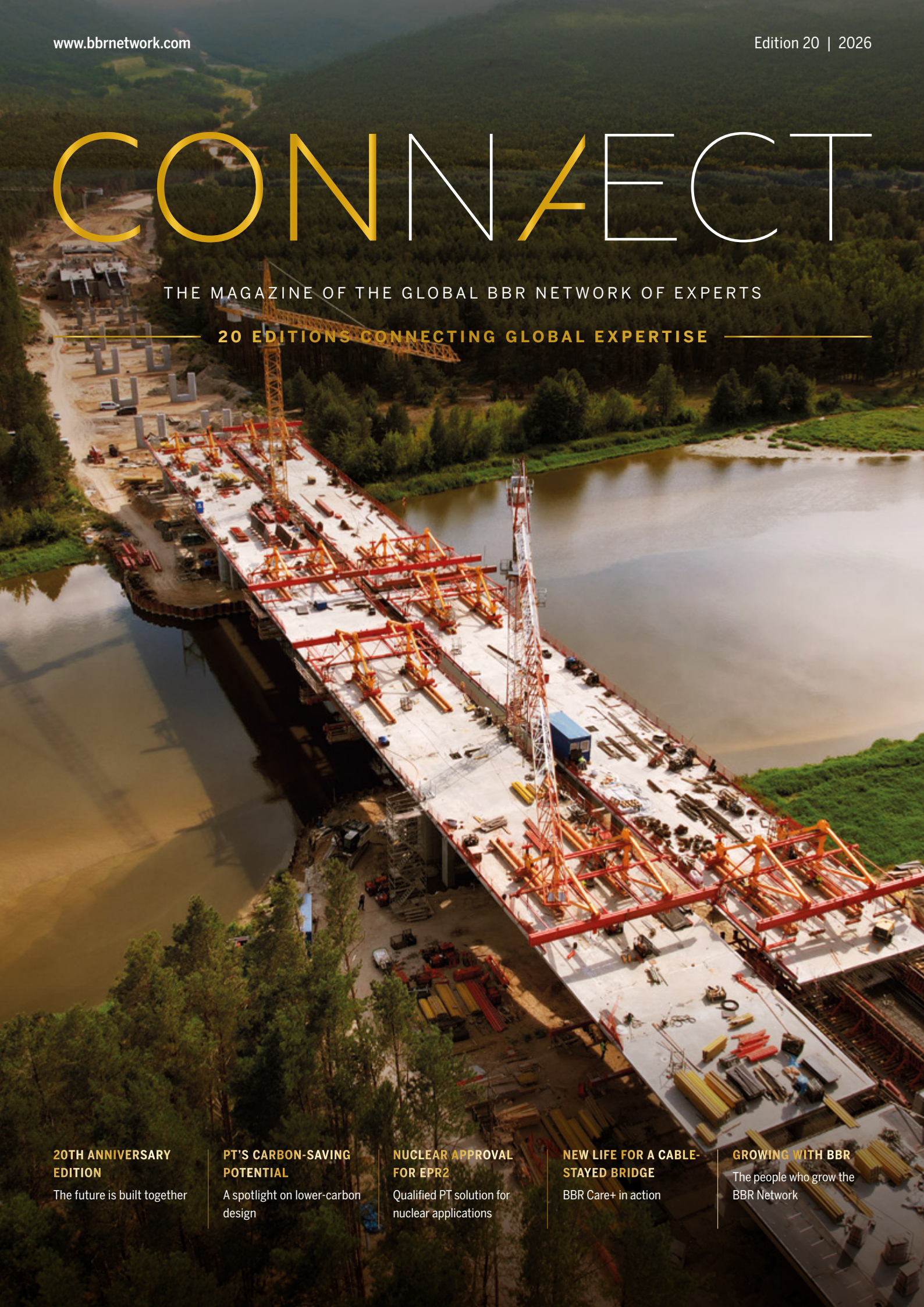
CONNECT

THE MAGAZINE OF THE GLOBAL BBR NETWORK OF EXPERTS

20 EDITIONS CONNECTING GLOBAL EXPERTISE



20TH ANNIVERSARY EDITION
The future is built together

PT'S CARBON-SAVING POTENTIAL
A spotlight on lower-carbon design

NUCLEAR APPROVAL FOR EPR2
Qualified PT solution for nuclear applications

NEW LIFE FOR A CABLE-STAYED BRIDGE
BBR Care+ in action

GROWING WITH BBR
The people who grow the BBR Network



BBR Network: Leaders in engineering the future.

Over 80 years of innovation, excellence, and global impact

Since 1944, the BBR Network has set the global benchmark for post-tensioning, stay cable systems, and specialized construction engineering.
Founded by Swiss pioneers Antonio Brandestini, Max Birkenmaier, and Mirko Robin Roš, BBR thrives today with the same spirit of innovation and technical mastery — proudly marking more than 80 years of engineering excellence.
From our Technical Headquarters and Business Development Center in Switzerland, we connect the world's most ambitious projects with outstanding technology and expertise.
BBR is not just about building structures — it is about building the future.

GLOBAL NETWORK, LOCAL POWER

Global know-how meets local strength.
The BBR Network empowers each Network Member with:

- Access to leading-edge technologies and systems
- Collaborative technical platforms and international alliances
- Knowledge-sharing that creates decisive local advantages

From tendering strategies to specialized deployments, BBR Network Members stay ahead — competing smarter and building better.

