CONNECTIONS

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

2*2018

BUILDING IN URBAN AREAS

IT'S ALL ABOUT SPACE – OR LACK THEREOF

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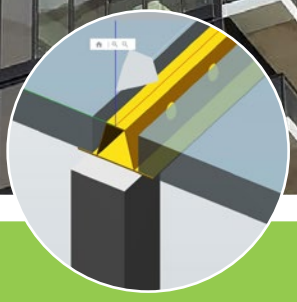

THE CIRCULAR BUILDING MOVEMENT

IS READY TO GET CONCRETE

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PROUDLY PRESENTING PEIKKO DESIGNER® DELTABEAM SELECT

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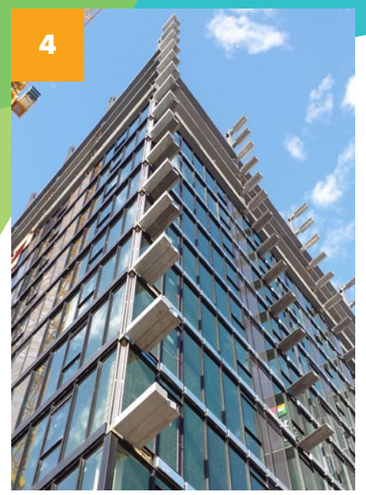

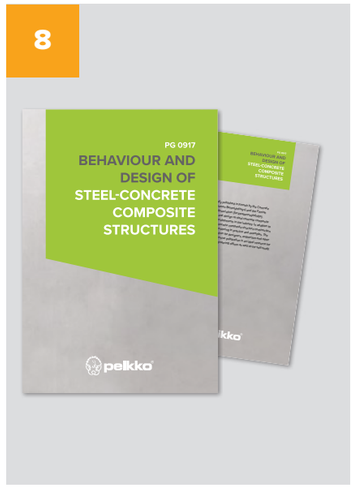

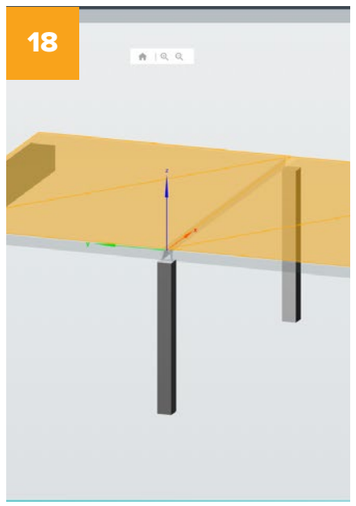

HIGHLIGHTS

TECHNICAL

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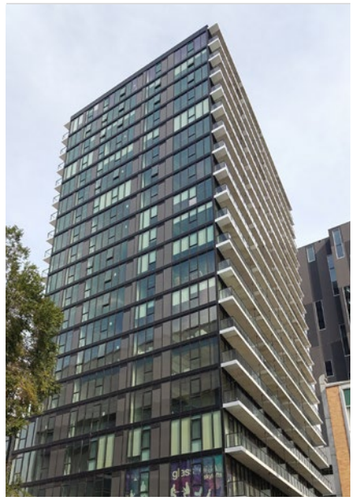
ON THE COVER:
For the construction business, urbanization means that more and more projects will be in congested areas. Read more on page 4.



AND I BECAME A FAN OF IT!

Sometimes it just takes a long time to get it.

Despite the topic being lectured in various seminars, despite seeing a huge amount of presentation slides, despite the enthusiasm and drive, despite the pure and irresistible logic – at the end of the day I could not put the pieces together.

How can the topic of "Circular Economy" be more than a mere marketing gimmick, a thing of today that becomes a thing of yesterday much sooner than we realize?

It took me some time, but suddenly I realized it made sense. And not just sense but also business sense. And if we can simultaneously help our customers to make more money and contribute towards the environment, what could be better?

Yes, I believe in Circular Economy. And I believe Peikko can provide the vital connections to help our precast customers follow the path towards Circular Economy. This is not about presentation slides, this is about intelligent, very concrete connections that will change the behavior of our industry.

Read more on Circular Economy on pages 12–15.

TOPI PAANANEN
CEO, Peikko Group Corporation

Testing new limestone based grouts at Peikko, CEO Topi Paananen and Board member Kasper Guldager Jensen at work.


Jerry Grajewski, Grajewski Fotograph Inc

BUILDING IN URBAN AREAS
IT'S ALL ABOUT SPACE – OR LACK THEREOF

The Winnipeg skyline got a new landmark when the 21-storey GlassHouse was completed. DELTABEAM® played an important role in meeting the needs of the architect, structural designer and constructor alike in this ambitious Canadian project.

Wherever you look, you see the same phenomenon. Estimates may vary, but they all point in the same direction. According to the United Nations, nearly all global population growth between now and 2030 will be absorbed by cities. The fourth generation builder and Director of Project Delivery at Bockstael Construction, **Nick Bockstael**, says that's also the case in Winnipeg, Manitoba, in Canada.

"My great-grandfather migrated from Belgium to Canada in 1907 and soon became an established craftsman and builder. This neighborhood sure looked different back then and there was no lack of space where to build."

Times have changed and Bockstael now looks back fondly to a certain downtown address in Winnipeg.

"311 Hargrave Street would have been child's play in 1907, but in 2015 it was a tight spot. We had only one lane to use for the site and 21 floors to build – with just one crane."

"This is a universal challenge for managing urban sites and their material flows. There is usually no room for storing the materials," Bockstael notes.

"Everything needed had to arrive on site just on time, so we had to use a small depot outside the city to truck the materials over. There was no place for hiccups in the supply chain." →

A 21-story residential project Glasshouse on 311 Hargrave Street, Winnipeg, was built using Peikko's DELTABEAM® Frame.

Read more:

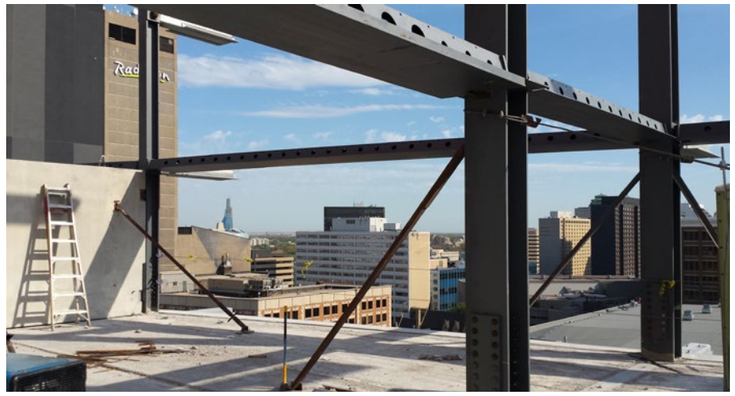
SAFETY MUST COME FIRST

City planning allowing, new buildings in downtown areas tend to be high-rises to compensate for high property prices. This poses additional requirements for the contractor. Safety issues have to be taken seriously.

