first months of operation have already shown great potential.



The new manufacturing unit further strengthens our presence as a forerunner in Romania and neighboring countries,” says **Andrius Surantas**, Peikko Group's Vice President, Operations. “At the same time, we aim to establish solid physical presence in the European market where demand is expected to grow significantly during the upcoming years.”

ONE SUPPLIER – ENTIRE BUILDING FRAME

To be able to provide genuine added value for European customers, the Romanian manufacturing unit was built to be very flexible and able to deliver even the entire DELTABEAM® Frame to our customers.

This setup required thorough preparations – as well as careful recruiting of top-notch personnel.

“There was plenty to do during the ramp-up phase, but everything went according to plans and schedule,” reports **Milan Đurčović**, Managing Director of Peikko Romania SRL.

“Several changes were made to facilities and factory layout, painting line was renovated, energy supplies were rebuilt, and new technological equipment purchased. At the same time, we started recruiting the unit's key management team.”

In the beginning of April 2019, everything was in place with altogether 40 professionals recruited. Thanks to the already existing European demand for DELTABEAM®, the unit was soon able to run operations continuously. Milan Đurčović emphasizes that accomplishing that stage in just four months is an achievement for any production facility.

EVEN IN CONCRETE BUSINESS, FLEXIBILITY IS KEY

While making DELTABEAM® more known step by step, industrial floor joints and related products are manufactured to serve the local markets. When it comes to big potential in the short term, Andrius Surantas emphasizes the added value that this kind of a flexible manufacturing unit can bring to the customers.

“Whenever the market requires, we are able to increase our production volume in a flexible manner. DELTABEAM® is a great product and the Romanian manufacturing unit's ability to deliver even the entire structural frame clearly improves our chances to make a real impact in the European markets.” ●



PSB PLUS®

– NEW PRODUCT IN CAST-IN-SITU PORTFOLIO

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Peikko has a long tradition in developing solutions that make the design and execution of slim floor structures safer and more efficient. One of the latest additions to Peikko's product portfolio is PSB PLUS®, a high-performance reinforcement solution for cast-in-situ flat slabs locally supported on columns. The system complements Peikko's offering in the punching shear reinforcement segment by providing a simple and cost-efficient solution for the reinforcement of slabs under extreme loads.

FLAT SLABS

Flat slabs locally supported on columns form a structural system that offers numerous practical benefits (e.g. optimized interior space, ease of installation) to different stakeholders involved in the construction supply chain. The load-bearing capacity of a flat slab is typically governed by its capacity to transfer vertical loads to columns. In the absence of vertical supports underneath the slab,

the transfer of vertical forces relies on the so-called mechanism of aggregate interlock. Most of the modern design codes condition the activation of such mechanism by the use of adequate reinforcement that is designed and detailed in order to limit the opening of shear cracks in concrete (see Figure 1).

According to the Eurocode EN 1992-1-1, the punching shear resistance of a flat slab is then determined as follows:

$$V_{Rd,c} = C_{Rd,c} \cdot k \cdot (100 \cdot \rho_l \cdot f_{ck})^{1/3} \cdot d \cdot u_1 \quad (1)$$

where $C_{Rd,c}$ and k are empirical factors, ρ_l is the bending reinforcement ratio, f_{ck} is the characteristic compressive strength of concrete, d is the effective height of slab and u_1 is the control perimeter. The formulation implies that the maximum amount of bending reinforcement (given as $\rho_{max} = 2\%$ by EN 1992-1-1) also governs the punching shear capacity of the slab. If necessary, the resistance of the slab can be further increased by placing vertical shear reinforcement through the potential shear crack. As the slabs are usually relatively thin, reinforcement elements using mechanical anchorages (e.g. headed studs) are more efficient than conventional bented stirrups.

