

CONNECTIONS

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

2023

Lyra: built with solid structures and good teamwork



The ABCs of sustainability in construction



Vaulted concrete ceiling – new opportunities with DELTABEAM®



Luxurious apartments built with precast concrete

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CONNECTIONS

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ON THE COVER:

The Lyyra quarter currently under construction will be a new landmark in the district of Kallio in Helsinki, Finland.



I just had my 18th anniversary of working at Peikko. These years have offered an intriguing vantage point at the global construction industry and its changes. Let's take a look at what has actually changed!

The type of buildings

I would not have even imagined that Peikko would one day be involved in building data centers, car battery factories, or microchip factories, for example. As new building types arise, the traditional ones are transforming – for instance, conventional school buildings are becoming multi-use and some now gather day care centers, schools, libraries, and sports facilities under the same roof. Society and technology are changing, but the building industry remains.

Pre-fabrication

When I began my career at Peikko, I was a huge advocate of precast forecasting, which the precast market share would rapidly increase. I was both right and wrong. The change is happening, but slower than expected. Recent challenges in the construction market, such as labor shortages, are now rapidly speeding up development.

Digitalization

As of today, could you imagine a large construction project without a 3D model or a common electronic databank? That was the industry standard when I began my career, but now even the smallest building sites are paperless. For Peikko, model sharing with our customers and our own software development are part of our

everyday work and an important focus area for the future.

Sustainability

When we choose to build a new building, we need to optimize it with materials containing less CO₂ emissions and design concepts and materials that can be easily recycled. In recent years, Peikko's biggest efforts and improvements have been made in this area.

End result

Sometimes people say that the productivity of the construction industry has not increased – which I don't think is the case at all. We need to look at the end result; buildings from 18 years ago cannot be compared to the buildings of today in terms of construction time, energy efficiency, the level of automation, or the quality of the materials.

I am proud to work for the construction industry and be a part of the effort of making our everyday lives better. Let's keep on making changes together!

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The ABCs

of sustainability in construction

– Here is what you should know



The building industry is responsible for a significant ecological impact, with 40% of total energy use and 30% of the amount of waste globally. The concrete business has a particularly great responsibility in climate change as we account for a large proportion of this impact. What steps is Peikko taking toward more sustainable construction?

Furthermore, the talk about sustainability and climate change is full of abbreviations of related terms, regulations, and policies. But which are the most common ones affecting the construction industry and what do they mean? Let's take a closer look.



General vocabulary on sustainability

C CE – Circular economy

A circular economy (also referred to as circularity) is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products for as long as possible. The three principles of circular economy are designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.

Peikko is the first company to offer precast connections that enable design for disassembly: making the reuse of the building components possible.

E ESG – Environmental, Social, Governance

ESG can be described as a set of practices (policies, procedures, metrics, etc.) that organizations implement to limit negative impact or enhance positive impact on the environment, society, and governance bodies. See also CSRD.

For example, Peikko is in the process of transferring from solvent-based coatings to solvent-free coatings. By 2025, all coatings will be made solvent-free.

European Green Deal

The European Green Deal is a package of policy initiatives, which aims to set the EU on the path to a green transition, with the ultimate goal of reaching climate neutrality by 2050. It supports the transformation of the EU into a fair and prosperous society with a modern and competitive economy.

EU Taxonomy

The Taxonomy Regulation introduces a taxonomy system to define environmentally sustainable economic activities, as well as environmental objectives and disclosure obligations. As an example, for buildings on a Circular Economy, examples of the main criteria are having at least 90 % (by weight) of the construction waste prepared for re-use or recycling, using construction designs and techniques that support circularity, and demonstrating how they are designed to be more resource efficient, adaptable, flexible and easy to dismantle to enable reuse and recycling.

S SDG – Sustainable Development Goals

The Sustainable Development Goals are a collection of seventeen interlinked objectives designed to serve as a "shared blueprint for peace and prosperity for people and the planet, now and into the future", such as gender equality, affordable and clean energy, sustainable cities and communities, and responsible consumption and production. The SDGs monitored by the United Nations emphasize the interconnected environmental, social, and economic aspects of sustainable development by putting sustainability at their center.

In 2030, the share of women working among Peikko's white-collar employees is 40%. In 2020, it was 29%, and in 2022, 31%.

Peikko aims to improve its Lost Time Injury Frequency Rate (LTIFR) by 5% annually. In 2020, it was 19.2; in 2021, 14.4; and 2022, 13.5.

Useful terms

C CO₂ – Carbon Dioxide

Greenhouse gas emissions (GHG emissions) from human activities strengthen the greenhouse effect, contributing to climate change. CO₂, which is emitted from burning fossil fuels such as coal, oil, and natural gas, is one of the most important factors in causing climate change. Electricity generation, heat, and transport are major emitters; overall, energy is responsible for around 73% of emissions.

The carbon footprint serves as an indicator to compare the amount of greenhouse gases emitted over the entire life cycle from the production of a good or service along the supply chain to its final consumption.

Peikko is the first company to offer steel structures made from >90% recycled steel which decreases CO₂ emissions by 50%. By 2025, DELTABEAM® Green will be used in a minimum of 100 building projects. As of 2022, DELTABEAM® Green has been utilized in 47 different projects.

Peikko is the first company to actively offer steel structures in combination with wooden floor slabs and to invest in researching this topic.

E EPD – Environmental Product Declaration

An EPD is the result of a unifying methodology for evaluating and publishing environmental impacts associated with the production of a product. It covers all phases of the product life cycle from raw material extraction to disposal. It allows businesses to compare and select products that perform the same function with a lower environmental impact or choose a product with an EPD over a product without one.

You can find more information on Peikko's EPDs at www.peikko.com.

L LCA – Life Cycle Assessment

LCA is a methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service. An LCA study involves a thorough inventory of the energy and materials that are required across the industry value chain of the product, process or service, and calculates the corresponding emissions to the environment. The aim is to document and improve the overall environmental profile of the product.

Regulations and policies

C CBAM – Carbon Border Adjustment Mechanism

The Carbon Border Adjustment Mechanism (CBAM) is the EU's carbon tariff on carbon-intensive products mainly including construction materials such as cement and steel. CBAM aims at more strict observation throughout the supply chain, including a mandatory requirement for EPDs from raw material supplies. The CBAM will take effect in 2026, with reporting set to begin within 2023. Between 1 and 10% of all material used in the EU construction sector is currently imported from outside the EU.

CPR – Construction Product Regulation

CPR aims to make the single market work better and improve the free movement of construction products in the European Union (EU), by laying down uniform rules for the marketing of these products and providing a common technical language to assess the performance of construction products. From a climate point of view, an important change will be mandatory reporting of carbon footprint to receive a CE marking.

CSRD – Corporate Sustainability Reporting Directive

The EU's Corporate Sustainability Reporting Directive (CSRD) paints the big picture of full corporate responsibility taking one step further from environmentally friendly production to considering the consequences of all of the company's actions. See also ESG.

E ESPR – Ecodesign for Sustainable Product Regulation

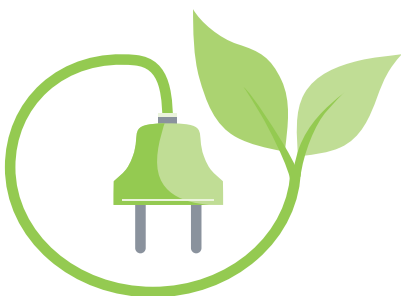
Ecodesign regulations set requirements that improve the energy efficiency of products or reduce their other environmental impacts (e.g. material efficiency, circular economy, sustainability, repairability, use of recycled materials). If a product does not meet the applicable ecodesign requirements, it cannot be placed on the market or put into service in the EU.