"Of course, working at height can be precarious business. You have to enforce safety at all levels of organization," Nick Bockstael says.

In addition to gravity, there is also another element that needs to be reckoned with.

"Wind is always a factor on a high-rise. Materials can blow off the site if you don't pay attention to safety measures. The same goes for pouring concrete. In high winds, there is a risk of getting concrete splashes all over the place – on adjacent buildings, vehicles or even people. Splashing concrete can be tamed by meshing the work area, but that's of course an additional cost."



BUILDING METHOD CAN MAKE A DIFFERENCE

Bockstael Construction uses precast in around 60 percent of their projects, urban or not.

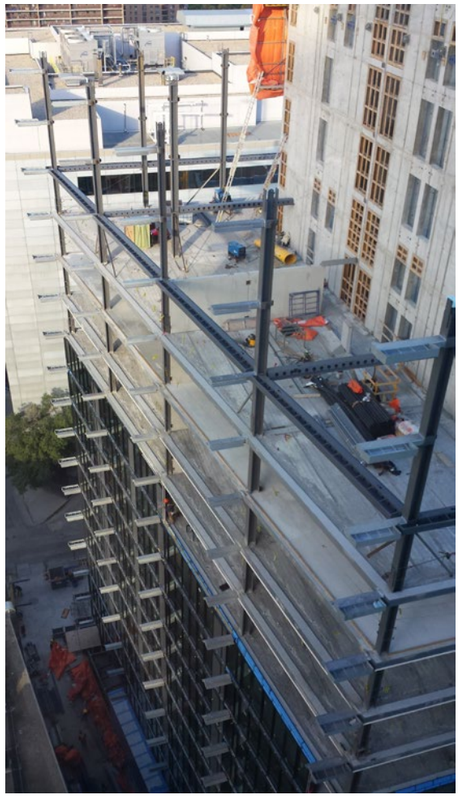
"In terms of cost, there isn't necessarily a difference. It all depends on the shape and type of the building. But when space is at premium, using steel and hollow-core construction helps," Nick Bockstael says.

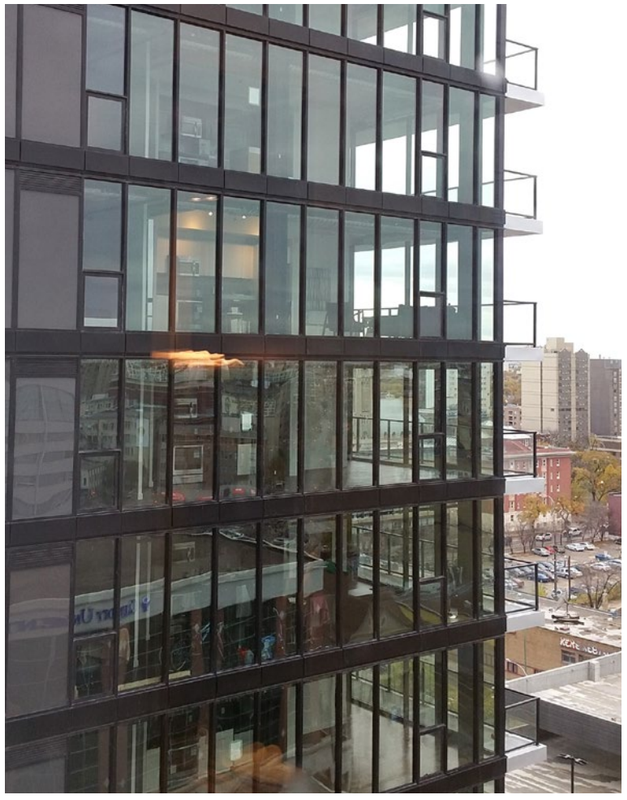
During winter months, heating costs can also add up.

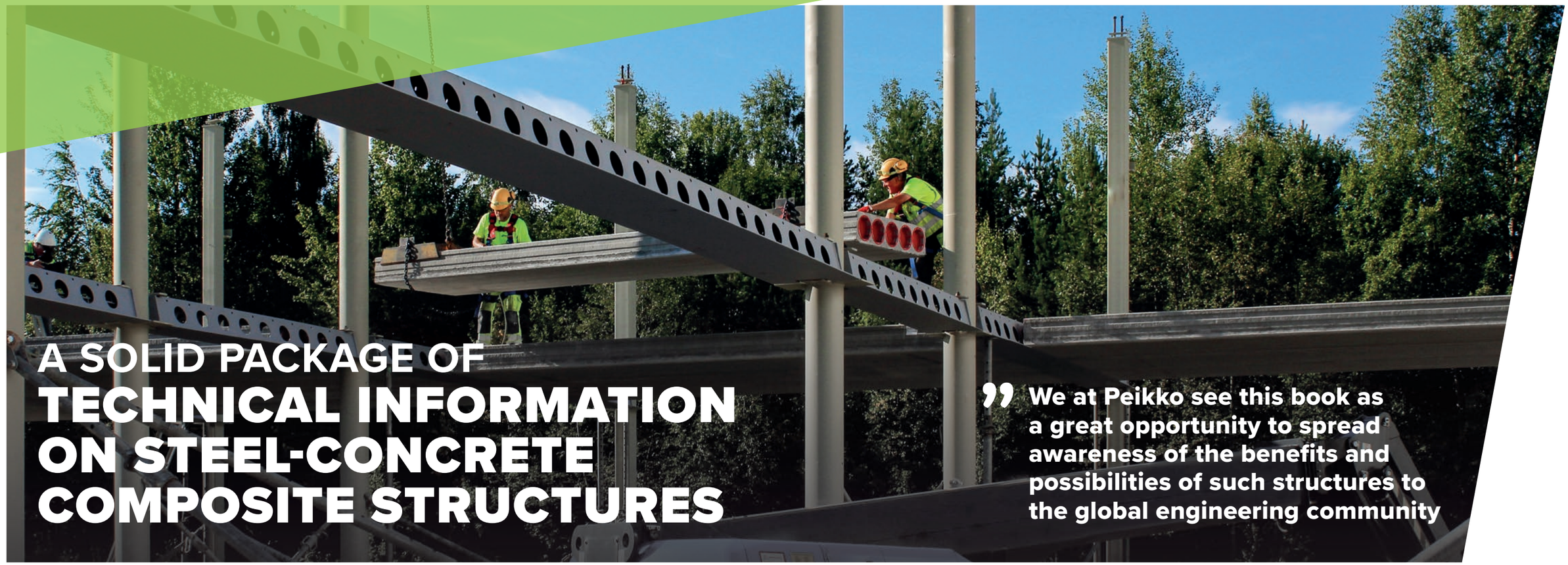
"In Manitoba, half of the year is cold. The less you need to heat structures, the more economical you will be. In that sense, prefabrication has its benefits."