MORE THAN POST-TENSIONING: A WORLD OF EXPERTISE

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BBR Network Members offer a wide range of tailored construction services — beyond post-tensioning — adapted to local markets and client needs.
Respected in their regions, connected globally, our Network Members combine deep market understanding with global technical leadership.

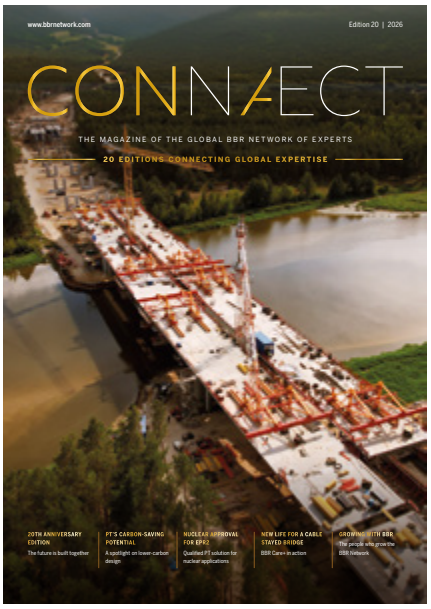
BBR TECHNOLOGIES: TRUSTED WORLDWIDE

Engineering solutions for critical infrastructure.
BBR technologies and systems underpin thousands of essential structures: bridges, towers, LNG tanks, dams, tunnels, wind farms, water infrastructure and nuclear facilities.
Our internationally renowned brands, such as CONA®, BBRV®, HiAm®, DINA®, CONNÆCT®, HiEx, SWIF and BBR E-Trace are synonymous with safety, reliability, and innovation in the built environment.

MORE THAN 80 YEARS OF ENGINEERING EXCELLENCE: BUILDING THE NEXT 80

At BBR, our legacy inspires our future.
With unrivaled professionalism, constant innovation, and a bold vision for tomorrow, the BBR Network is shaping the next generation of global infrastructure.

Partner with the best. Build with BBR.



Built together. Carried forward.

CONNÆCT has always been more than a magazine. It is one of the ways the BBR Network makes its knowledge visible, shares its progress, and strengthens the sense that local expertise becomes more powerful when it is connected. In this 20th edition, that feels especially important. We mark a milestone not as an exercise in nostalgia, but because history is important — and so are the people who carry it forward.