For instance, by 2025, the amount of used electricity from renewable sources at Peikko factories will be 75%. In 2020, it was 60%, and in 2022, 72%.

ETS – Emissions Trading Scheme

The EU ETS follows a 'cap-and-trade' approach: the EU sets a cap on how much CO₂ can be emitted – which decreases each year – and companies need to have a European Emission Allowance (EUA) for every metric ton of CO₂ they emit within one calendar year. They receive or buy these permits and can trade them.

We in the building industry need to be innovative in creating solutions that are economical yet ecological and good for mankind. We need to provide products and solutions that greatly improve the sustainability of buildings during their whole life cycle. In addition, by providing our customers with products that are manufactured by using recycled raw materials with lower CO₂ emissions in the process, even challenging environmental targets can be achieved sooner than expected.



Peikko's Sustainable Development Goals

We have identified six goals that we believe are closely tied to our operations and where we can make the most significant contributions.



In 2030, a share of women working among Peikko's white collar employees is 40%.



To improve Lost Time Injury Frequency Rate (LTIFR) by 5% annually.



To accelerate Research & Development investments into sustainable building industry.



By 2025, the amount of used electricity from renewable sources at Peikko factories is 75%.

To transfer from solvent-based coatings to solvent-free coatings. By 2025, all coatings are made as solvent-free.



By 2025, DELTABEAM® Green will be used in a minimum of 100 building projects.



When we at Peikko speak about sustainability, we have two different angles:

Our own actions

- To focus on reducing our CO₂ footprint
- To accelerate Research & Development investments in the sustainable building industry

Our offering to our customers

- Provide solutions to help customers reduce emissions

It is important to walk the talk – sustainability is about actions both big and small. Whether focusing on one action or another, every step of the way counts – there remains a lot to do. Welcome to the path of sustainability together with Peikko!

Passionate about sustainability?

Read more at: peikko.com/sustainability



Lyyra: built with solid structures and good teamwork



The Lyyra quarter currently under construction will be a new landmark in the district of Kallio in Helsinki, Finland. The block rising above the Hakaniemi metro station will have new cafes, restaurants and services, a hotel, apartments, and more than 7,000 m² of office space. Lyyra will be completed in stages from 2023–2024 and it is built with Peikko's DELTABEAM® composite frame.



The Lyyra quarter, owned by Ylva, the student union of the University of Helsinki, is being built to replace the technically and functionally outdated office and administrative buildings on site. The first construction phase completed Lyyra's office and retail building, and the second phase consists of a hotel and apartments. The main contractor of the project, Haahtela, acts on behalf of Ylva, and Ramboll Finland Oy is responsible for the structural design. Lyyra's architects are Cederqvist & Jäntti Arkkitehdit Oy and the ARCO Architecture Company.

Visible buildings, challenging structures

Peikko was responsible for the delivery of Lyyra's steel parts, such as columns, DELTABEAM® Composite Beams, and PETRA® Slab Hangers. In addition, there is an open space in the maintenance yard of the office and retail building supported by an exceptional jumbo truss. The unique truss weighs more than 30 tons and crosses the entire maintenance area. It has a span of 22 meters and a height of four meters, and it transfers loads to the foundations from a height of eight floors.

"New solutions offer versatile opportunities for future steel construction, the jumbo truss being only one example," notes Peikko Finland's Business Manager **Juuso Salonen**, whose role has entailed involvement with DELTABEAM® and DELTABEAM® Frame.



The façade of Lyyra's buildings is spectacular but structurally challenging - the sharp pointed corners built on steel beams are Lyyra's best distinguishing feature. Inclined walls, long spans, and large window wall lines require special solutions, and, for example, steel frames are used instead of traditional solutions. The steel-framed restaurant area and the roof terrace on the top floor of the office building also challenged the structural design.

The DELTABEAM® composite frame utilizes the available space in two ways. Thanks to the slim floor structure, it is possible to increase the height of the room or build several floors up to a certain height. Composite columns take up very little floor space and leave larger amounts of space available than other construction methods.

"Lyyra is an ideal example of future construction; the space available will define the structures and solutions used. With innovations and out-of-the-box ideas, we are moving towards a more sustainable construction," notes Salonen.



The project benefitted hugely from the shared data model; it makes the modeling a whole lot easier and helps with the problematic details.

A shared data model offers synergy benefits

Lyyra won a prestigious honor at Finland's 2023 Tekla BIM Awards. One of the special features of the design was that Peikko was inside of the other organization's Tekla Model Sharing data model. Data models help the designers to communicate throughout the project. In the shared model, each party participating in the design immediately sees the level of readiness of other phases and can proceed accordingly. The cloud-based platforms have further enabled data model coordination.

"The modeling work of Lyyra was time-consuming with plenty of precise details of complex shapes and narrow space. The project benefitted hugely from the shared data model; it makes the modeling a whole lot easier and helps

with the problematic details," describes **Timo Sihvola**, Peikko Finland's Modeler in charge of Lyyra's DELTABEAMs®.

"Exporting data models and drawings to the same application and linking them together meant a lot; the design would have been almost impossible without full-scale modeling of HVAC, structure, and architecture," explains Juuso Salonen.

Environmental friendliness throughout the construction and use

Responsibility is at the core of the project. The carbon footprint of Lyyra's life cycle has been estimated, and it will be reduced, for example, by using biogas as a form of heating, by looking for alternative raw materials, and by increasing energy efficiency. There will be solar



panels and a green roof. The Lyyra project aims for a recycling rate of 95 percent of the demolition material.

Lyyra has applied for LEED Platinum certification, and in addition, the facilities are aiming to be approved to use class A, the highest possible energy class, by the regulating body of the Finnish Ministry of the Environment. Lyyra participates in the Inclusive Site project, which is one of the pilot projects of the OECD's Business 4 Inclusive Growth network.

One way to increase the environmental friendliness of a building is to make it flexible so that the structures can be easily modified for new uses throughout the building's life cycle. The slim floor structure of the DELTABEAM® composite frame enables the flexible design of floor plans. Furthermore, the second phase of the project is built with DELTABEAM® Green, which makes the carbon footprint of the site even lower. The carbon footprint of DELTABEAM® Green is approximately 50% smaller compared to conventional steel structures. In accordance with a more environmentally friendly operating model, more than 90% of the material is recycled, the electricity used in the production is renewable, and transportation is organized in an environmentally wise manner.

Logistics plays an important role

The hybrid project containing several different functions has required a lot of precision for project coordination. Placing a large building complex in the city center required careful coordination between the design and the demanding construction environment.

In the densely built and bustling center of Helsinki, new construction is challenging. The movement of large-scale components must be scheduled outside of peak times, and storing parts on a restricted construction site is not possible. Carefully planned punctual deliveries and intermediate storage ensured that all parts were delivered exactly when they were needed.

Lyyra, the quarter of science and economy, is built with the values of sustainable development and seamless cooperation. ●



Open-space garage solution with compatible connections

Förseglet Västerås is a Swedish neighborhood with several apartment buildings and a two-level parking garage with 385 parking spaces. With Peikko's DELTABEAM® Slim Floor Solution, the construction company Peab Sverige AB achieved an integrated beam solution that allows for the maximal use of open space with no downstands in the ceiling.

Förseglet Västerås in the Öster Mälarstrand district has an attractive lakeside location in one of the city's largest and most prestigious development areas, only 15 minutes walk from central Västerås. The 14- and 16-story buildings provide homes

with a light and airy character; most of them with lake views. Förseglet Västerås will be completed in 2024 and the project developer is Bostads AB Mimer / NREP.