311 Hargrave Street was built with a self-climbing formwork, steel and hollow-core.

"There were no major safety incidents and we delivered on time and on budget. Needless to say, the owner was happy," Nick Bockstael concludes.







A SOLID PACKAGE OF TECHNICAL INFORMATION ON STEEL-CONCRETE COMPOSITE STRUCTURES

We at Peikko see this book as a great opportunity to spread awareness of the benefits and possibilities of such structures to the global engineering community

Composite structures of steel and concrete – in the form they are known today – were first used in the United States more than a hundred years ago both for buildings and bridges. There has been a lot of progress since then, but the fundamentals are as strong as ever.

Whether you are a designer, public authority or other building professional, a book that contains all the essentials of steel-concrete structures will come in handy.

Originally published in Finnish only, this landmark textbook is now available to the English-speaking world as a hardcover edition.

"Peikko is honored that an established expert in the field, **Matti V. Leskelä**, D.Sc. (Tech), has put his time and effort into this project. We are grateful for the permission to make the valuable content of this book available to all English speakers," Peikko's CEO **Topi Paananen** says.

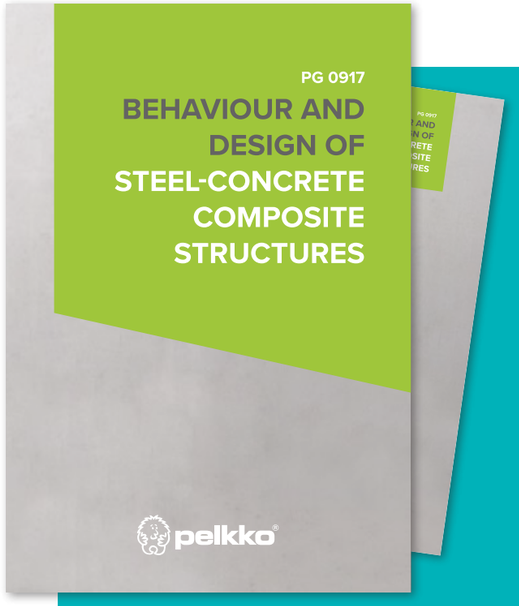
In addition to this book, Matti V. Leskelä has been involved in the development of Peikko's DELTABEAM® Composite Beam and the DELTABEAM® Frame solution for many years. His expertise in this field has made a remarkable difference, not only to Peikko but to the industry in general.

"I hope that the international audience will find the book a useful reference in their own work," Leskelä states.

The 429 pages cover the fundamentals and the latest developments in the industry, but also dimensioning in practice, examples and the DELTABEAM® technical manual.

"As the world's leading composite beam manufacturer and a forerunner in the field of steel-composite structures, we at Peikko see this book as a great opportunity to spread awareness of the benefits and possibilities of such structures to the global engineering community," says Topi Paananen.

The book is a great resource also for universities and colleges or even for self-study.



INTERESTED IN THIS LANDMARK PUBLICATION?

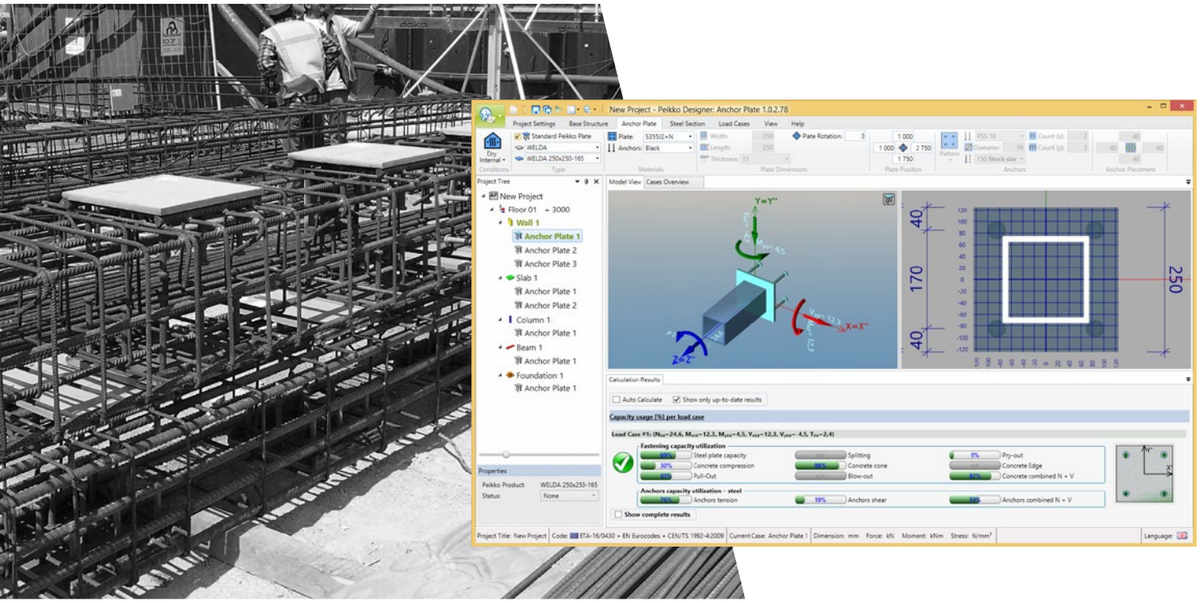
Download the table of contents and introduction and order the book at

www.peikko.com/behaviour-and-design

Peikko's new WELDA® Strong Anchor Plate has taken the market by storm. However, there have been questions regarding which dimensioning method to use. Let's take a closer look.

CONCRETE EDGE SHEAR RESISTANCE:

PEIKKO DESIGNER® VS. CEN/TS 1992-4:2009



The CEN/TS 1992-4:2009 is the overall standard to be used for dimensioning both post-installed anchor plates and embedded anchor plates such as WELDA®. While safe and sound for post-installed anchor plates, it leads to needless over-dimensioning when using WELDA® or WELDA® Strong.

GAP BETWEEN ANCHOR AND PLATE MAKES THE DIFFERENCE

The problem with post-installed anchor plates is that you need to have installation tolerance. This means that the holes in the plate have to be larger than the anchor diameter. There is always hole clearance in the bolt-to-plate interface.

CEN/TS 1992-4:2009 has to take this into account. As such, it is very conservative in the case of embedded WELDA® anchors. In fact, the European Committee for Standardization have realized it themselves as they state that "for groups without hole clearance this approach might be conservative in the case of concrete break-out failure."