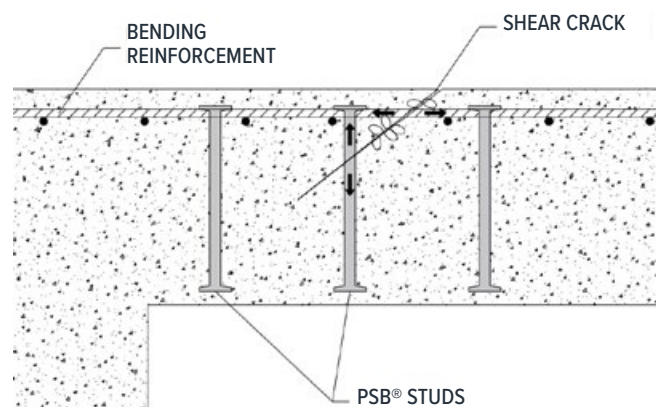


Figure 1. Figure of an inclined crack with bending and vertical reinforcement

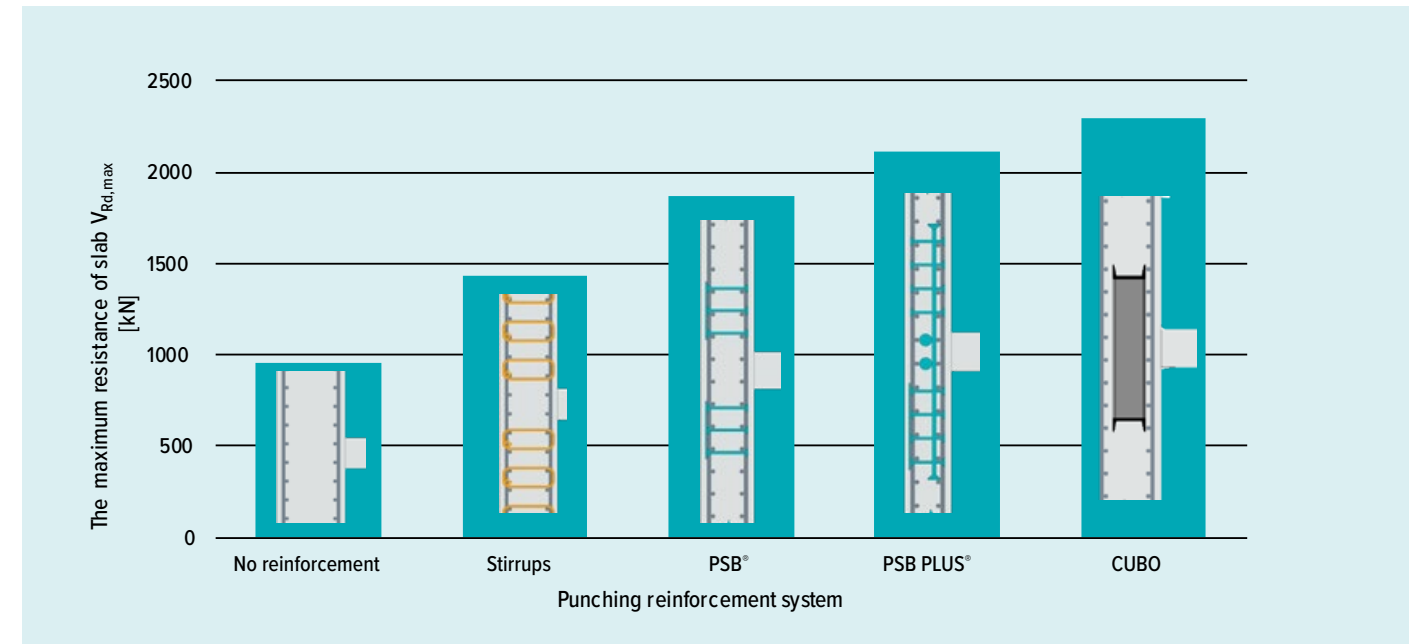


Figure 2. Maximum shear resistance of slab with different punching prevention systems

This has been demonstrated by research (e.g. tests of PSB® studs) and is already interpreted by current design codes, where the resistances of slabs reinforced by stirrups and studs are formulated respectively as:

$$V_{Rd,max} = 1,5 \cdot V_{Rd,c} \text{ for stirrups acc. to EN 1992-1-1 (2015)}$$

$$V_{Rd,max} = 1,96 \cdot V_{Rd,c} \text{ for PSB® studs acc. to ETA 13/0151}$$

A slab reinforced by double-headed studs thus has a punching shear resistance that is about two times higher than the resistance of a slab without vertical reinforcement. Such resistance is typically enough to accommodate loads most commonly present in buildings.

However, in extreme cases, even resistances provided by double-headed studs might not be sufficient. A common solution to support flat slabs in such cases is using massive steel profiles bearing on columns and integrated to the depth of the slab. These profiles are designed to act as stiff supports and accommodate the whole reaction of the slab, neglecting the load-bearing capacity of concrete. Welded steel profiles (e.g. CUBO) allow accommodation of extremely high loads, but are also significantly heavier, more expensive and more difficult to install than studs.

PSB PLUS®

Working together with our customers, Peikko's sales and product development teams identified a need for a solution that would fill the gap between punching shear systems and welded steel profiles. The main ambition was to develop a solution that will allow for a moderate increase of capacity in comparison to studs, but at the same time would be more practical and cost-efficient than welded steel profiles. Once practical needs were identified, a certain number of technical solutions were studied and prototyped by Peikko's product development team.

The result of the development, PSB PLUS®, combines vertical PSB® studs with PSH horizontal headed bars located in the bottom part of the slabs and crossing the column area (Figure 3).

First prototypes of the system have been pre-tested at the University of Žilina in Slovakia. These tests confirm that the system enables the slab to reach resistances significantly higher than those provided by mere vertical studs. Thereafter, an extensive experimental campaign has been performed at the EPFL Lausanne in Switzerland (Figure 4) with the target to identify the basic behavior patterns of the system and to develop reliable design recommendations.

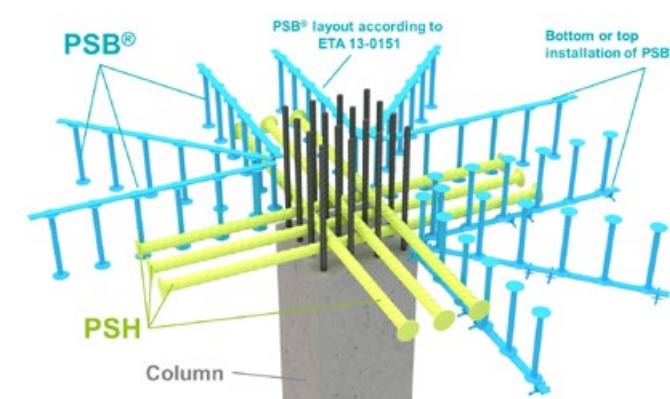


Figure 3. PSB PLUS® 3D model



Figure 4. Tests of PSB PLUS® system at the EPFL Lausanne in Switzerland



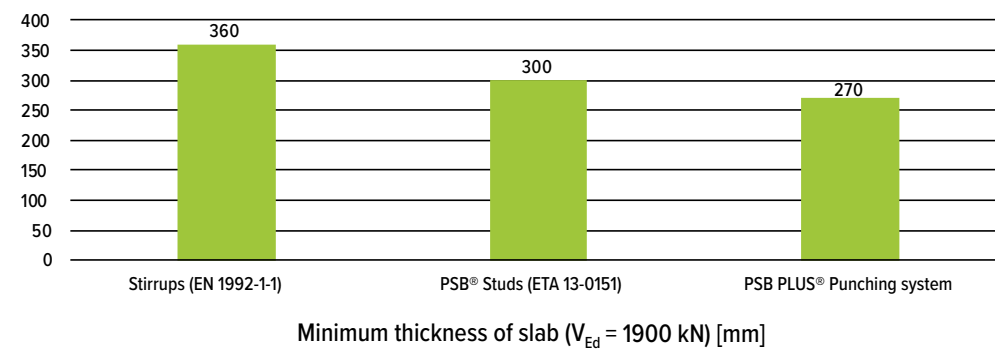


Figure 5. Comparison of punching reinforcement system performance

Technical details of the research program will be published in the journal of the American Concrete Institute (ACI) in fall 2019. The experiments identified that the PSH horizontal bars do contribute to the load-bearing capacity of the joint by activating a doweling mechanism, and the design value of the load-bearing capacity of the slab can thereafter be formulated as:

$$V_{Rd,max,PLUS} = V_{Rd,max} + \frac{\sum V_{Rd,dow}}{2} \quad (2)$$

where $V_{Rd,max}$ is the resistance of a slab reinforced with PSB® studs only and $V_{Rd,dow}$ is the increase of resistance provided by PSH bars. The design method of PSB PLUS® has been assessed by DIBt in the technical approval Z-15.1-333 issued in 2019.