Öster Mälarstrand is an oasis of sustainability; it will be Västerås' first sustainable technology and environmental

district with a focus on, among other things, high energy efficiency, and sustainable transport. The vision for Förseglet is to become a car-free neighborhood with several house types, green areas, and social activity areas for all ages. The buildings will be certified according to Miljöbyggnad Silver and Svanenmärket, which shows that the building has a low environmental impact and high energy efficiency. The high environmental level also requires detailed documentation and Environmental Product Declarations (EPD) from the contributing suppliers.

Integrated beam solution for long spans

The project forms a boundary between the existing city and the new district, which challenges the space available for parking lots, for instance. The lack of parking space has been solved by building a sizable parking garage of 385 parking places divided over two floors. The property's height difference provided the opportunity for a large parking facility under the area without having to dig down.

The garage frame consists of 130 pcs of Peikko's DELTABEAM® that enabled long spans with architectural freedom, more flexible floor plans, and more surface area for the building's given height. Integrated fireproofing offers additional time and cost savings as the



reinforcement inside the beam ensures lifelong fireproofing. Proven by multiple full-scale fire tests, DELTABEAM® Slim Floor Structure is even fireproofed for up to 4 hours without any additional fireproofing material required.

“The surface coating of the beams can be complex, and coated beams are difficult to weld – this issue was solved with Peikko’s bolted connections”, shares **Erik Bergman**, Sales Engineer, DELTABEAM® at Peikko Sweden.

The compatible connection items allow for smooth beam-to-column installations. Peikko also delivered PETRA® Slab Hangers used to support hollow-core slabs and make openings and configurations into hollow-core slab floors, PC® Beam Shoes and PCs® Corbels, and WELDA® Anchor Plates. As DELTABEAM® was combined with bolted connections, a slim floor solution was assembled quickly and easily, saving both space and time.

“We are very satisfied with Peikko’s solutions and service in the project”, notes **Boris Yukhin**, Construction Engineer at Peab Sverige AB.

” **Öster Mälarstrand will be Västerås' first sustainable technology and environmental district with a focus on, among other things, high energy efficiency, and sustainable transport.**

“This project was solved with a good dialogue; both internally at Peikko and simultaneously with Peab Sverige AB. We were all up to date on the project while mutually providing information to each other”, recounts **Nina Gustafsson**, Sales and Marketing Coordinator at Peikko Sweden.

Erik Bergman continues: “Förseglet Västerås proves that the magic lies in the details. Besides good communication, the time spent on planning and ensuring that all the details were considered, was the key to a successful and smooth project”. ●



Peikko's Design Concept: Demountable Connections and how they can change the world of construction

As mankind strives to build a greener future, the need for sustainable and resource-efficient construction solutions increases. Peikko's thorough R&D work towards circular and demountable connections has created a new Design Concept. This concept focuses on the demountable connections and their significant role in revolutionizing the construction industry and is now gathered as a detailed, up-to-date guide for designers and all parties interested in circular construction.

One of the key objectives of EU and national construction guidance in promoting a circular economy is the utilization of demolition materials of buildings and the promotion of reusing building components. This involves designing in a way that the building and its parts are reused at the end of their first useful life, referred to as circular design. For years, Peikko has researched and developed circular solutions through its bolted connections that promote the Design for Disassembly (DfD) concept. Peikko's demountable connections contribute to reducing waste and minimizing the environmental impact of construction projects.

"The steel industry accounts for 8% of the world's CO₂ emissions, and sustainability is on everyone's lips.

Someone needs to pioneer, and we at Peikko felt the urge to do our share. What makes me especially happy is to bring more knowledge of alternative and circular solutions to the masses and help to shape the industry," explains R&D Engineer and one of the guide authors, **Patience Wanjala** from the Peikko Group Corporation.

Concept guide for greener construction

Peikko's designs allow for ease of accessibility of the joints, making the dismount of connections easier, faster, and with little to no damage to the structural members. The Design Concept Guide explains how to use Peikko's bolted connections in a way that permits the disassembly, recovery, and reuse of structures. The joints

currently illustrated are column-to-base, column-to-beam, and beam-to-slab joints. The document also gives a summary of applicable European Regulations specifically dealing with the reuse of construction products, highlighting the importance of sustainable practices and the role of innovative solutions. While the Design Concept Guide primarily focuses on Peikko's demountable connections, it also touches upon broader topics related to resource efficiency and circular design in the green building industry.

"This is a living guide – as our R&D work proceeds, the guide will be updated accordingly. Our work is not yet over," Wanjala emphasizes.

Peikko's Design Concept serves as a valuable resource for anyone interested in understanding the significance of demountable connections in the construction industry. By embracing these connections, we can unlock the potential for resource efficiency, reduce waste, and build a more sustainable future.

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From cast-in-situ to precast

– new solutions and a record speed of construction

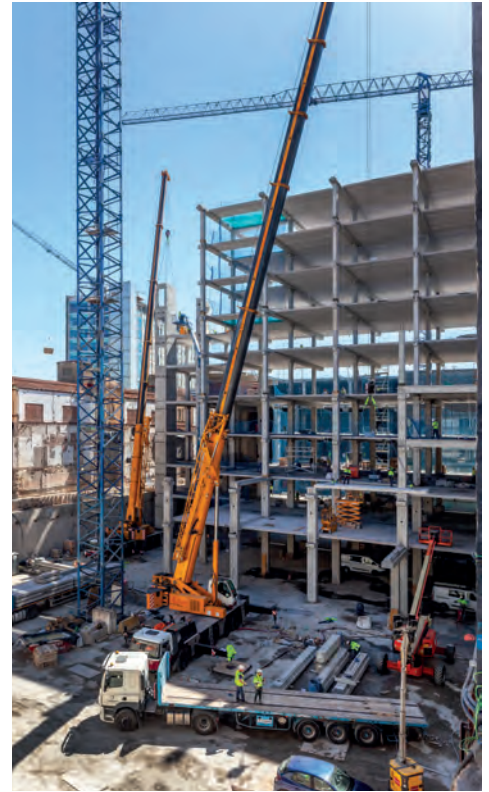
The iconic landmark El Hospital del Mar in Barcelona, Spain, is undergoing a significant expansion and reformation. When completed in 2025, it will be the highest full precast building in the Iberian Peninsula, with a building height of over 40 meters. The project was converted from cast-in-situ to precast during the design phase, which, despite the initial doubts, turned out to be an ideal solution that benefits all the parties involved.

El Hospital del Mar located by the beach in the Barceloneta area undergoes an expansion project with over 30,000 m² of the area and 180 hospital beds. The modern nine-story hospital building, equivalent to 13 floors in residential use, will be highly digitalized with flexible open space for different use cases. Altogether, the magnificent building consists of 6,300 m³ of concrete.

The design is complex; as a building of high importance, the design phase has included detailed seismic calculations, and due to the proximity of the sea, the wind exposure class is high. The entire construction project aims at material optimization and environmentally friendly solutions based on a circular economy. The building's main architect is Pinearq y Brullet de Luna and the project is developed by Consorci Mar Parc Salut de Barcelona. The main builder is ACCIONA.

Due to the central location of the building, the construction site area is very limited with only one point of access to the site, which requires careful delivery planning, prescheduled delivery batches, and coordination with the rest of the work outside the prefabricated structure. The precast elements had to be lifted to 45 meters with cranes and platforms.