This means that dimensioning WELDA® or WELDA® Strong Anchor Plates with CEN/TS will result in a needlessly heavy solution.

USE PEIKKO DESIGNER® FOR DIMENSIONING WELDA®

When anchor plates are installed close to the edges, the ability to resist shear loads is critical.

In the extreme case of a post-installed anchor plate, the load may be taken only by the front anchors while the back anchors do nothing at all (illustration 1.). That's why all shear loads need to be distributed on the front studs when using post-installed anchor plates.

But when an embedded anchor plate – such as WELDA® – is installed into the mold and cast, all anchors are always active and load bearing thanks to a welded one-piece structure (illustration 2.).

To get the full potential of WELDA® and WELDA® Strong Anchor Plates, dimensioning is best done with Peikko Designer®.

Illustration 1. Post-installed anchor plate

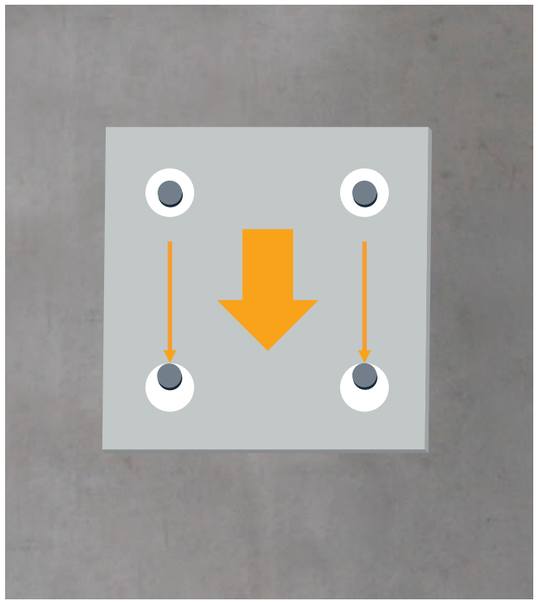
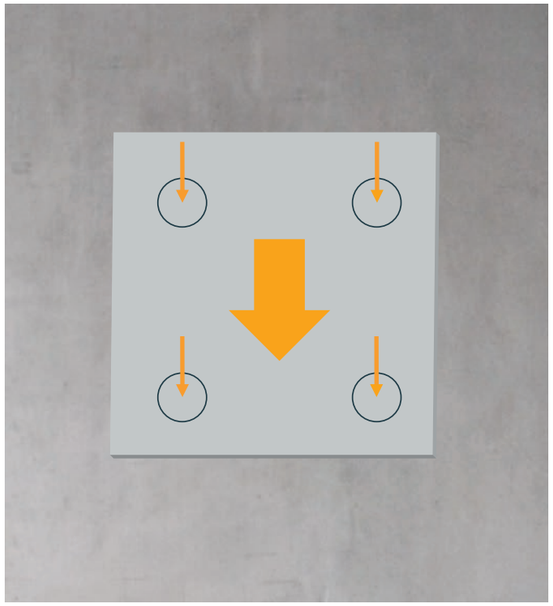


Illustration 2. WELDA® Anchor Plate



THE CIRCULAR BUILDING MOVEMENT IS READY TO GET CONCRETE

“Construction accounts for around 40 percent of material and energy consumption in Europe, but natural resources are becoming scarce. We need to rethink,” says Kasper Guldager Jensen of 3XN Architects, Denmark.

Until recently, the world has been used to taking the resources for granted. But that’s a luxury we don’t have any more. Circular economy is needed to meet the sustainable development goals.

“In the next 50 years, we will build as much as we have done so far. If we continue the current linear take-make-waste model, we will end up in severe economic and ecologic difficulties. Being circular is high on both political and business agendas,” **Guldager Jensen** says.

Guldager Jensen is an avid proponent of the circular building movement.

“We use a lot of resources and talent to make the building look great and fit for purpose. But when the life-span of the building is up, the demolishing process is unprecise and not very pretty. Deconstruction results in great value loss.”

With dwindling resources and new-found scarcity, material prices are on the rise. This opens the door for new business models. According to Guldager Jensen, we have reached a tipping point where the ecologic and economic benefits meet.

“Buildings should be seen as material banks. It’s a totally new way to look at the construction ecosystem. We must learn from nature, where everything has a purpose and everything is a resource. Nature wastes nothing, so why should we?” Guldager Jensen asks.

By rethinking construction, business can be made out of demolishing.

“Building circular has both long- and short-term business upsides. This has not always been the case. It has been difficult to talk about sustainability and economy in the same sentence. But reusing building parts is good business. Increasing resource prices will only accelerate this. Circular thinking leads to faster and safer methods not only in construction, but also in remodeling or demolishing. It makes high value out of materials that used to be good only for landfills.”

Nature wastes nothing. Why should we?

Kasper Guldager Jensen of 3XN Architects, Denmark.

MORE THAN AN UNREACHABLE UTOPIA

Circular building may have deemed as hot air by some. But the world’s first 100 percent circular building is being built in Denmark at this very moment.

The Circle House of Aarhus is a cross-industry collaboration between manufacturers, contractors and demolishers. Comprising row houses and mid-rise buildings, it will have 60 social housing units.

“We took a simplified approach to test our ideas. In a way, we are learning from the old ways of designing joints and details – such as pegs, nuts and bolts. This kind of detailing will create new Scandinavian aesthetics,” Guldager Jensen promises.

The Circle House is designed to use only four types of precast slab and wall elements. Simple mechanical connections will allow the recycling of components and materials when the buildings finally need to be demolished.

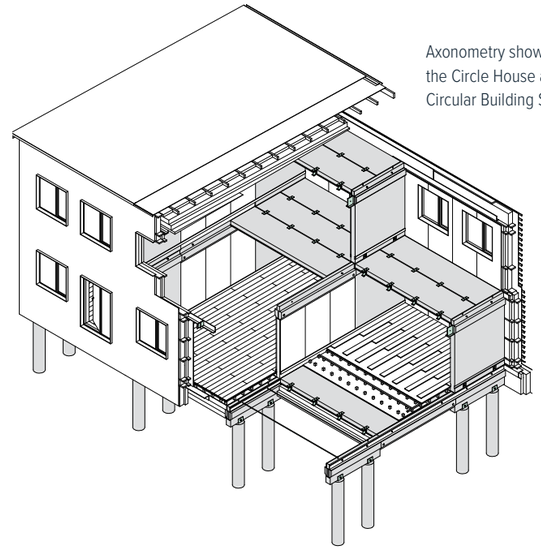
“Lime mortar is used for fire-proofing and corrosion protection of the connections. When the time comes, it’s easy to remove the mortar with a pressure washer and disconnect the joints. This kind of construction method means that all the materials will have high reuse value. Just like you can disassemble a Scandinavian log house, transport it to a new location and reassemble it,” Guldager Jensen compares.