This edition reflects both legacy and momentum. Olivier Forget's Business Review sets out how **BBR Build+** and **BBR Care+** give clearer expression to the value the Network creates: lower carbon, longer asset life, better performance, greater economic benefit and stronger long-term value. Across the following pages, those ideas become visible and are brought to life in projects, technologies, and people.

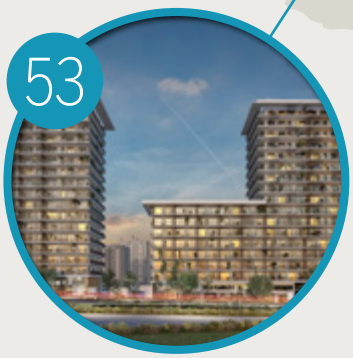
You will find bridges, buildings (MRR), geotechnical works, special applications, maintenance, repair and retrofitting and built health projects that show engineering in practice. You will also find work that points directly to the future: nuclear approval for EPR2 containment applications, advances in anchoring and 3D printing, and the growing role of building 'birth certificates' and digital asset intelligence. Alongside this, our 20th anniversary feature Growing with BBR reminds us that technical progress is always carried by people, judgment, and collaboration.

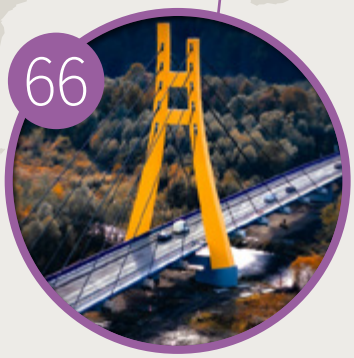
That is the spirit of this edition. It looks back with gratitude, but it looks forward with confidence. The future is not built by technology alone. It is built by people, shared standards, and the collective strength of a Global Network of Experts.

Marcel Poser
Chairman, BBR VT International

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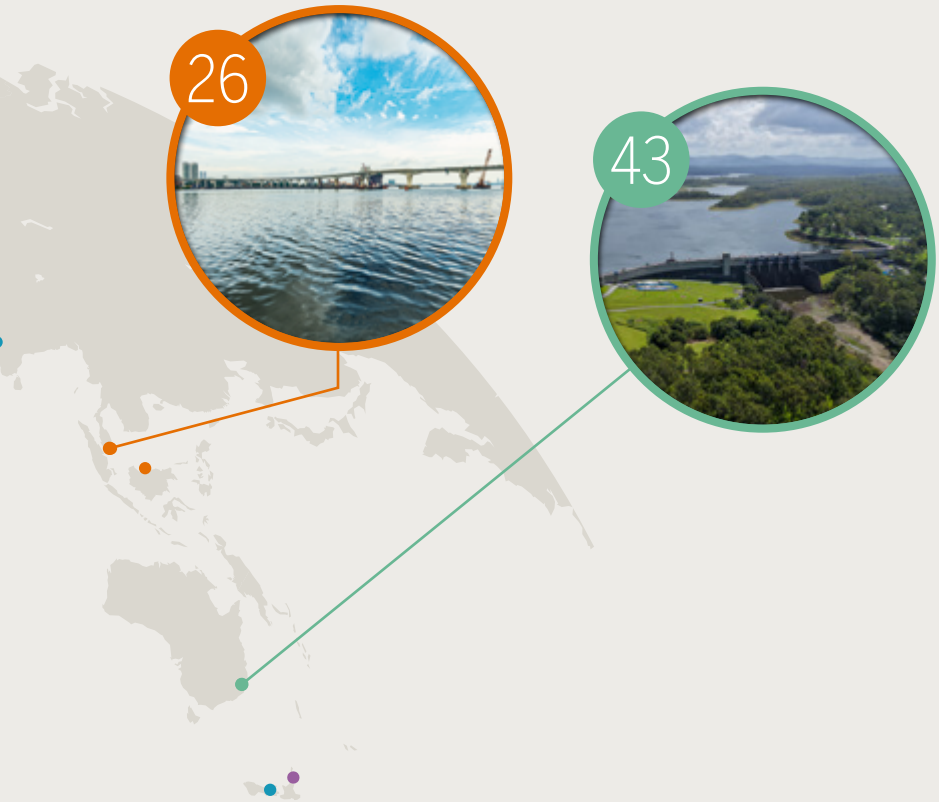
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The front cover image and hero image for PT and ILM bridging technologies deliver one complex river crossing hero on p30 are reproduced with kind permission of GDDKiA o/Bialystok