Innovations renew the market

Peikko delivered a significant number of concrete connections for the project, such as HPKM® Column Shoes and HPM® Anchor Bolts, SUMO® Wall Shoes, MODIX® Rebar Couplers, ARBOX® Plus Joint Reinforcements, WILORA® Connecting Rails, and GRIP Recess Plates. They guar-

antee standardized and reliable connections, meet high-capacity requirements, and solve vertical and horizontal joints of bracing panels as well as cantilevers with beams and interrupted columns.

Through the project, Peikko has introduced new products to the market, such as ARBOX® Plus, WILORA®, and

GRIP, and also innovative ways to use already-known products, such as MODIX®. Following Peikko's proposals, the project's precaster, Hormipresa, was keen on trying new solutions for a faster construction process, which will eventually impact the conventional cast-in-situ market and modify it towards smoother future construction.

"During the construction process, we have made several visits both to the precast factory and to the construction site to support the customer in everything related to Peikko's products. Standard products have been used in special applications and innovative products have been introduced to solve all connections between precast concrete elements," explains **Daniel Martínez Blasco**, Regional Sales Manager of Peikko Spain SLU.

” Standard products have been used in special applications and innovative products have been introduced to solve all connections between precast concrete elements.



Precast pay-off

The Spanish construction market has a strong tendency to utilize cast-in-situ concrete, and alternative solutions are often a target of resistance. El Hospital del Mar is a pioneer project in its market consisting of 100% precast concrete columns, floors, and bracing cores without any welded elements. Originally, the building was designed for cast-in-situ concrete but was converted to precast concrete

during the design phase due to the need for faster construction. To reduce the lead time, Hormipresa became interested in less conventional solutions that could help meet the extremely strict deadlines.

The conversion was not simple as it entailed respecting the original layout and recalculating the loads and capacities required thorough technical work and attention to detail. The initial design included several elements not adaptable to precast such as cantilevers on all floors, non-orthogonal alignments of columns in plan and elevation, a high density of supported and hanging installations, and an in-situ façade system.

“This project is an excellent showcase of how smooth cooperation can be when all parties share the same values, priorities, and goals, from safety to cost-effectiveness. The support offered by Peikko as well as their innovative solutions have made it possible to solve the great complexities of converting

a project from in-situ concrete to fully precast concrete,” notes **Josep M^a Ruiz Fargas**, CEO of Hormipresa.

The conversion to precast paid off and has eventually led to a speed of execution of 28,000 m² in 6 months, cores and staircases included. It also minimized the duration of work at height by eliminating propping and formworks, whereas Peikko's rigid connections increased the total assembly safety. Furthermore, as the building is located on the seafront, it benefits from the quality and strength of

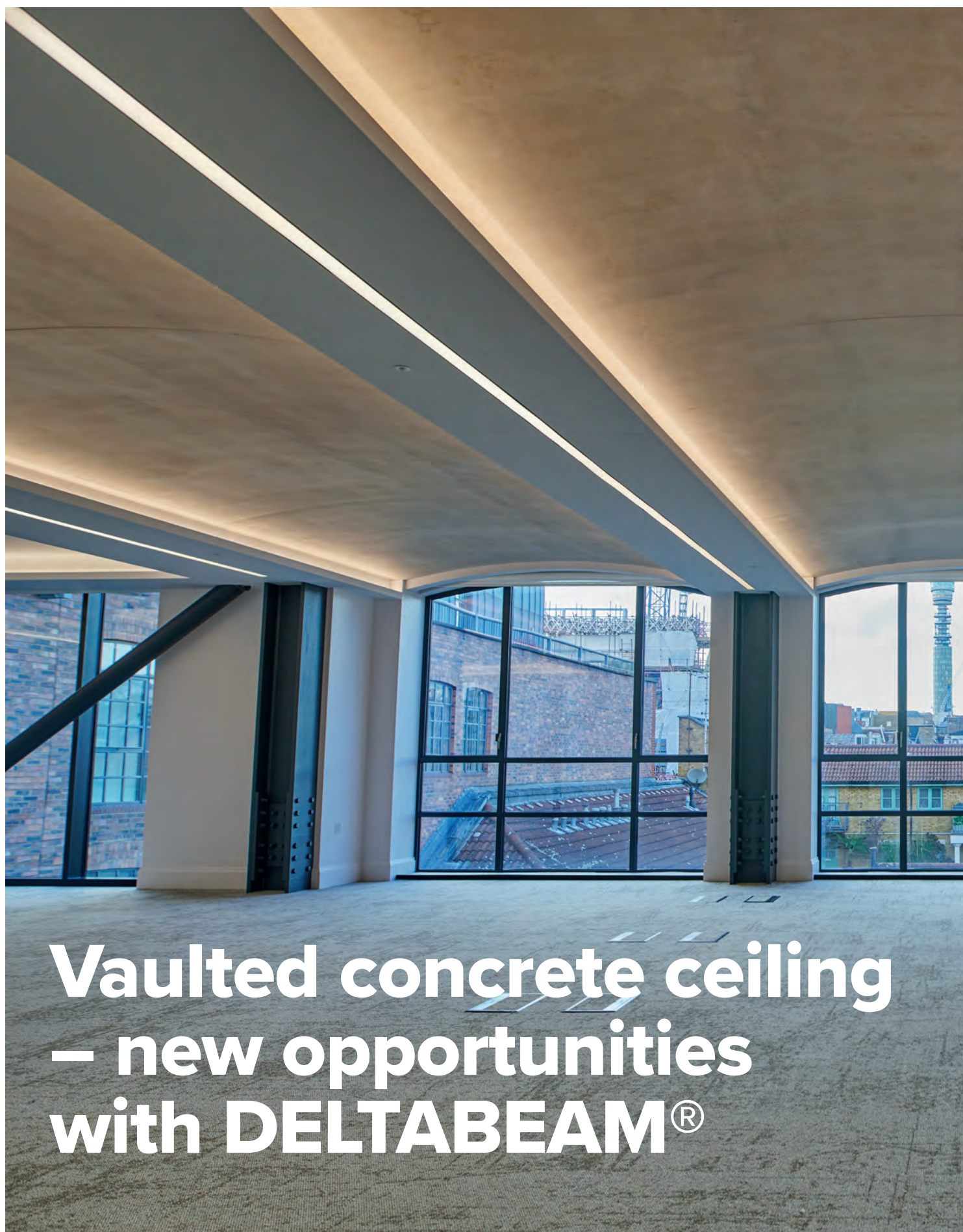
the C50/60 concrete, which is superior to in-situ concrete.

As Managing Director of Peikko Spain SLU **Adrián Liste Martínez** comments:

“In my opinion, this project's main takeaway is that nothing is impossible with Peikko and precast concrete. We are proud to develop construction methods that speed up the building process, are extremely safe to assemble, and are more sustainable. Despite the initial resistance to precast concrete, we have done something nobody thought possible.” ●

” We are proud to develop construction methods that speed up the building process, are extremely safe to assemble, and are more sustainable.





**Vaulted concrete ceiling
– new opportunities
with DELTABEAM®**



Firmdale Hotels as a developer and main contractor has built an innovative seven-story office building, 9-11 Richmond Buildings, in the heart of Soho, London, UK. The building consists of a ground-floor lobby and café, three vast floors of office space, two luxury apartments, and a top-floor entertaining space and terrace. The building of approximately 1,478 m² opened in the spring of 2022. Peikko's DELTABEAM® was an ideal solution for the challenging vaulted ceiling.



The 9-11 Richmond Buildings are located close to six underground lines, with Heathrow City airports and the city's business district being within easy reach. It was originally a post-war development that ultimately ceased to positively contribute to the area's character and appearance. However, the site offered great potential for a new building that would repair the street frontage, add to the mix of uses, and complement the architecture of the adjacent buildings. The building has since undergone complete redevelopment, with the demolition of the original building commencing in the summer of 2018. The design by architects Allies & Morrison was influenced by the Georgian houses typical of the Soho area. The project's structural engineer was David Dexter Associates.