NOT ONLY BOXES

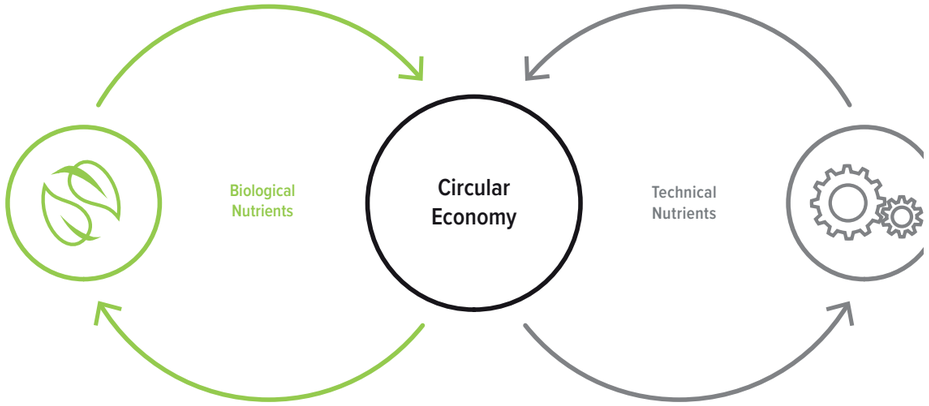
It’s common knowledge that something beneficial and good for you may taste foul or look boring. Is that the case also with circular and sustainable buildings?

→

Reusing building parts is good business.



Axonometry showing the Circle House and the Circular Building System.



Buildings should be seen as material banks.

"I don't think architecture should be standard boxes just because it's circular. At 3XN we aim to use a lot of standard parts, from 60 to 80 percent – even though our work usually looks architecturally more ambitious when compared to off-the-rack buildings."

A prime example of innovative circular thinking is the new high-rise being built on top of an old one in Sydney's Quay Quarter, Australia. Most of the existing structures will be reused for savings of AUD 130 millions in materials and time.

"As much as 65 percent of structural columns, beams and slabs and 98 percent of structural walls are retained. This helps prove that circular building is not just ecological and sustainable. It's also economical," says Guldager Jensen.

GOING INDUSTRIAL WITH CIRCULAR

Critical mass needs to be reached for the circular building model to really gain momentum.

"The new way of thinking must be widely accepted. We need to prove the concept time and time again to create demand for the circular building methodology. "

But for the keen eye, the proof is already there.

Kasper Guldager Jensen recently co-authored the Building a Circular Future publication, which calculated the effects on a 42,000 m^2 (50,200 sq ft) case study office building.

"We redesigned the building using the principles of circular economy and turned the demolishing costs into a positive business case. The costs with the current operating model were EUR 2 million, but with circular thinking we ended up with a profit of EUR 5 million. The new built value of the building was EUR 115 million."

But to make an impact, industrial scale solutions are needed. That's why Guldager Jensen was invited to join the Peikko Group's Board of Directors in 2017. In addition to that, he leads the internal innovation unit of 3XN, GXN Innovation.

Dedicated to circular economy, GXN Innovation and Peikko have started a research program to develop new solutions for transforming the precast industry.

"We are working together on a roadmap that will lead to a circular building system. Soon we'll be ready to get concrete," says **Topi Paananen**, the CEO of Peikko.

"This is quite unique in the concrete industry, which has had a hard time finding its place in the sustainability band wagon. We are going to show what can be done not only today but also tomorrow," Guldager Jensen adds. ●

Start designing on June 18th!

PROUDLY PRESENTING DELTABEAM SELECT

A new online module of Peikko Designer® will be unveiled on June 18th.

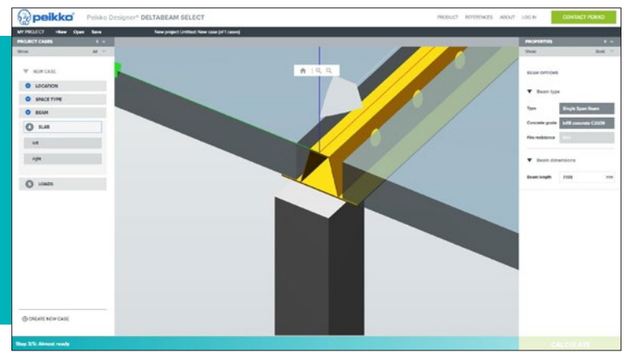
For users familiar with Peikko's current design tools Peikko Designer® and DELTABEAM® Preselection software, DELTABEAM SELECT is a logical step towards easier and quicker design of slim floor structures. And if you are just starting with DELTABEAM® and designing Peikko's slim floor structures, DELTABEAM SELECT will guide you along the way.

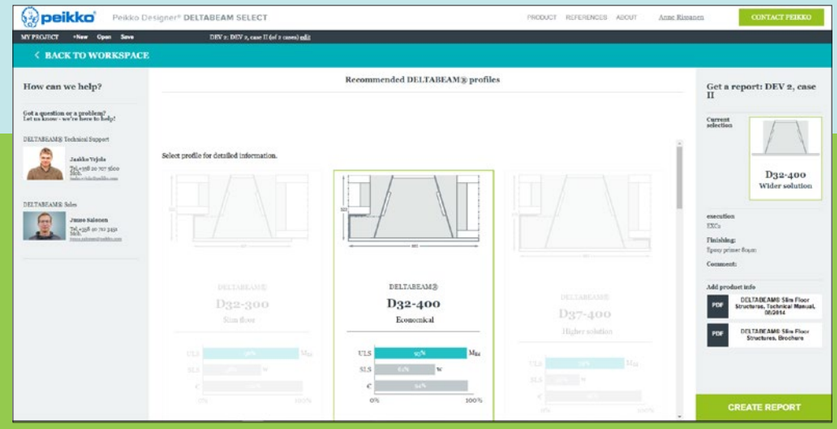
As DELTABEAM SELECT is an online tool, it's always up to date and doesn't need installation. Just enter the values and you are done. And it's free to use!