PRACTICAL BENEFITS

An example of the practical benefits provided by PSB PLUS® is illustrated in Figure 5. The chart represents a minimum thickness of the slab required to resist a load of 1,900 kN using different types of reinforcement systems. By increasing the local resistance of the

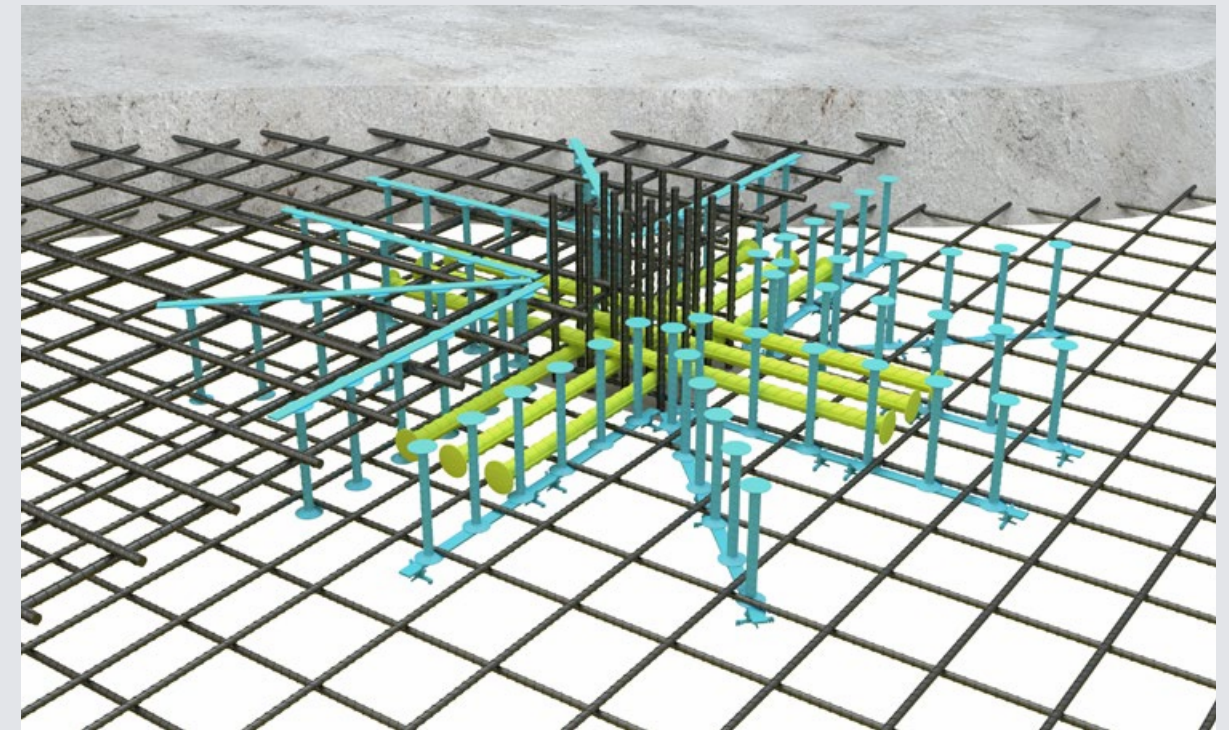
slab around the column, PSB PLUS® can significantly optimize the cost-efficiency and sustainability of the entire structure.

One of the first PSB PLUS® projects was the extension of a school in Winkel, Switzerland in summer 2018. In this project, PSB PLUS® was designed to provide an alternative to a welded steel profile. While the installation of such welded profile would have to be done by crane, PSB PLUS® was installed by a single worker in less than 10 minutes, proving the practical benefits of PSB PLUS® on site.

CONCLUSIONS

Peikko's ambition to make the construction process faster, safer and more efficient can be fulfilled only if our offering responds to customer needs. PSB PLUS® is a solution that meets the practical needs that have been known for years using the latest technical knowledge. Being extremely simple, cost-efficient and technically unique, we are confident it will be able to provide genuine added value for our customers. ●

Figure 6. Extension of an elementary school in Winkel, Switzerland



SIMPLE INSTALLATION WITH HIGHER CAPACITY

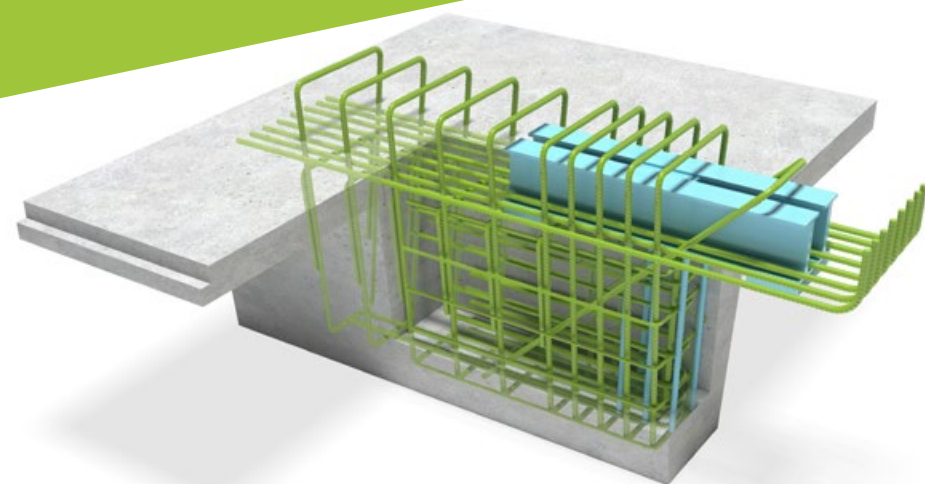
As the demand for higher load capacities and slimmer slabs increases, advanced solutions are needed to protect concrete slabs against punching shears.

PSB PLUS® Punching Reinforcement System is a combination of vertical PSB® studs with unique horizontal PSH studs placed on top of the column. With PSB PLUS® it is possible to achieve higher capacity against punching shear failure, compared to a solution with vertical PSB® studs only. Together with simple installation of horizontal elements, this makes it a cost-efficient and practical solution for flat slabs subjected to extreme load requirements.

PSB PLUS® SYSTEM BENEFITS

- Easy on-site handling and installation
- Higher capacity than with a standard vertical solution
- Thoroughly tested, approved design
- Simple structural design process
- Superior technical support

Slim floors mean better space efficiency – more room height, less overall building height and weight, or more floors for a given building height.