One of the most eye-catching design details of the new building is the attractive façade of green architectural terracotta tiles. Internally, vaulted ceilings follow the curve of each vaulted window on the 1st to 4th floors, which was achieved by using concrete GRP formwork and Peikko's DELTABEAM®. The expansive open-plan office accommodations with floor-to-ceiling double-glazed windows can be configured in a variety of ways to align with the requirements of a modern office.

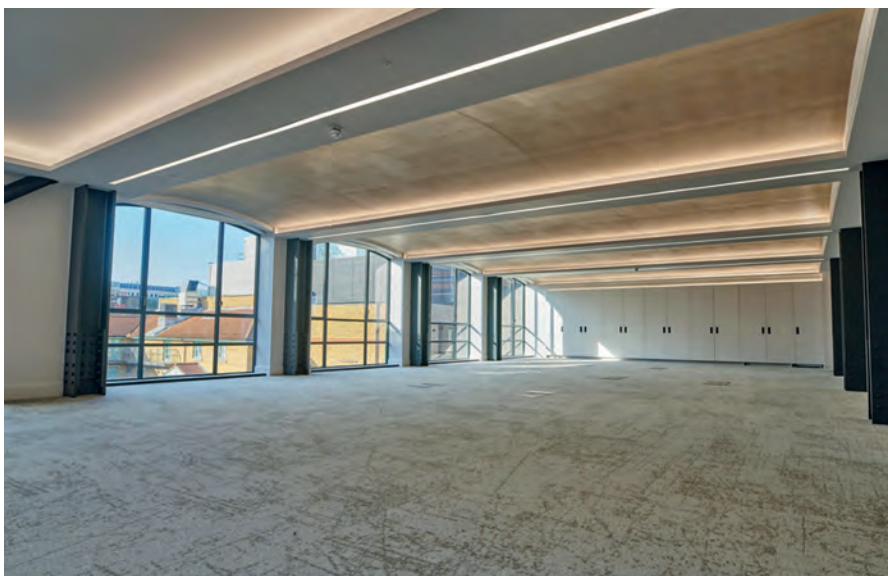
Challenging structures and demanding engineering work

The design required a vaulted ceiling with no down stands that utilized a steel frame with a high fire rating, along with the short lead time and challenging site



logistics. These were the key issues when the Structural Engineer **Jo Smith** of David Dexter Associates started to approach the project of the 9-11 Richmond Buildings. Having heard of Peikko's DELTABEAM®, a versatile slim floor solution for open spaces, she contacted Peikko to find answers to the available questions. Finding a suitable ceiling-to-floor solution was the key to the project, and with Peikko's proven calculations and engineering work, the vaulting issue was solved. The opportunities and open space offered by the long beams further eased the project. Being easy to install, DELTABEAM® was an ideal solution that sped up the construction project remarkably.

"The DELTABEAM® solution was chosen as we were looking for a way to span the 9.5 m space in a single span, supporting exposed vaulted concrete slabs whilst maintaining the required headroom. The exposed concrete vaults were an integral part of the architectural design. We suggested the use of DELTABEAM® Composite Beams following a CPD presentation on hybrid concrete construction. The decision to use in-situ construction rather than the usual precast was driven by the limit on the size of the crane we could use without oversailing the adjacent buildings. This meant that there



” The DELTABEAM® solution was chosen as we were looking for a way to span the 9.5 m space in a single span, supporting exposed vaulted concrete slabs whilst maintaining the required headroom.

would be a joint in the exposed soffits, but with in-situ concrete, cast to a high standard of finish, we could achieve the effect without the joints. The project was shortlisted for the 2022 Concrete Society Awards.

DELTABEAM® Composite Beams turned out to be the ideal solution for our building. From the initial inquiry through to the final construction, Peikko was part of the design team and made suggestions to ensure that our design was fully coordinated with theirs, ensuring that construction on site went smoothly, including advice on connection design. This was especially true given that the fabrication and construction phase of the project was carried out during the first COVID lockdown”, Smith recalls.

Michael Scott, DELTABEAM® Sales Manager at Peikko UK Ltd. explains: “As demonstrated during more than 30 years of building history, DELTABEAM® is



truly a versatile solution that can be used for any kind of building from congested city centre sites to large open brown or green field sites, and from new build to restoration.”

The project experienced various challenges, such as groundwork obstructions and pandemic delays. However, the most challenging aspect was site logistics. Working within an extremely tight corner site with plenty of traffic, while trying to keep disruption to the area to a minimum required careful planning and scheduling. Here, Peikko worked with Duffy Construction Ltd., which was the installation sub-contractor responsible for the smooth execution of the logistics.

“Due to site restrictions, Peikko’s DELTABEAM® Composite Beams were kept at a holding yard on the outskirts of the city and delivered in smaller batches. In this way, the customer could have the correct beams on site just when they needed them,” notes **Anastasia Tornesaki**, Sales Engineer at Peikko UK Ltd.

The 9-11 Richmond Buildings were also shortlisted for the 2022 Concrete Society Awards. The annual Concrete Society Awards celebrate excellence in concrete and are the longest-running awards event in the UK construction industry, with over 400 members, guests, and industry representatives attending the awards dinner. ●



Luxurious apartments built with precast concrete in Cape Town, South Africa

Nearing completion, the luxury apartment housing project on Rugby Road in the Oranjezicht district of Cape Town, South Africa, is the first of its kind to be built with precast concrete. Peikko supplied the special concrete connections for the project.

The Rugby Road project comprises two four-story units, each with four bedrooms and a total living space of 425m² per unit. The housing strives to implement sustainable architectural design derived from the Living Building Challenge; a very stringent green certification design founded by the Living Future Institute. The principles of energy and water conservation have been in focus throughout the project design.

"We could optimize water and energy collections better with a precast concrete design than with conventional construction. The intent of the house, from an energy point of view, was to be net positive to generate more energy than consumed over the course of a year, and to be entirely self-sufficient in water consumption, provided by integrating rainwater storage within the design parameters," explains the project's architect, **Anthony Svelto**, Architectural Designer at A-I-R Inc. in the USA.

Precast benefits from design to quality

"We chose the precast method due to a number of factors: speed of construction, the quality of surface finish, ability to cast intricate shapes repeatedly necessary for capturing solar energy and rainwater retention, and, of course, cost," clarifies Svelto.

Thanks to the precast construction method, the Rugby Road project has a striking visual concept, which is the





desired effect in its up-market elevated location amidst amazing cityscape, mountain, and sea vistas.

Cape Concrete as the precast supplier entrusted the endeavor of harnessing the specialized skills required to meet the architectural concepts, tolerances, and the element's flush connections to Peikko South Africa, whose experience and range of precast connecting elements ensured a perfect fit between columns, beams, and decks by the perfect positioning of anchor bolts within the precast mold.

"Most of Peikko's work in South Africa involves more traditional uses of precast concrete in industrial and commercial buildings and structures such as bridge design. There was something of a learning curve for all the professionals involved in the Rugby Road project and we were pleased that we could assist in fully meeting the architect's design narrative," notes **Daniel Petrov**, Managing Director at Peikko South Africa. ●

” We could optimize water and energy collections better with a precast concrete design than with conventional construction.



Hybrid high-rise: strength meets sustainability

The ambitious office hub SPARK located in Berlin, Germany, is one of the first high-rise buildings in hybrid construction in the market. The seven-story building with distinctive façade elements will be completed by mid-2024 and it has around 13,600 m² of flexible office and conference space. Peikko delivered nearly 2 kilometers of DELTABEAM® Composite Beams for the project.