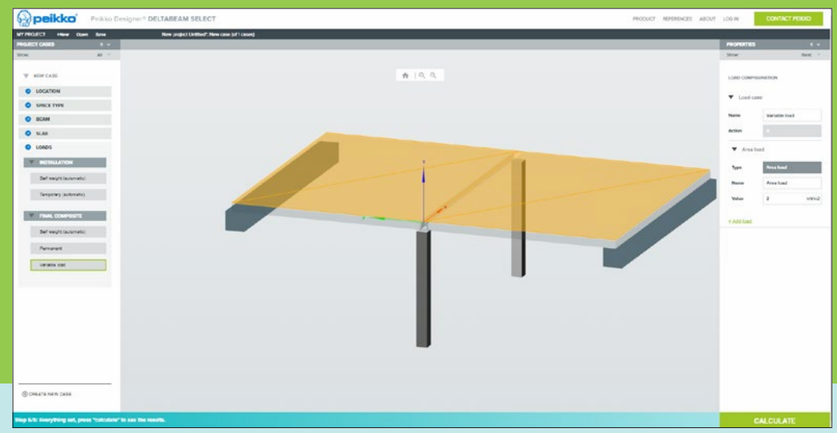
After registering, you can save your projects and print plans – a useful feature when presenting your plans to colleagues, investors, architects or authorities. With the same registration, you can also use other Peikko Designer® modules. If you already are a Peikko Designer® user, you can use the same credentials for DELTABEAM SELECT.

Whatever your design background is, DELTABEAM SELECT will give quick answers to your questions:

- Is DELTABEAM® Slim Floor Structure suitable for my project?
- How slim floors can I design?







FEEDBACK FROM TEST USERS:

> Easy to use and visually appealing.

> I like the fact that it's web-based and you don't have to download updates. Because of our company's IT policies that's a definite bonus.

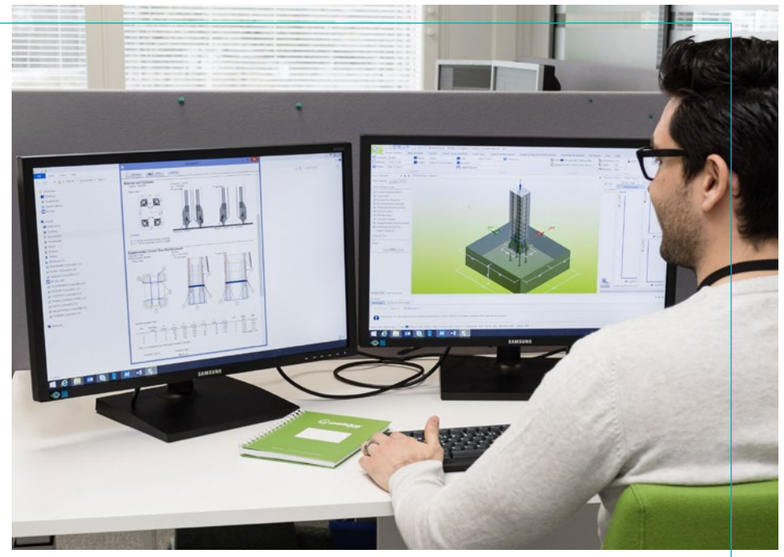
> Much quicker to use than the printed capacity tables!

> Very straight-forward. Dimensioning is fast and if something needs to be changed, that can be done in no time.

> If the customer specifically asks for DELTABEAM®, you can quickly present a solution – even in the middle of a meeting.

PEIKKO DESIGN TOOL UPDATES

Free design tools to optimize structural designs



Use our powerful software every day to make your work faster, easier and more reliable. Peikko Design Tools include design software, 3D components for several modeling software, installation instructions, technical manuals and product approvals of Peikko's products. All Peikko Design Tools can be accessed online at **www.peikko.com/designtools**.

LATEST IMPROVEMENTS IN PEIKKO DESIGNER®

The Fastening Plate module has a new name. It is called the Anchor Plate module. Peikko's Anchor Plate family has grown, and we want to make things more straightforward by renaming the design module according to our product names. At the same time, WELDA® Strong Anchor Plate and Long WELDA® Anchor Plate selections were updated.

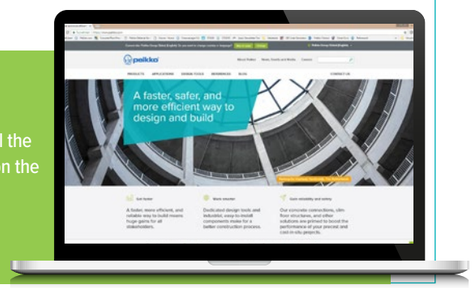
REVIT AND AUTOCAD TOOLS

- 3D DWGs for precast products have been released.
- METAFORM® Free Movement Joint is no longer available, the product is discontinued. METAFORM® is replaced by the OPTIMAJOINT® and TERAJOINT® ranges of Free Movement Joints.
- StruSoft IMPACT components for precast products have been released. You can find these in the Peikko library in the Prodlib service.
- Nemetschek Planbar fixtures are coming soon.

DESIGN TOOL SECTION ON OUR WEBSITES

Find all design related info and materials on our websites. You can, for instance, access all the information on the available design tools, view their release notes, watch tutorial videos on the design tools, and download tools.

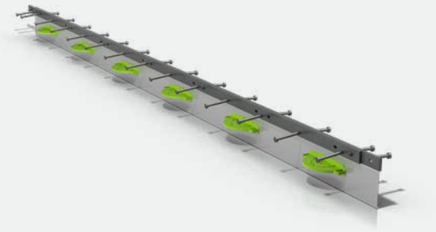
www.peikko.com/designtools



GOODBYE METAFORM®

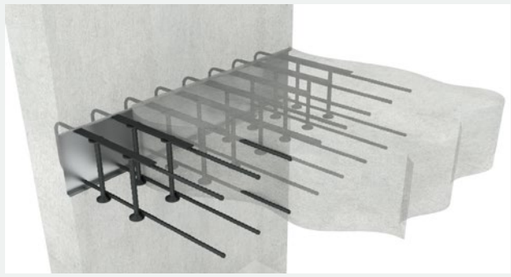
REPLACEMENT BY OPTIMAJOINT® AND TERAJOINT®

METAFORM® Free Movement Joint has been discontinued. As a replacing product, we recommend hot-dip galvanized models of OPTIMAJOINT® and TERAJOINT® Free Movement Joints. They both offer an easier and more cost-effective installation on site and more options to fit your requirements.



RENEWING THE REBAR STARTER BOX

ARBOX® COMING ON THE MARKET FIRST IN FINLAND



Designed according to Eurocode, the new ARBOX® Joint Reinforcement is a ready-to-install system for creating stiff concrete casting joints. The shear resistance transverse to the joint can be increased significantly by using PSB® Punching Reinforcement System with ARBOX®. This opens new possibilities in high load applications. Take a look at calculated transversal and longitudinal resistances in the Technical Manual available at **www.peikko.com.**

PEC® NOW DESIGNED TO EUROCODE

Seeing the need for further Eurocode compliancy, Peikko is proud to release a new version of the PEC® Column Shoe. For the designer, this means easier approval processes. For the user, the resistance and casting boxes remain the same. In some models, in contrast, requirements for supplementary reinforcement have been reduced.