TWIN CORBEL

— SUPPORT FOR TT SLABS AND SECONDARY BEAMS

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INTRODUCTION

Prestressed TT slabs are very popular for long span structures thanks to their economy, durability and ability to retain their properties and appearance over time. They are mainly used in building structures for industrial purposes or anywhere where a flat ceiling is not required.

TT slabs are usually supported by beams or girders. If TT slabs are placed on the top surface of supporting beams according to Figure 1, the structural height of the floor becomes quite uneconomical.

One of the possible solutions is to equip beams with flanges and create mortised ends on the TT slabs according to Figure 2. This solution often requires complex supporting beam cross-sections with additional load eccentricities and, at the same time, causes concrete cracking problems due to unfavorable concentration of stresses at the re-entrant corner of the supporting area of the TT slabs.

The same functional effect can be reached by using Peikko TWIN Corbel (see Figure 3.), which eliminates effectively the above stated problems. The DIBt approved TWIN Corbel has been recently launched as the successor product of Peikko's PBH Corbel system, providing an optimized reinforcement layout together with multiple application options for any kind of side beam constructions.

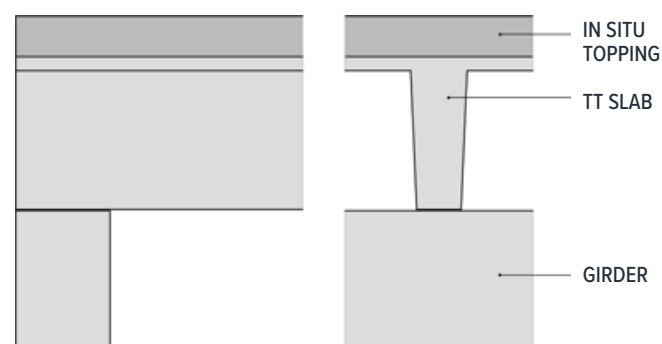


Figure 1: Stacked arrangement of TT slab and girder

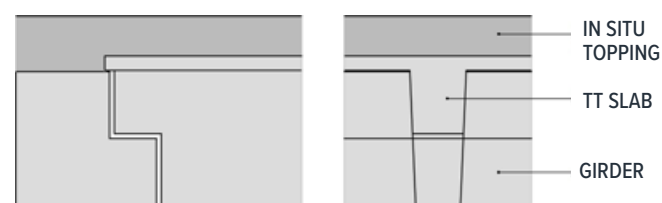


Figure 2: Flanged girder and TT slab with mortised ends

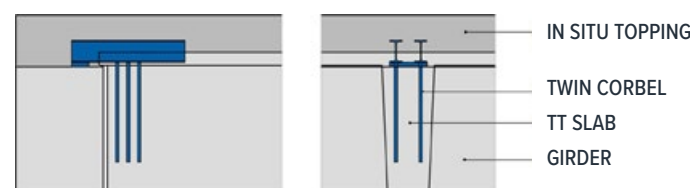


Figure 3: TT slab support with TWIN Corbel

DESCRIPTION AND FUNCTION OF THE TWIN CORBEL

TWIN Corbels are essentially steel assemblies allowing TT slabs to be placed on supporting girders or walls without the necessity to create girder flanges and mortised ends on the TT slabs. At the same time, they minimize the structural height of the floor structure. The assembly consists mainly of two vertical steel profiles mutually connected by a bearing plate and six vertical bars as anchoring reinforcement of the assembly to the TT slab.

The spacing of the steel profiles and anchor bars has been selected so that interference with the beam reinforcement is minimal, particularly with the lower strand layers.

The distance of steel profiles can be adapted for individual project cases at any time.

Dimensions and weights of the TWIN Corbel are given in Table 1.

TWIN Corbels consist of steel grade S355 for steel profiles and S235 for the bearing plate according to EN 10025-2 and B500B according to EN 10080 for the anchoring bars.

STRUCTURAL SYSTEM

TWIN Corbels are designed to carry out both transient situations during assembly of TT slabs (referred to as erecting state herein) and the final state, when cast in-situ concrete topping is hardened.

For the design these, two situations must be considered:

Erecting state:

The erecting state is defined as the period before the in-situ topping is completely hardened. Loads in this state result from dead load of the precast unit and the in-situ topping and potential additional loads during the casting process. All loads applied in this state are carried by the TWIN Corbel to the supporting structure. Resistances of the TWIN Corbel for the erecting state are given in Table 2.

The resistances includes a lateral force due to constraint in the range of $0.2 V_{Rd,erect}$.

The constraint is caused by friction between the bearing plate and the concrete surface of a supporting girder in the cases where neoprene bearing pads are not used.

It has to be verified that:

$$V_{Ed,erect} \leq V_{Rd,erect}$$

where

$V_{Ed,erect}$ = Loading in erecting state

$V_{Rd,erect}$ = Resistance in erecting state

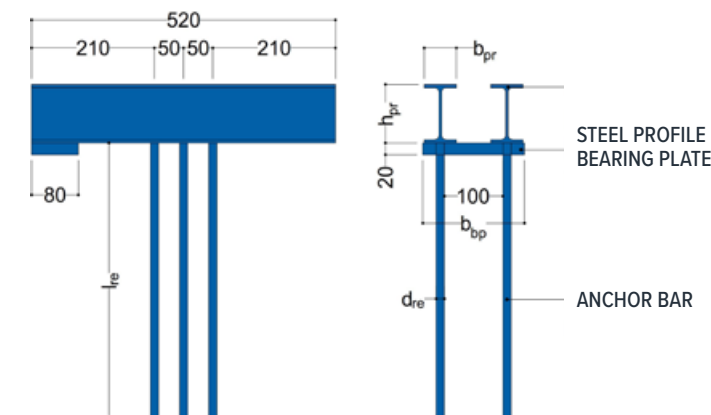


Figure 4: TWIN Corbel

Type of corbel		TWIN 65	TWIN 100	TWIN 145
h_{pr}	[mm]	80	100	120
b_{pr}	[mm]	46	55	64
b_{bp}	[mm]	168	179	188
l_{re}	[mm]	370	470	560
d_{re}	[mm]	12	14	14
Weight	[mm]	10.3	14.0	17.2