SPARK is well located with highway access and public transportation nearby. The developer of the project is Townscape & Gateway Real Estate, and the construction company is Köster GmbH. The main architect is K6 Architekten and R & P RUFFERT Ingenieurgesellschaft mbH is responsible for the structural design. Thanks to the

use of wood SPARK is visibly a very attractive building but also expected to be awarded DGNB Gold certification thanks to its sustainable design.

Hybrid construction benefits

SPARK will be built in an innovative wood-hybrid construction method. This mix of materials benefits both tenants and

the environment; it matches the static load capacity of concrete with the ecological advantages of wood. The hybrid construction also ensures savings in time, energy, and CO₂. The hybrid construction consists of Peikko DELTABEAM® edge and center beams and wood-concrete composite ceilings in slim-floor construction.

Conventional construction with steel



and concrete is characterized by high consumption of resources and energy. That's why SPARK also uses renewable and recyclable wood as an ecological alternative. Building with wood saves enormous amount of time thanks to the option of prefabricating components. Load-bearing walls and façades, including the windows, can be prefabricated precisely and independently, brought to the construction site, and used there without delay. The outstanding insulating properties of wood reduce the energy required for air conditioning in the interior. In addition, the natural building material ensures a healthy room climate, optimal humidity, and thus a high feel-good factor.

“Though building wood-hybrid structures is a common trend in the German construction market, wood only is not enough. Only when combined with the strength and fire resistance

of steel and concrete, one can reach optimal outcomes. Currently, Peikko's DELTABEAM® is the only solution in the market that enables hybrid construction for such a high building including a fire resistance of R90, a span length of 8-10 meters, and a slim floor solution of only 30 cm. It just isn't possible with anything else”, emphasizes **Marvin Vollbracht**, Project Manager at Peikko Deutschland GmbH.

Peikko already participated in the design phase of the SPARK and helped the designers to create both flexible and reliable hybrid structures. This means that in addition to the use of the CO₂-friendly material wood, the building height is also optimized, and, in many places, savings can be made on vertical components such as façades. Besides the climate-friendly ceiling system, DELTABEAM® allows for easy assembly and fast erection.

Vollbracht continues: “SPARK was made possible by a tight collaboration. And the end result is just stunning. Many local design offices have contacted us as they desperately want to visit the site; the project in its scale is very special to the German market.” ●





BESISTA® Tension and Compression Rod Systems – It's in the details

Peikko's BESISTA® Tension and Compression Rod Systems set the standard for aesthetically and efficiently bracing buildings and other load-bearing structures. Award-winning BESISTA® helps architects and contractors to create bold, impressive, and super-modern spaces in typically high-profile locations.





BESISTA® is strong and lightweight, with above-average safety margins. It is designed to look good from all angles and even down to smaller details such as smooth transitions – and of course it's designed to make the building look good. BESISTA® is ETA approved, CE marked, and type tested. It has been developed to minimize energy and resource use during manufacture. Its high quality, performance and reliability make it an effective and sustainable solution.

The BESISTA® Rod System consists of rod anchors and tension / compression rods as primary parts and an extensive range of accessories, like cover or extension sleeves and cross anchors, for wide projects. BESISTA® has been used in a variety of applications, from sports stadiums to eye-catching bridges. The products are used in timber, steel, and concrete structures, and in special applications such as in façades.



Peikko acquired the company BESISTA International GmbH at the beginning of 2023. The acquisition included the operations of a company with some 20 employees, the related factory premises and the IPR rights, such as patents and trademarks. BESISTA® Tension and Compression Rod Systems complement Peikko's product range and brings additional possibilities to architectural design.



BESISTA® Tension and Compression Rod Systems in use



**WILDPARKSTADION,
KARLSRUHE, GERMANY**

Football stadium for
34,000 spectators



**CITY-PLAZA, STUTTGART,
GERMANY**

Office and retail building



**PWC, PARK SIDE, ZURICH,
SWITZERLAND**

A residential park and an
office building



**PWC, PARK SIDE,
ZURICH, SWITZERLAND**

A residential park and
an office building



**THE EDEN PROJECT,
CORNWALL, UK**

The greenhouse complex



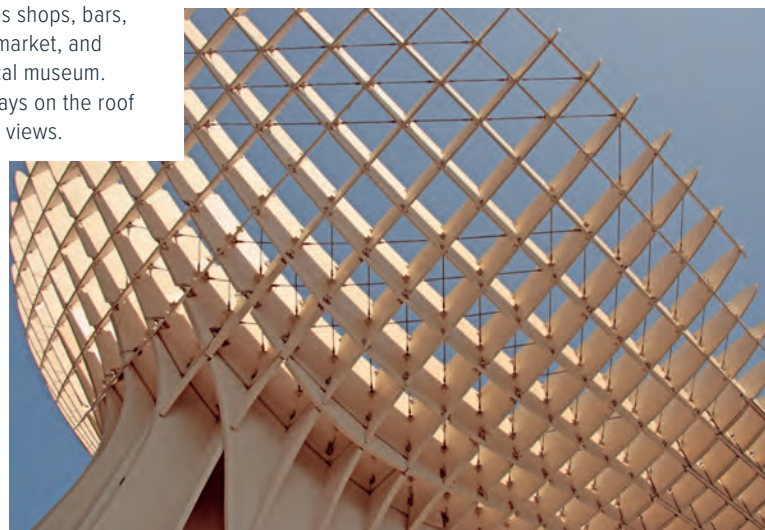


**HAMMERAU BRIDGE,
SIEZENHEIM, AUSTRIA**
Pedestrian and cyclist-
friendly boardwalk



**METROPOL PARASOL,
SEVILLE, SPAIN**

Building includes shops, bars,
a restaurant, a market, and
an archaeological museum.
Elevated walkways on the roof
offer panoramic views.



Find more Peikko's references around the world
from [peikko.com/references](https://www.peikko.com/references)



Bolted Connections goes cloud

– the launch of Peikko's next-generation design tool

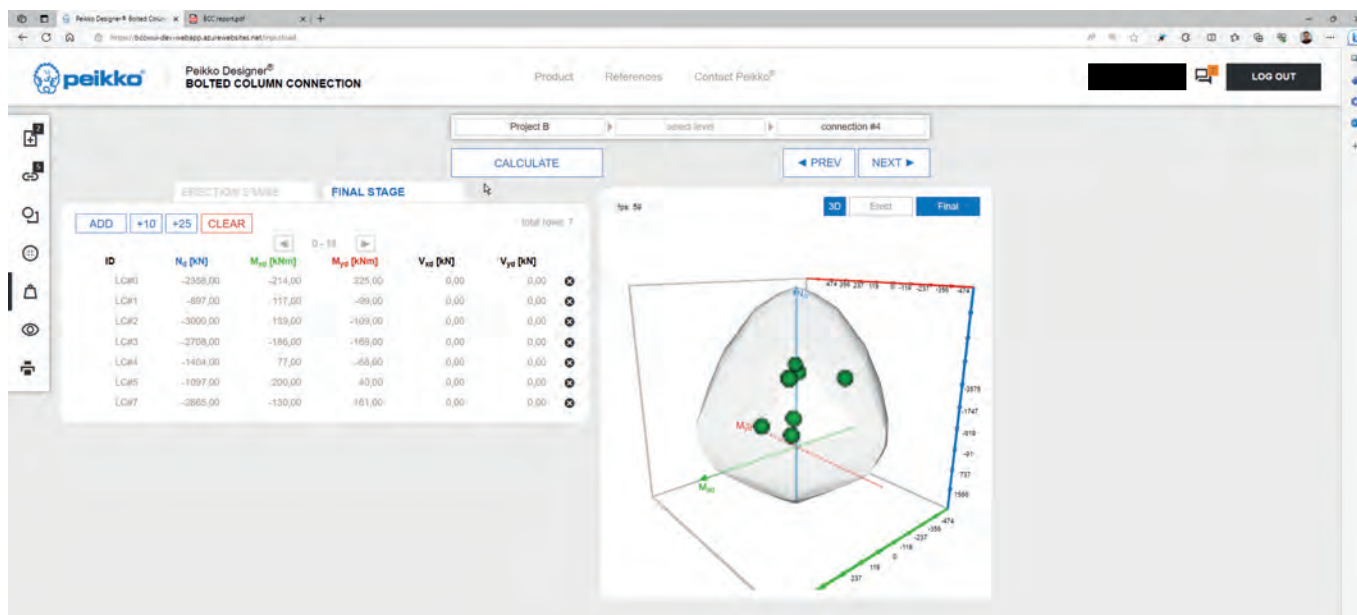
The new generation of Peikko Designer® is here now: Peikko releases the first cloud-based design tool for column connections. The new tool will make the designer's everyday life smoother while also following industry trends.