TOP PROFESSIONALS JOIN TO BUILD TOP-OF-THE-LINE HOSPITAL

The Hospital District of Helsinki and Uusimaa, HUS, has started construction work for a new hospital building, called Bridge Hospital, in Helsinki, Finland. Peikko is one of the key partners of this project. The hospital, opening in 2023, is the hospital district's largest investment to date and also Peikko's largest individual DELTABEAM® project.

Once completed, the new Bridge Hospital of the Hospital District of Helsinki and Uusimaa in Helsinki will replace Töölö Hospital and part of the current Department of Oncology. When the construction work is finished in 2022, Bridge Hospital will form a hospital complex with the current Tower Hospital and Triangle Hospital on the Meilahti campus. In connection with the project, facilities will be built for three new linear accelerators.

The total gross area of the two projects amounts to over 70,000 m² (84,000 sq yd) with a net area of over 33,000 net m² (39,000 sq yd). The hospital will house four medical wards and 215 beds, 58 intensive care beds, 69 day hospital beds, 16 operating rooms, outpatient units, a restaurant, and lecturing and teaching facilities. The number of floors varies from five to nine.

The project is implemented by SRV who will utilize methods tried and tested in cooperative projects, including Big Room sessions, workshops, and shared Last Planner schedules.

"The importance of good cooperation is emphasized in vast and challenging projects like hospitals. It has enabled us to raise our level of prefabrication, shorten the schedule, and reduce costs," says **Mirja Serenius**, Project Manager at SRV.

Serenius considers the main challenges of Meilahti to be location and constricted building site. It is also important to ensure that the construction work does not cause too much disturbance to the daily operations of the adjacent hospitals.

"Bridge Hospital is also a technically demanding site and will have, for example, intensive care facilities, operating rooms, and radiotherapy rooms," Serenius adds.

LARGE PROJECT ALSO FOR PEIKKO

If Bridge Hospital is a large project for the constructors, the same is true for Peikko who is one of the key partners. Peikko will deliver its DELTABEAM® Frame for Bridge Hospital consisting of DELTABEAM® Composite Beams, composite columns, and other steel structures of the frame. The delivery contains 12.5 kilometers (7.8 miles) of DELTABEAM® and 1,600 tons (1,800 US t) of other steel structures.

"For us this is the largest ever DELTABEAM® delivery for a single project," says **Tomi Tuukkanen**, Business Manager for DELTABEAM® at Peikko Finland.

According to Mirja Serenius, Peikko is a natural choice for the project because the cooperation has been going smoothly also in the soon to be completed new children's hospital in Helsinki, where Peikko delivered the DELTABEAM® Frame.

"Quick frame erection is of utmost importance in an urban project, which is the exact advantage of Peikko's DELTABEAM® Frame. DELTABEAM® also enables slim intermediate floors without high ledges, which take away space from technical installations. Hospital projects typically require a lot of space for technical installations, so this is really significant," Serenius adds.

HUS BRIDGE HOSPITAL HELSINKI

- **Owner: The Hospital District of Helsinki and Uusimaa HUS**
- **Developer: HUS-Kiinteistöt Oy**
- **Cost estimate: EUR 295 million**
- **Main contractor: SRV**
- **Principal architect and architectural designer: Consortium Team Integrated (AW2 Architects, Brunet Saunier Architectures S.A, B&M Architects Ltd, and Harris-Kjisik Architects.)**
- **Structural design: A-Insinöörit Oy**
- **HVAC and automation, electricity, and fixed medical equipment designer: Consulting group Granlund Ramboll.**
- **Size: gross area is 71,500 m² (84,000 sq yd) and net area is over 33,000 net m² (39,000 net sq yd).**
- **To be opened to patients: 2023**
- **Peikko delivers its DELTABEAM® Frame for the project consisting of DELTABEAM® Composite Beams, composite columns, and other steel structures of the frame. The delivery contains 12.5 kilometers (7.8 miles) of DELTABEAM® and 1,600 tons (1,800 US t) of other steel structures.**

Markbygden Wind Park, Piteå, Sweden

FOCUS FOR SUCCESS

After delivering the gravity foundations for the first 16 turbines of Markbygden Wind Park in Sweden, Peikko and the contractor NCC have formed a strategic partnership for the remaining 163 turbines.

From the foundation design to the delivery of the materials on site, Peikko's professional performance has impressed us.

Markbygden Wind Park, Piteå, Sweden

Peikko and NCC are laying the foundation of what is to become one of the largest wind parks in the world. Located in Piteå area, Northern Sweden, the Markbygden Wind Park will eventually have 1,100 turbines.

"From the foundation design to the delivery of the materials on site, Peikko's professional performance has impressed us. In the early stage of the project, several different designs were analyzed thoroughly and finally Peikko's solution was deemed the most cost-effective. The savings they were able to find by fine-tuning the design were amazing. It makes a big difference in such a large project," notes **Nils Pettersson**, Assisting Project Manager at NCC Sverige AB.

In addition to the first building phase, additional construction stages involving more than 400 foundations are planned to take place over the coming years. That is of course something both NCC and Peikko hope to be involved in.

"Markbygden is the world's largest wind park that is being built on gravity foundations. This will be a landmark project and we are glad to be a part of it," says **Kari Tuominen**, Business Director for Peikko's wind turbine foundations.

Markbygden Wind Park, Piteå, Sweden

THE FIFTH GENERATION OF GRAVITY FOUNDATION

Peikko's gravity and rock foundations rock the business.

"We designed our rock technology especially to meet Nordic needs. It has been a success with more than a 90 percent market share. Yet it's the gravity foundation that is dominant in most wind power projects," says Tuominen.

Having constantly pushed the envelope for speed and cost-efficiency, Peikko has now reached the fifth generation of their gravity foundation.

"Developed specifically for the Markbydgen park, our new design uses 60 to 80 m^3 (80 to 100 cu yd) less concrete. On top of that, it needs 6 tons (7 US tons) less reinforcing than the previous one. This is good news for the CO^2 emissions," Tuominen describes.

The fifth gravity foundation generation can be assembled in seven days.

"That's one full day faster than in the previous design, which was already very fast to install."

Another change is the foundation shape.

"We now have a straight slope, which is much easier and quicker to measure and finish," Tuominen points out.

According to Peikko's estimate, the savings from generation 4 to generation 5 is approximately EUR 20,000 per foundation.

Svåheia wind park, Rogaland area, Norway

WHAT DOES THE FUTURE HOLD?

The turbine technology will continue taking quantum leaps and the demands for the foundations are on the rise.