Table 1: Dimensions and weight of the TWIN Corbel

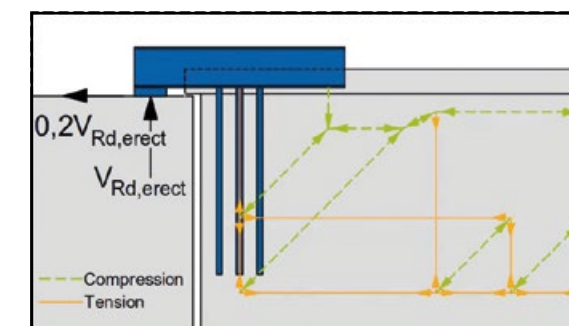


Figure 5: Structural system for erecting state

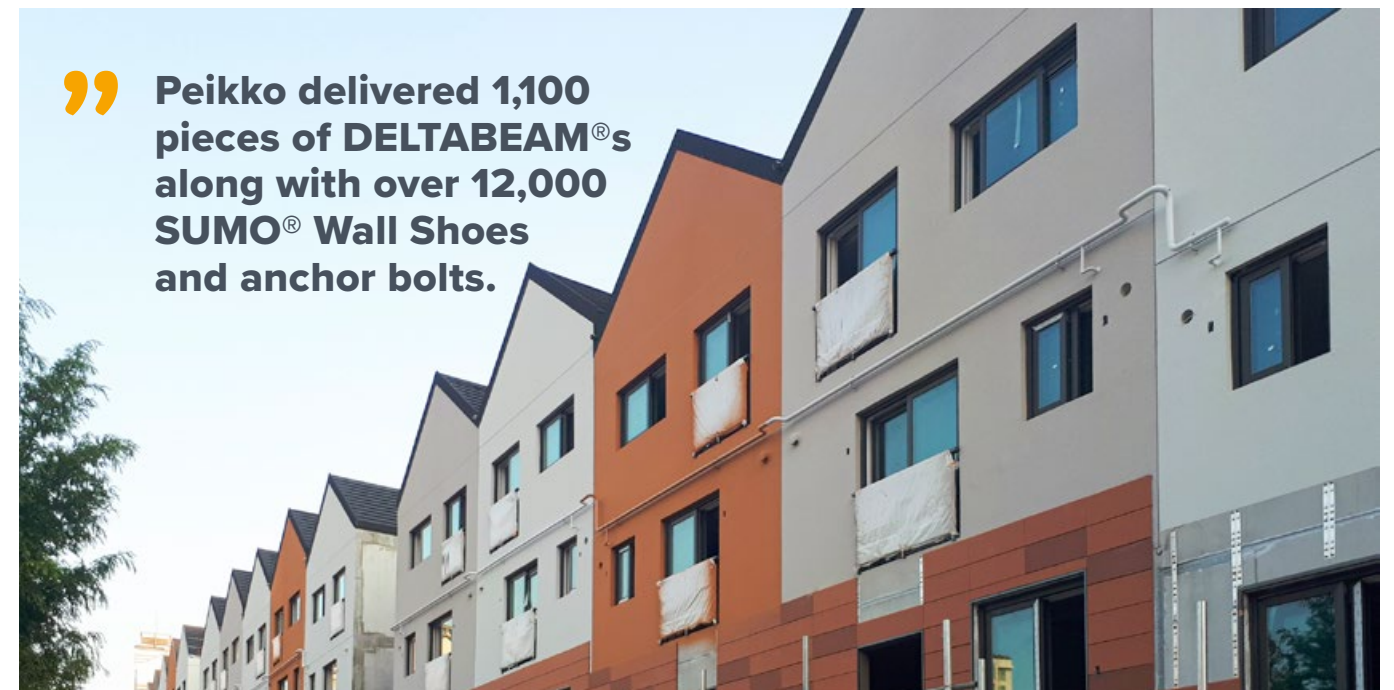
Type of corbel		TWIN 65	TWIN 100	TWIN 145
$V_{Rd,erect}$	[kN]	65	100	145

Table 2: Resistances of the TWIN Corbel in erecting state



DELTABEAM® OPENS DOORS IN SOUTH KOREA

South Korea has traditionally leaned heavily on cast-in-situ building, but it is beginning to discover the benefits of precast, especially for the most challenging situations. One of the best examples is about to be completed at the end of 2019 in Seoul; the KCC project in Seongnam is a 203-unit residential building complex that is based on concrete element building technology. In the staircases, there was a design challenge that conventional precast concrete was not able to solve.



Peikko delivered 1,100 pieces of DELTABEAM®s along with over 12,000 SUMO® Wall Shoes and anchor bolts.

Due to architectural requirements, we needed to build two openings for each living floor – one for the stairs and one for a small in-house garden,” explains **Young Deuk Kim**, Site Manager at the construction company KCC. “Solving such a challenge with precast methods is almost impossible without changing the geometry of the building.”

Smart connections were necessary, and a desperate need for a genuine solution provider arose.

“We compared various connection solutions with Peikko and decided DELTABEAM® was the best alternative,” says Mr. Kim.

“It has a specific wing type which helped

us to solve our main problem – separating the location of the connection part from the load-bearing solid wall and DELTABEAM®. Thanks to that, we were able to maintain the original geometry and architectural design.”

Altogether, Peikko delivered 3.5 kilometers (2.2 miles) of DELTABEAM®s to the KCC project in Seongnam, along with over 12,000 SUMO® Wall Shoes and anchor bolts. Planning proved to be the most challenging phase as this kind of solution is still quite new in South Korea. After that was taken care of, everything went on smoothly.

“DELTABEAM® worked precisely as we estimated,” Mr. Kim compliments.

“Had we not found a solution, we might

have even had to go back to the drawing board and reconstruct the staircases. That would have meant serious delays and additional costs.”

Mr. Kim states that KCC has learned a lot about its opportunities to provide a reliable, cost-efficient solution for demanding situations such as Seongnam and will consider using DELTABEAM® also in similar upcoming projects.