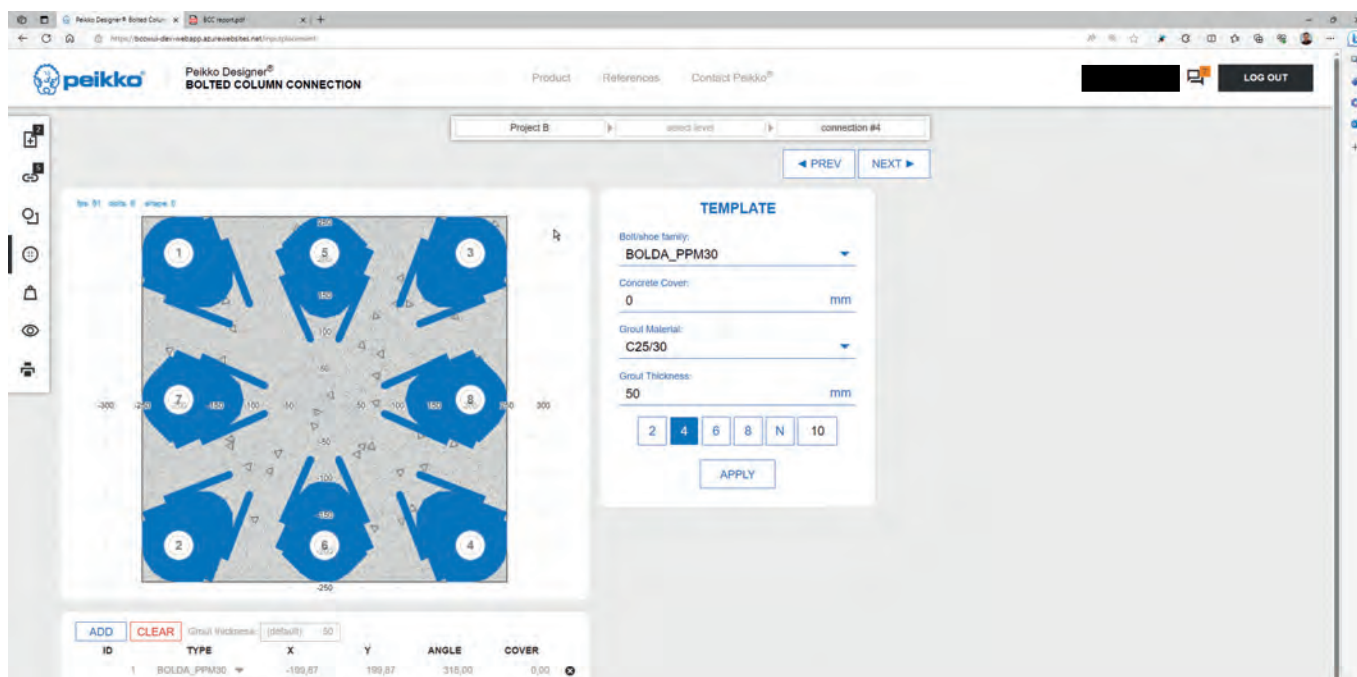
Daily benefits

The new generation of Peikko Designer® is a cloud-based design tool, which means that you only need an internet connection, no installations or downloads. It's easy to get up and running; existing users can log in to the new version with the same credentials that they use for the current one. The tool is always up to date thanks to its automatic updates, and the simple and intuitive user interface ensures a good user experience. Just like its predecessor, the new generation Peikko Designer® tool for column connections is free of charge.

What's new?

Compared to its predecessor, the new cloud-based Peikko Designer® has many improvements including in reporting and calculation. The new tool gives the user more freedom as it enables the reliable and standardized design of architectural shapes that deviate from the mainstream. For example, the new tool allows more freedom to design column shoes for columns of all shapes, while the current version is limited exclusively to column shapes that are round or rectangular. The new Peikko Designer® now also allows for inspecting the load capacities more visually thanks to the new 3D capacity graphs. In addition, the tool offers more options for visualizing results while also leaving room for their interpretation.





Release and updates

With the introduction of the renewed design tool, any additional updates to the existing Peikko Designer® will no longer take place. During a transitional period, the tool will remain accessible alongside its cloud-based successor, offering users both options in parallel. In the future, all of Peikko's cloud-based design tools (DELTABEAM SELECT, EBEA SELECT, EBEA Balcony Designer, FLOOR JOINT, Column Connection) will be easily accessible with a single login using the same credentials.

Solutions for the future

Structural design is developing and becoming digitalized. Industry trends also provide guidelines for the development of Peikko Designer®:

- cloud-based solutions
- ease of use
- compatibility of the tools
- artificial intelligence (AI)
- out-of-the-box and architecturally challenging solutions.

The new generation Peikko Designer® for column connections is just one step towards new technology and the design needs of today and tomorrow. Product development is taking place even at this very moment. New tools will be released – to make your daily design work easier and more meaningful.

How would you like design tools to be developed? What features do you need, and what would make your work easier? Or have any questions come to mind?



Deepen your know-how – read a White Paper

We asked the authors why you should

White Paper: High Fire Performance of DELTABEAM® Slim Floor Joints with Timber Slabs

Authors: Salla-Mari West, Simo Peltonen

DELTABEAM® with timber slabs is a safe solution in the event of fire

The use of mass timber structures, such as CLT, has become more common thanks to their ecology, strength, dimensional accuracy, and rigidity. In Central Europe, CLT slabs have been used together with DELTABEAM® for more than ten years. The fire performance of DELTABEAM® is well known, but due to the high thermal conductivity of the steel, the connections and joint areas of the timber structures are generally the most critical in the event of fire. Peikko performed a two-hour charring test and 90-minute loaded fire test on the DELTABEAM® + CLT slab combinations to ensure that the structure is also reliable in the joint area of the materials.

In the fire test, the slab was exposed to a fire from below. The load transfer between the slab and the beam was ensured by installing transverse reinforcement through the beam and anchored to the grooves of the CLT slab. In the slab design, the charring of timber during a fire was considered in accordance with Eurocode part 5.

After the fire test, the charring of the slab was measured and noted to be smaller in the joint area between DELTABEAM® and timber slab than in the midspan of the slab. It can be concluded that the beam does not have a negative impact on the fire performance of the timber slab.