"The costs need to be brought down as the foundation price tag is a significant factor in overall cost-efficiency. Peikko can offer the right foundation solution regardless of the size of the project – whether small or huge. We have the resources to see the projects through efficiently," Tuominen emphasizes.

Peikko has invested heavily in production technology and both software and hardware automation. They aim to continue developing the whole foundation supply chain. This entails foundation design, manufacturing of components, on site processes and project management.

"We want to be strategic partners with turbine manufacturers, contractors and investors. Cost-efficiency, reliability and flexibility in all phases of the project is what they are looking for. If you would like to visit the Piteå project to see what it's all about, just call me. We'll make it happen," Kari Tuominen promises.

Tindafjellet Wind Park, Rogaland, Norway

PRODUCTION OF TENLOC® PANEL CONNECTOR HAS BEEN DISCONTINUED

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PARALLELOGRAM CLADDING CALLED FOR CONNECTION EXPERTISE

Located at Najmat Abu Dhabi in Reem Islands, the 30-storey-high Mismak Towers consist of twin residential and commercial towers on a shared 4-storey podium. But it's the parallelogram cladding that sets the towers apart from the rest.

While giving the buildings a dynamic look, the cladding was a precasting challenge.

"If done in a single piece, the cladding elements would have been difficult to handle and install. That's why we chose to do the elements in two pieces. This meant we needed to find a reliable connection method," explains **Giovanni Enecio**, Engineering Design Manager at Abu Dhabi Precast.

Peikko's wall shoes and rebar couplers made short work of the installation of the 3,000 cladding elements.

"In addition to being easy to fit into the precast molds, wall shoes and rebar couplers make installation easy and safe on site. Peikko's solutions also have all the necessary approvals. It simplifies the design process and saves a lot of time."

According to Enecio, Peikko's staff has been very helpful and supportive.

"This is not always the case with suppliers. That's one of the reasons this is already the third project we've done together. Peikko is a good connection choice for demanding precast elements," Enecio says.

PROJECT FACTS

- **Project size: 100,000 m² (120,000 sq yd)**
- **Floors: 30 (i.e. 4 Podiums + 26 Floors)**
- **Client/Owner: Mismak Properties**
- **Developer: REEM Developers**
- **Construction Company: SEIDCO General Contracting**
- **Architect: GA Architects & Engineers**
- **Precaster: Abu Dhabi Precast**
- **Delivery year: 2017**
- **Completion year: 2018**

A STELLAR COMBINATION OF ARCHITECTURE AND STRUCTURAL DESIGN

Located in Garching near Munich, Germany, the ESO Supernova planetarium reflects a fusion of two celestial bodies in a three-dimensional structure. A structural designer’s dream – or a nightmare?

Architects Bernhardt + Partner created an ambitious planetarium for the European Organization for Astronomical Research in the Southern Hemisphere. Known for their innovative approach, Bollinger + Grohmann Engineers stood up to the structural challenge.

"The project was stimulating, challenging, and extraordinary", says **Rainer Pum**, M.Sc. (Eng.) of Bollinger + Grohmann Engineers.

The building consists of two cores composed of an inner and outer shell, which are connected with a system of ramps. The floor spans between the cores like a 20 meter (66 ft) bridge.

"We used 50 centimeter (2 ft) slim floor slabs without ridges, beams or pre-tension", Rainer Pum describes the structural solution.

Also the inclined shells and cantilevered ramps were demanding to design.

"To form a load-bearing cantilever, we specified five MODIX® threaded couplers in one of the ramps."

For punching reinforcement, the contractor Grossmann Bau preferred Peikko's PSB® over the others.

CONSTANT DIALOGUE BETWEEN PARTIES

The building was developed in close cooperation between the architects and engineers during the planning phase. Precast structure was also considered. However, the precast elements would have ended up too large considering the architectonic, free-form shapes.

"To find the optimum structure, we worked together with architects on a single master file of the 3D model. This file was constantly passed back and forth between the architects and us, and the design always got better", Pum states.

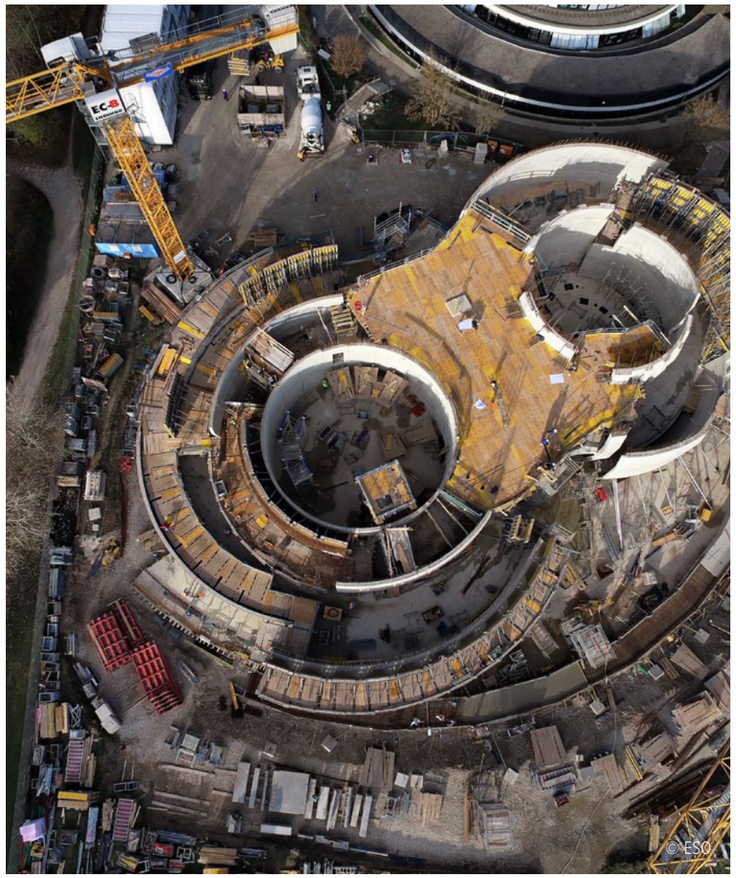
NO STRANGER TO PEIKKO

Bollinger + Grohmann is no stranger to Peikko's solutions.

"We frequently use bolted connections and the DELTABEAM® Slim Floor Structure. And there have been some pretty impressive projects with significant bending moments solved with column shoes", Rainer Pum concludes.

PROJECT FACTS

- **Project size: 4,980 m² (5,963 sq yd)**
- **Floors: 4**
- **Developer: ESO**
- **Contractor: Grossmann Bau**
- **Structural Designer: Bollinger + Grohmann**
- **Architect: Architekten Bernhardt + Partner**
- **Delivery year: 2015-2017**
- **Completion year: 2018**



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