Images throughout Fura Bridge to restore resilience on the Simplon Pass route on p33-35 courtesy of dsp Ingenieure + Planer AG and Emch+Berger AG

Hero image for Ground anchors keep a complex energy and data project moving on p46 courtesy of FlexBase Group Switzerland.
https://flexbase.ch/

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Business Review
Building for today, caring for tomorrow - strategy from BBR VT International's CEO, Olivier Forget

Lower carbon, longer life, stronger value

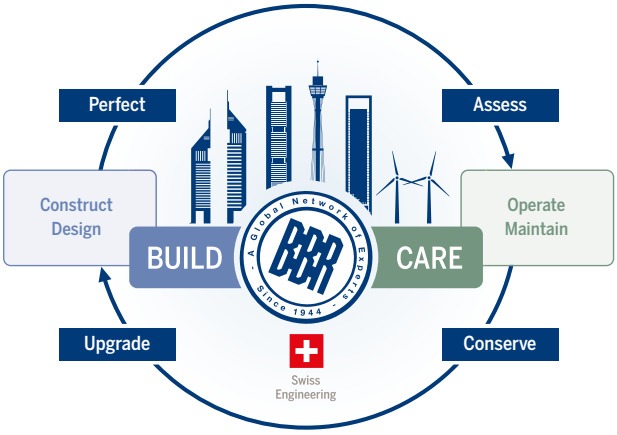
In a less predictable world, asset owners need structures that use less material, perform better, last longer, are commercially viable and adapt more easily over time. **BBR Build+** and **BBR Care+** give the BBR Network a clearer way to express how it delivers that value through engineering, technology, and locally rooted expertise from a global Network of Experts.

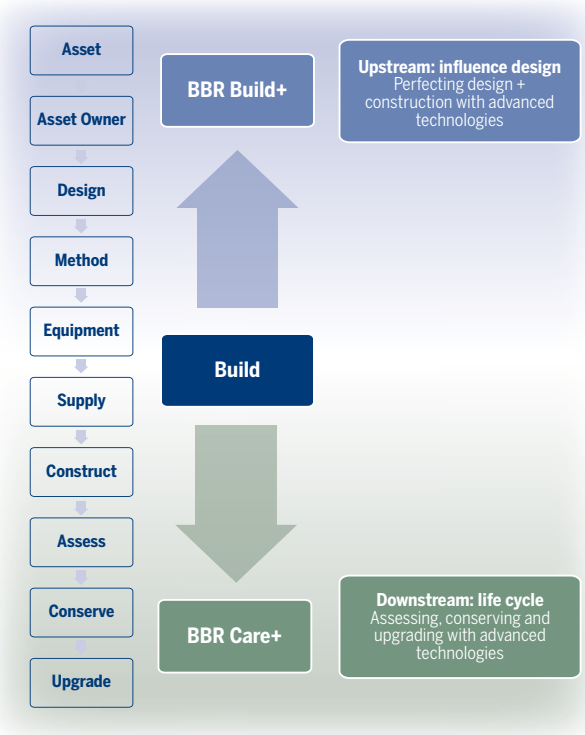
The construction industry is changing, under pressure from every direction. Geopolitical instability continues to disrupt supply chains and investment patterns. Climate change is raising expectations around resilience, durability, and decarbonization. Demographic growth, urbanization, and the energy and digital transitions are changing where and how infrastructure is needed. At the same time, the industry is being asked to build differently: with less carbon, less waste, greater efficiency, and better use of what already exists.