Thanks to the loaded fire test, the load transfer of the structure could also be tested under realistic conditions of a fire. In the test, the load was kept uniform for 90 minutes, and the

entire structure met the requirements for load-bearing capacity, integrity, and insulation.

In the event of a fire, the timber slab is charred in the joint area between DELTABEAM® and timber slab only at the bottom as expected. Charring didn't penetrate to the contact surface. The concrete of the joint area remained undamaged in the fire. Thanks to the compressive arch, the vertical loads of the slab are thus transferred to the beam also in the event of a fire.

"The fire tests were aimed at proving that the DELTABEAM® Composite Beam is a safe solution to be used with timber slabs in both ambient temperature and in the case of a fire. We were confident that DELTABEAM® with timber floor joints would perform well in fire situations. However, we were positively surprised that with our solution the effective charring depth was smaller in the joint area than in the midspan of the timber slabs. The White Paper shows that Peikko's solution works by introducing the results of the fire tests and viewing the demolished cut-open structure after the 90-minute fire test", shares **Salla-Mari West**.

"Reading the White Paper helps one understand how the joint area between DELTABEAM® and timber slabs performs during a fire. Together with the updated Technical Manual "DELTABEAM® Slim Floor Structure with Timber Construction" and the White Paper "DELTABEAM® with hybrid timber floors - Load transfer tests" Peikko helps designers to understand the key areas to consider when using DELTABEAM® with timber slabs", explains **Simo Peltonen**.



About the authors



Simo Peltonen is a team leader in the Peikko Product Development team. His team works with composite structures - DELTABEAM® and ATLANT® columns. Simo's team is a cross-sectional resource that works with new developments, product improvements, design tool development, and technical approvals. They also offer training and technical support and are authors of several conference papers and articles. Simo has worked in this field from the day he joined Peikko in 1998.



Salla-Mari West is a Research and Development Engineer focusing primarily on DELTABEAM® Composite Beam. She has studied the behavior and design of the product and is dedicated to continuing to investigate new solutions with DELTABEAM®.



Read the White Paper from peikko.com/whitepapers:



White Paper: EBEA® – Surviving the flames

Authors: Seref Diler, Silvija Gasiūnė

Balcony connections' quality is literally fire-proven

The use of cantilever balconies has become more common in recent years as they allow for architectural freedom and high construction. EBEA® Balcony Connector is a connection part for cantilever balconies offered by Peikko. One of EBEA®'s key properties is its fire resistance.

Depending on the building and the façade, load-bearing structures are required to be outfitted with fire resistance capabilities of 30 to 90 minutes, which is a specification that also holds for EBEA®. The fire resistance of EBEA® Balcony Connectors has been tested with extensive fire tests.

In a recent fire incident in Latvia, EBEA® was put to a real test when an apartment building under construction caught fire. Within a few minutes of the fire starting, the entire façade was on fire, and the plastic-based EPS insulation (Styrofoam) was practically almost completely burned away. All in all, the fire lasted about half an hour. The building was unoccupied at the time of the fire, so personal injuries were avoided.

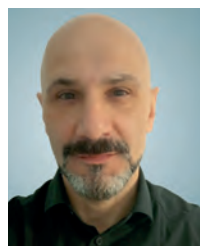
After the fire, the question arose of whether balcony cantilevers could be used safely any longer. What happened to the thermal insulation and load-bearing properties of EBEA® in the fire? The balconies were first examined at the construction site, after which they were subjected to functional tests.

Based on the site inspection, the tensile rebars inside the insulation were in perfect condition and had not been exposed to fire at all. The stone wool insulation had also remained dry despite the fire having extinguished, except for the top layer. The load-carrying capacity of the reinforcement was tested by loading 25 kg cement sacks on top of the slabs until the maximum design payload was reached. After loading, the deflection of the balcony slab was measured for several hours. The measurements showed no deflection that would have indicated that the fire had weakened the reinforcement. Based on the inspection the conclusion was that the balcony slabs could remain in place and the developer should only renew the façade damaged in the fire.

"Normally our products are only tested in the laboratory and hopefully never catch fire. Our White Paper shows what can happen in practice in the event of a real fire, and further also

shows the differences between the conditions of fire testing in the laboratory and in practice. Because of the incident, our EBEA® has been proven to work perfectly even in the real event of a fire. This shows that our products stand for the quality we promise. Furthermore, the White Paper pictures the importance of the insulation material. Thermal protection is often a priority for thermal break elements such as EBEA®, but this incident showed that fire resistance and used insulation materials are just as important", notes **Seref Diler**.

About the authors



Seref Diler is an experienced Product Manager of Thermal Break Elements at Peikko Deutschland GmbH. Seref likes to explore the world of product development whenever he has a chance. Due to his international experience, Seref feels at home everywhere and enjoys teamwork.



Silvija Gasiūnė is a Civil Engineer from Peikko Lietuva with a passion for sales. She has technical expertise and can explain complex products to anyone in a simple and understandable way, which makes her a great colleague.



Read the White Paper from peikko.com/whitepapers:



White Paper: Soil modulus for onshore wind foundation design

Authors: Andris Bērziņš, Jānis Šliseris

More accurate foundation design for different soil types

Optimization of the time, resources, and materials at hand is the key to more sustainable and cost-efficient foundation construction. The hardening soil small strain (HSS) mathematical model is one of the best for wind turbine foundations in terms of accuracy and safety. Now we tell you how to derive input parameters for it.

Wind turbine sizes and power are quickly increasing and consequently loads on the foundations have doubled during the past eight years. Higher loads, in turn, lead to higher steel and concrete volumes. As a forerunner, Peikko continuously searches to further optimize steel and concrete volumes and has developed a state-of-the-art calculation method that requires less well-known soil parameters for each subsoil layer. The white paper presents a comprehensive study on soil modulus for different soil types, aiming to provide theoretical and practical guidelines to those involved in the onshore wind turbine foundation design.

Peikko offers several product options for wind turbine foundations. Gravity7 foundations are used on medium and hard soil as well as solid rock. The loads are transferred from the tower to the ground through an anchor cage along with a wide and shallow foundation over a large area of soil. Apart from standard reinforcement, gravity foundations designed by Peikko include PSB® Punching Reinforcements. The single and double-headed studs allow for efficient and trouble-free assembly. Peikko also delivers anchor cages.

The final design, manufacturing process of the components, labeling, and quality information of each foundation are based on the initial requirements and site needs clarified in a joint kick-off meeting between stakeholders.

“The main goal for writing the White Paper was to improve soil modeling accuracy and reduce foundation size with more precise models. We need to constantly improve ourselves and our calculation tools to be competitive in the rapidly developing wind turbine market. By making more precise soil models we can actually make a cheaper and more optimal foundation solution that all the parties involved can benefit from”, describes **Jānis Šliseris**.

About the authors



Andris Bērziņš has a structural engineering background, and he joined Peikko in 2012. Until 2022, Andris worked in wind turbine foundation design and R&D management. Now he is responsible for PUUCO® timber connections as an R&D Manager.



The paper is co-authored by **Jānis Šliseris** - a Structural Engineer with programming and development of numerical modeling software as his passion. He joined Peikko after finishing his Ph.D. studies in structural engineering and post-doctoral research in the development of numerical models for wood fiber boards.



Read the White Paper from peikko.com/whitepapers:



Find all Peikko White Papers: peikko.com/whitepapers

BESISTA®

It's in the details

Peikko BESISTA® tension rod and compression bar systems set the standard for elegantly bracing buildings and other load-bearing structures. With detailed aesthetics and patented safety and installation features, BESISTA® is your first choice for load-carrying connections that boldly stand out.