“The composite structure and slim floor system enabled us to save on the total height of the structures and thus reduce the amount of concrete. I believe there will be plenty of additional demand for it in the Korean markets in the near future.” ●



PROJECT FACTS

The first application of full precast method used for residential houses in Korea in the 21st century

General information:

- 203 units with 6 different architectural building types and total living area of 13,400 m² (16,100 sq yd)
- Project divided into two parts: A zone = 153 units; B zone = 50 units
- Peikko solutions used: 1,110 pieces of DELTABEAM®, SUMO® Wall Shoes, HPM® Rebar Anchor Bolts, PVL® Connecting Loops and HPKM® Column Shoes



DELTABEAM® RISES TO THE CHALLENGE

Marriott and Residence Inn Hotels at the City Center are part of an ambitious mixed-use development project taking up an entire block of the downtown area in Lexington, Kentucky, USA. DELTABEAM® Frame was chosen as a structural solution due to accelerated speed of construction while maintaining the same floor-to-floor height as the original design.

Bristol Group Inc. acted as the general contractor and played a fundamental role in DELTABEAM® Frame being chosen for this project. The conventional post-tension system had proven insufficient, and Peikko's composite structure allowed for a faster construction start while respecting the allocated budget.

"Peikko's DELTABEAM® system, coupled with our own precast concrete production capabilities, allowed us to substantially

expedite the construction schedule and reduce the risk for a complex project that was starting during the winter months," explains **Todd Ball**, Founder and President of Bristol Group. "A post-tension system was not going to meet the developer's deadlines. We compared the DELTABEAM® system to a couple of alternative structural systems and came to the conclusion that DELTABEAM® would reduce risks, shorten the schedule, and reduce costs. It did so, and even exceeded our expectations."

As DELTABEAM® was a new concept for Bristol's team, there was a learning curve to deal with in the beginning. But as soon as the work began, the benefits started to show.

"Peikko and the DELTABEAM® Frame system were new to us but with plenty of experience in the precast or pre-fabricated construction method, our team was able to adapt and see productivity increase fairly quickly," explains **T.J. Chin**, Project Manager with Bristol Group.

"Overall, DELTABEAM® provided unique design solutions for the project as well as allowed for more efficient construction."

GOING BEYOND TYPICAL

Chin refers to several details that were not typical for this kind of project – including various connections. They succeeded in carrying out their work using these types of connections in a smooth manner that enabled maintaining the quality of the work. In spite of the tight schedule and additional tasks that were not that typical either, T.J. Chin's team learned the new system quite quickly.

"The schedule was quite condensed at times. But as soon as we picked up the new system, everything started to go so much smoother."

Chin also compliments the responsive Peikko team, which at the starting phase spent extended time on site to make sure everything worked out as planned.

” Altogether, **603 composite columns and 554 DELTABEAM®s** were used in the project.

DELTABEAM® MAKES ITS MARK

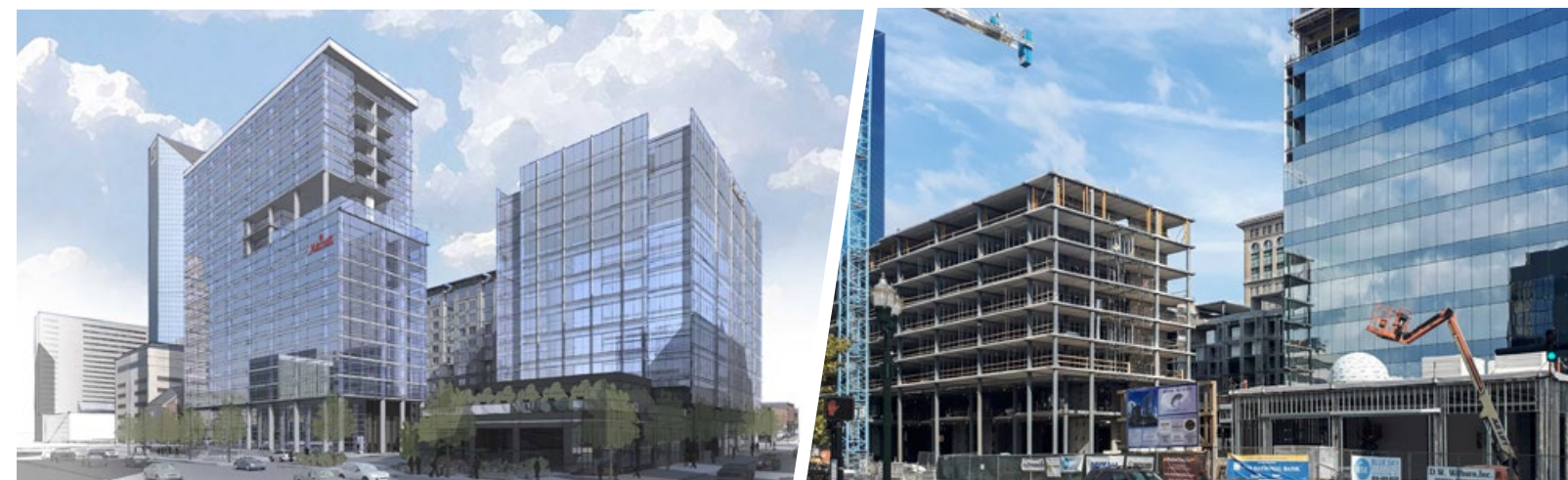
Marriott and Residence Inn Hotels at the City Center is Peikko USA's first DELTABEAM® Frame project where DELTABEAM® is supported by composite columns. Altogether, 603 composite columns and 554 DELTABEAM®s were used. Bristol Group Inc. did the structural shell of the building and while there is still work to be completed with the interior, Bristol and Peikko have finished their share of the project successfully.

As this was an introduction to a new and innovative concept in the area, it attracted plenty of attention and interest amongst construction industry professionals. People

wanted to see DELTABEAM® in action and the experience was eye-opening for many. There is every reason to believe that now that the door has been opened, new opportunities to show how DELTABEAM® can help with local construction processes will certainly arise.

And why shouldn't they; a high-quality solution that speeds up the process combined with excellent engineering skills and exceptional support is certainly something every construction professional appreciates and looks for.

Or, as T.J. Chin puts it: "A pleasing experience in my opinion." ●





THE WINDS OF FUTURE ARE BLOWING

The share of wind power and other renewable energies is growing massively. Going big with wind power naturally calls for massive structures. Erecting a wind turbine is truly a big deal, but we are up for it. Actually, we have been a partner in over 2,000 wind turbine foundations in several countries.

"We are talking about massive structures here. The foundations must bear the weight of a tower over 150 meters (490 ft) tall, plus the strain of the dynamic wind force that is transferred to the foundation," says **Antti Rousku**, sales director of Peikko Group wind energy applications.