"Demographic growth, urbanization, energy and digital transitions are changing where and how infrastructure is needed."

Innovation, precision, and material optimization have defined BBR's contribution to construction for more than 80 years. Our core post-tensioning (PT) technologies have continued to evolve, the applications have expanded, and new strategies have been developed to answer new challenges, but the engineering logic remains familiar: help clients "do more with less", build better, and extend value over time.
What **BBR Build+** and **BBR Care+** now provide is an evolved, coherent framework for expressing that contribution in the market we operate in today.

Building for today, caring for tomorrow





1

How we "build +", creating value earlier

BBR Build+ brings together the technologies and expertise that create value early in a project, when design choices have the greatest influence on cost, embodied carbon, durability and design life, construction speed, and long-term performance. Across the BBR Network, that value is already visible in the kinds of projects featured in this and recent editions of CONNÆCT: essential infrastructure in Europe and Asia, post-tensioned mixed-use developments in Saudi Arabia, warehouse and industrial structures in New Zealand, assets exposed to corrosion, such as a floating pontoon with PT cables below water level, and technically demanding ground engineering and energy work in multiple markets.


2

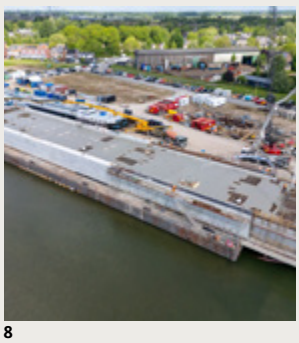

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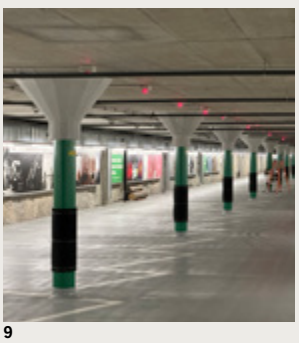

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PT is a "green technology"

The PT fundamentals underpinning our technology have been refined through decades of engineering applications. Compact BBR system design allows reduced spacing between tendons and to the edges, which in turn supports smaller cross-sections in structures such as bridges and silos, and thinner slabs and walls in buildings. Efficient anchorage design minimizes bursting reinforcement, reducing material use and easing rebar congestion on site. Early stressing at lower concrete strength shortens construction cycles and improves program efficiency. These are not abstract benefits. They affect real projects directly through lower quantities, faster delivery, better buildability, and more efficient structures.

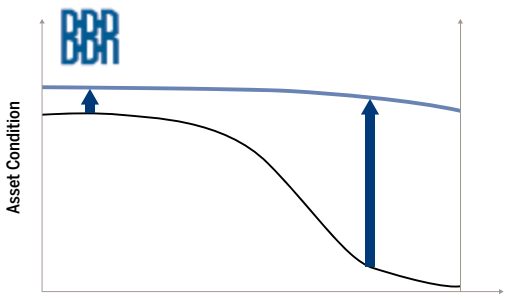


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The same applies in specialist applications. In geotechnical works, BBR strand ground anchors bring fully assessed system performance, with double corrosion protection along the full length or electrical isolation for more demanding environments. In stay cable applications, the active saddle helps optimize pylon cross-sections, reduce loads down to the foundations, and prevent fretting corrosion. In nuclear, BBR Network Member for France, ÆVIA has qualified the BBR VT CONA CMI N system for EPR2 nuclear containment structures, completing a full-scale testing program developed to meet EDF's demanding requirements for next-generation reactors.

By pioneering innovative solutions and setting higher standards, we strive to improve the construction industry, enhancing robustness, sustainability, and design longevity throughout the entire lifecycle—from design and construction to operation and maintenance.

Reducing amortization of embodied carbon by 75%



Standard RC Carbon Amortization = Embodied Carbon / Service Life

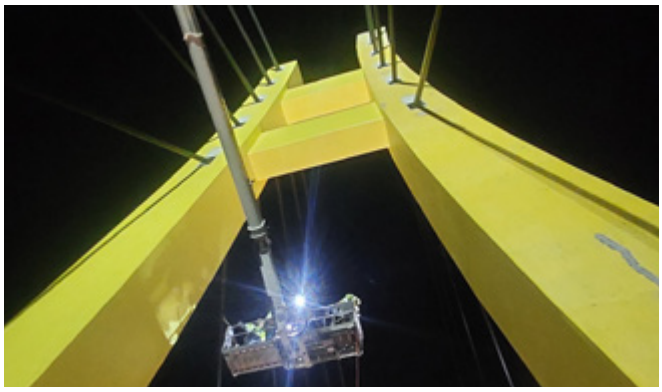
BBR Build+ Carbon Amortization = (Embodied Carbon x ½) / (Service Life x 2)

BBR Build+ Carbon Amortization = **¼ x Standard RC** Carbon Amortization

BBR Build+ for new construction:
Pushing for higher standards, extending design life, and integrating sustainability into construction from design to operation.

Extending life through care

If **BBR Build+** focuses on how value is created at the start of an asset's life, **BBR Care+** focuses on how that value is preserved and extended. That has become more important with every passing year. Asset owners are under increasing pressure to retain embedded value, avoid unnecessary demolition, reduce lifecycle cost, and keep essential structures in service for longer. Bridges, buildings, silos, energy assets, retaining structures, and transport infrastructure all need more from engineering than initial delivery alone. They need assessment, monitoring, repair, strengthening, adaptation, corrosion protection, and, where necessary, life extension.

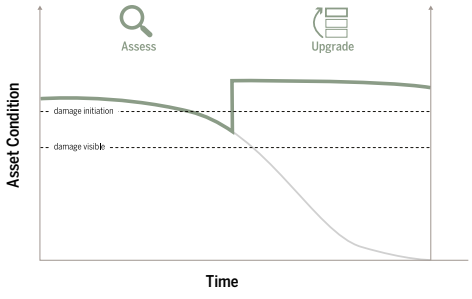


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In advanced maintenance, repair, and retrofit (MRR) work, active solutions can be combined with more traditional passive methods to strengthen, adapt, and preserve existing assets with greater precision. BBR has worked in this space for decades. **BBR Care+** builds on this legacy by bringing our expertise in asset care and active strengthening together under a clear, market-focused offering designed to address today's infrastructure challenges.

The sustainability logic follows naturally: when PT reduces concrete and reinforcing steel, embodied carbon falls. When structural design becomes leaner, the carbon burden of construction falls with it. When design life is extended and resilience improved, the embodied impact is amortized over a longer period of use. When an existing structure is strengthened and adapted instead of demolished and rebuilt, embedded value is preserved and significant new emissions are avoided. That is why sustainability at BBR begins with engineering. It is not a parallel conversation: engineering and sustainability are part of the same one.

Upgrading assets extends service life



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Perfect performance from the start with BBR Build+

CMI/E | Nuclear | HiAm | CMG



Preserve and extend life with BBR Care+

CMS | CMP | CMB | CMW



> “The BBR Network delivers what the market values: global expertise, commercial impact and local operational excellence.”

One Network. Local strength. Global resilience.

Across bridges, buildings, energy and ground engineering, every BBR Network Member brings a different mix of capabilities. Some lead in design and construction, others in maintenance, repair and retrofitting (MRR), while many span several sectors. Together, **BBR Build+** and **BBR Care+** turn this diversity into shared strength, local agility and collective resilience.