THE WINDS ARE CHANGING
Global wind power capacity is expected to rise to nearly 1,700 GW by 2030, and the means for renewable and more sustainable energy production are well under way. But it's not just about the wind anymore. It is just as important to complete construction projects in such a way that the consumption of building materials is reduced – from the foundations to the very top of the tower.

” The foundations must bear the weight of a tower over 150 meters tall, plus the strain of the dynamic wind force that is transferred to the foundation.



In 2018, 55 percent of new energy production capacity came from wind energy, which also means that wind energy became the second most important form of energy in terms of total capacity.

“Peikko has reacted to the changing winds in the market by developing our solutions even further,” Rousku adds. He stresses that the amount of reinforced concrete that goes into producing a megawatt is dropping proportionately.

DESIGNER WHO KNOWS THE FOUNDATIONS

Wind towers are such demanding structures that designing them cannot be entrusted to an inexperienced engineer. This holds true for both the towers and their foundations. As early as 2010, Peikko got wind of a demand for a new solution, one that was subsequently both designed and constructed by Peikko.

“We deliver foundation materials only to projects we have designed ourselves. Without proper design, the production of foundation materials is on shaky ground.

” **As Peikko’s foundation solutions save concrete and reinforcement, they also help to minimize the carbon footprint.**

In major wind park projects, it makes sense to combine the solutions for all aspects of the project in one deal. Of course, we also cooperate with contractors working on wind parks,” Rousku explains.

Peikko has completed numerous projects where the wind towers were built on rock. They all rely on the patented Peikko rock anchor bolt that is post-tensioned at the site. This allows the foundation dimensions to be minimized and the consumption of concrete to be decreased to one-tenth of that of competing solutions.

“Each project is based on tailored design and an optimized solution. Nonetheless,

when different options are clearly productized, it makes design easier and cuts down on material and other expenses,” Antti Rousku points out.

HELPING TO REDUCE CARBON FOOTPRINT

With wind turbines, Peikko also gets a chance to do its part for the environment. As Peikko’s foundation solutions save concrete and reinforcement, they also help to minimize the carbon footprint. Using rock anchor bolts reduces the carbon footprint by at least 50 percent compared with non-bolted foundations. ●

WIND ROCKS IN NORWAY

This year, our foundations reached an important milestone in Norway: rock foundation number 500 has just been assembled. This particular rock foundation is located in Geitfjellet wind park in the Sør-Trøndelag area, Central Norway.

Geitfjellet wind park is part of the Fosen Vind wind power project. Fosen Vind is Europe’s largest land-based wind power project, consisting of six wind parks with a combined capacity of 1,057 MW. Fosen Vind is a consortium of Statkraft, Trønder Energi and BKW. Peikko will deliver all the 277 rock foundations for the Fosen Vind project’s six wind parks.



DELTABEAM® 30 YEARS – CHANGING THE GAME OF CONSTRUCTION

Already in the 1980s it was clear that growth was one of the essential keys to Peikko's success. Growth, again, required new innovations which would act as door openers to new markets.

30 years ago Peikko's founder **Jalo Paananen** had a vision of growth, and he knew that in order to achieve that, new products were required to open doors into new markets. As a result of that, Jalo Paananen and Managing Director **Jorma Kyckling** got down to business and started to build a list of opportunities for development.

The target was a beam that could be prefabricated and integrated into slabs

without any additional fireproofing. That would enable longer spans and open spaces even with architecturally demanding shapes.

The initial idea about a composite beam was born.

The shape was fine-tuned to include the ability to support the slabs. Excellent fire resistance, prefabrication, longer spans, and slimmer floor structure became real.



DELTABEAM®
30 years of game
changing.



With DELTABEAM® the excellent fire resistance, prefabrication, longer spans, and slimmer floor structure became real. At the Peikko Group's headquarter, there is DELTABEAM® left visible to the roof.

The shape dictated the name. DELTABEAM®. A composite slim floor structure that saves time and makes space utilization more efficient.

FROM INNOVATION TO TRUE GAME CHANGER

Jorma Kyckling began concentrating on DELTABEAM® on a full-time basis. The first task at hand was to organize the production. That would, evidently, define the viability of the entire project.

“The ultimate challenge was to convince the customers of the new product's ability to fulfill its promise of revolutionizing the industry. Thanks to Peikko's solid reputation, the initial reception was positive. Still, turning the warm smiles across the meeting table into sales did not happen overnight.”

The idea of a component for frame construction was quite new to investors and construction companies. The competition was offering traditional frame solutions, which created a challenge for the sales and marketing team.

How to make this revolutionary product stand out to get the right people to notice its value?

The right people. The designers.

There it was. The ultimate solution. The channel that even today is one of the cornerstones behind the success of the DELTABEAM® composite beam.

Even with designers, there was immediate interest towards the new solution. However, carrying that interest all the way to construction drawings and sites took its time.

In the end, persistent work and high stress tolerance paid off, and the world was open to DELTABEAM®.

THE INGREDIENTS OF A SUCCESS STORY

From the very beginning it was clear that the best added value became available when all the benefits provided by DELTABEAM® could be taken into account already at the building design phase. This intrigued the architects and construction engineers – as well as, eventually, the investors and construction companies.

Raimo Lehtinen was involved in the initial DELTABEAM® creation process, and his input was essential in introducing the product to designers all over the world.

“To make the overall design process smoother, we started developing specific tools for designers. While software helps seeing the big picture, it also makes it easier to see how DELTABEAM® can be utilized in the most efficient way. As a result, Peikko gets a more complete understanding of customers' needs and requirements.”

THE NEXT DECADES

Today, DELTABEAM® has been used in over 15,000 construction projects in over 35 countries. Plenty has been achieved during the first 30 years, but this is just the beginning.

New opportunities arise in North America, Australia, South Korea... DELTABEAM® is moving ahead at a speed that only keeps increasing. Great achievements require time and effort, but Business Director **Simo Hakkarainen** and his team are prepared to take DELTABEAM® to new levels of success.

“We are close to our customers, continuously keeping our fingers on their pulse. We take pride in excellent service that includes both technical expertise and knowledge of local language and culture. Thanks to several production sites in various countries, our logistics chain operates reliably, helping our customers to keep their projects on schedule.”


The very same vision of growth that ignited the creation of DELTABEAM® is still the driving force as Peikko sets its sights on the next 30 years. Persevering development work is essential, as there is no knowing of where the next big innovation may lie.

Only by challenging the status quo can you make a better future. And that is how you change the game. ●

Flagstone Shopping Centre, first DELTABEAM® Slim Floor project in Australia.





CELEBRATING THE 30TH ANNIVERSARY OF DELTABEAM®

Meet the real Game Changers – our customers sharing their stories with us.
More stories at  LinkedIn: [Peikko Group Corporation](#)


He has facilitated innovations such as DELTABEAM® to become an essential part of South Korean building industry.


THE GAME CHANGER.





THE GAME CHANGER.







He understands the challenges of winter construction and the meaning of scheduling.


He is a technical manager with years of experience in the precast business. The right solutions are based on customer needs.


THE GAME CHANGER.





THE GAME CHANGER.





He is a senior structural engineer, who is proud of his work and has a strong and constant focus on innovations.

He is a site manager, who makes slim floor structures and flexible, open spaces happen in real life.

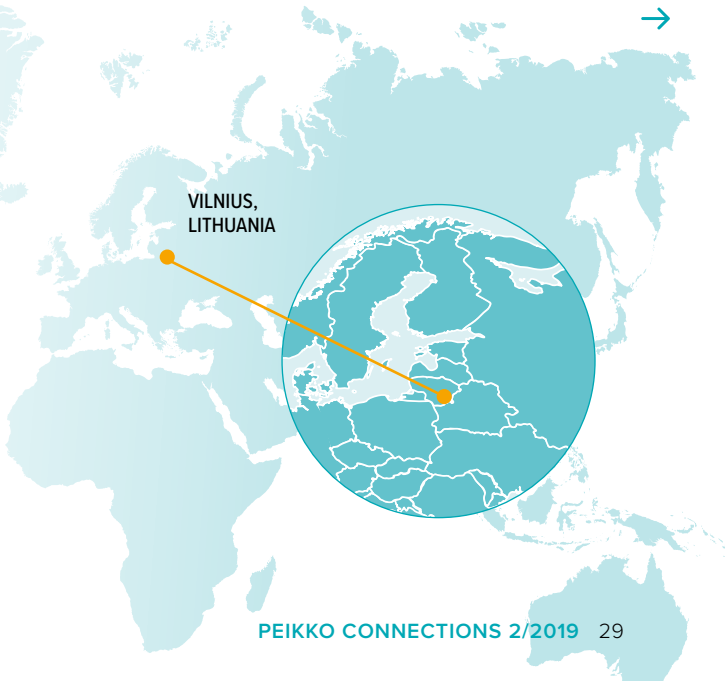
THE GAME CHANGER.





TAKING CARE OF BUSINESS
THE S7 BUSINESS CAMPUS IN VILNIUS

All the way from the design phase, it was clear that the S7 Business Campus was going to go well beyond conventional. A high-class office complex for high-class companies, both Lithuanian and international ones, was in the making. Quality was at the core of every step, draft and detail.



To achieve the ambitious goals, it was obvious that very particular attention was to be paid to the capabilities of the selected construction partners.

“In considering partner alternatives, we focused on balance between experience, quality, reliability and cost-efficiency,” says **Aurimas Martinkėnas**, Project Director at the UAB “M.M.M. Projektai”, the investor company behind S7. “The project had an exceptionally tight schedule, which meant that in addition to professional skills, the involved parties had to be able to show full commitment and engagement towards the best possible outcome.”

Combine all that with the extremely small storage space on site, it was evident that precast – along with timely deliveries – was the most viable option. Thus, Peikko’s DELTABEAM® was a natural solution for building frames.

“We were able to work together with the precaster in the same BIM model, share information efficiently, and solve complicated technical situations,” describes **Paulius Bulota**, Managing Director at Peikko Lithuania.



“We were chosen to supply all steel structures as well as to handle modeling of DELTABEAM® connections and workshop drawings.”

The first and second buildings of the S7 campus got some prestigious awards such as BREEAM New Construction Excellence Certificate and LEESMAN+ certificate. In addition, the first building became the winner of the BALTIC REAL ESTATE AWARDS 2018 in the best office & business development category, A+ class office.

In spite of the S7 featuring quite simple

shapes, it was a demanding project from an architectural point of view. It has bridges that connect various wings with one another and plenty of open space inside. The span between columns is a lot longer than in conventional buildings, as the goal has been to keep the total amount of columns to a minimum. The structure of the building is quite complicated due to the limitation of the building height, the length of cantilevers (in some areas cantilevers were up to 3.5 m, 11 ft), and restrictions to deflection due to the facade system.

The strict schedule did not allow many unexpected setbacks or delays. DELTABEAM® allowed the work to be carried out even in extremely cold weather and in summer heat. The structures could be assembled regardless the conditions, enabling the project to stay on track.

“We were the main supplier of steel elements for building structure and worked alongside with suppliers of precast concrete, thus contributing to the fact that the project was completed on schedule,” Paulius Bulota mentions. “Three buildings of S7 have now been completed, and the last building should be finished in 2021.”

The whole business campus is planned to cover an area of two hectares with a total area of 55,000 m² (60,000 sq yd) for the offices. The concept design and the execution of S7 is based on three core values: maximizing employee well-being, minimizing environmental impact, and serving local communities. It goes without saying that modern, sophisticated concepts such as DELTABEAM® are perfectly capable of supporting these kind of ventures – at every stage of the building lifecycle. ●




PROJECT FACTS

- Developer: UAB “M.M.M. Projektai”
- Construction Company: UAB “Mitnija”
- Completion year: 2021
- Total area of all buildings: 103,000 m² (123,000 sq yd)
- Office: 55,000 m² (60,000 sq yd)
- Parking area: 49,500 m² (59,000 sq yd)
- Total length of DELTABEAM® for all buildings: 8 km (5 mi)
- Steel structures: 1,200 tons (1,300 US tons)





Peikko Designer® DELTABEAM SELECT



Get beam
dimensions in
5 minutes!

START DESIGNING NOW
WITH DELTABEAM SELECT

Peikko Designer® DELTABEAM SELECT – a free online dimensioning tool for easy and fast slim floor structure predesign. Just enter the values to fit the structures within the architecture and carry on with your 3D model.

It's both fast and accurate. And what's best, it's always up to date. Note that while you can save and print your plans, the final beam design and dimensioning is done by Peikko.

www.peikkodesigner.com/deltabeamselect