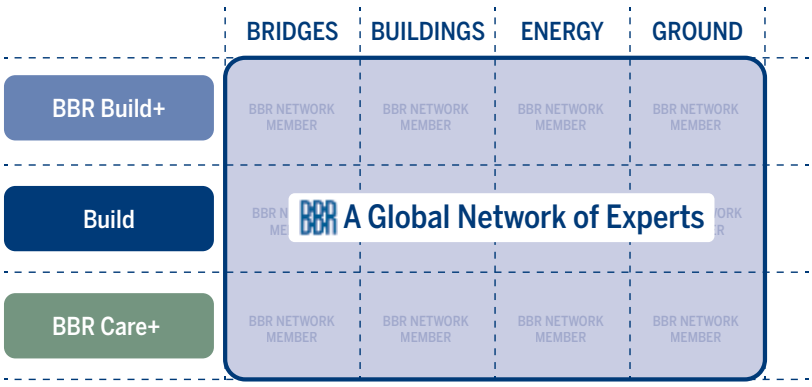
A Network for global and local resilience

In a world where unpredictability has become the norm, growing a diverse and coordinated network is one of the most effective responses. The BBR Network of specialized companies provides collective resilience through being locally rooted businesses with strong positions in their own markets and industry sectors, connected through shared engineering expertise, technology, knowledge, and values. Our federation brings together different markets, different capabilities, and different project environments that are mutually supportive and complementary. The BBR Network enables local teams to respond with speed and precision, while drawing on the wider experience of the Network Members. It creates room for entrepreneurship and local expertise, while reinforcing them through collaboration, shared development, and common technical standards. It also gives BBR breadth across the major transitions shaping the built environment: sustainable mobility, responsible urbanization, and the energy and digital transitions.

This is where the larger picture becomes clearer. **BBR Build+** and **BBR Care+** organize our position for the challenges of now and the future. They clarify how the Network creates value in terms the market can recognize immediately: lower carbon, longer life, better performance, and stronger value.

The strength of the BBR Network lies in a distinctive combination of local capability and global expertise. Network Members bring deep knowledge of their markets, strong client relationships, and proven execution capability. At the same time, they are supported by a global community of experts, technologies, and shared experience. That makes our resilience more than the resilience of individual companies. It is the collective resilience of the entire BBR Network.

Moving forward, staying agile, and never compromising on quality, this is how BBR continues to create lasting value for clients, communities, and the future.



Looking back, looking forward:
Reflections on 20 years of CONNÆCT



As we publish this 2026 edition of CONNÆCT, I want to begin with gratitude. BBR's history goes back to 1944, while CONNÆCT has been telling the story of the Network since 2007. With this 2026 issue, we mark its 20th edition. But history alone builds nothing. People do. So, my first words are simple: thank you. Thank you to BBR Management and our Network Members, and to the engineers, project leaders, factory teams, supply-chain specialists, quality teams, commercial teams and support functions who have built this company, this network and this culture over so many years. BBR itself says that people make the greatest impact on the success of the organization. I believe that is exactly right.

For me, CONNÆCT has always meant more than a magazine. Officially, it is the magazine of the Global BBR Network of Experts. In practice, it has helped build a shared culture across countries, markets and generations. It has connected people who may never work in the same office or even on the same continent, but who still belong to the same professional family. It has made projects visible, but it has also made experience travel. It has helped create that quiet but powerful feeling that BBR is not just a collection of local businesses, but a network with memory, standards, identity and shared ambition.

That is why this feels like the right moment not only to look back, but to look forward.

“History alone builds nothing. People do.”

We are living through a period in which AI dominates the language of business, technology and industry. Yet I believe much of that conversation still starts in the wrong place. It starts with applications, with visible tools, with the latest interface. Jensen Huang’s image of AI as a five-layer cake is more useful because it puts things back in their true order: energy, chips, infrastructure, models and applications. Before intelligence can scale, power must scale. Before software can dazzle, hardware must exist. Before a model can answer a question, someone must have built the plants, the factories, the datacenters, the cooling systems, the networks and the logistics that keep the whole system alive. AI may look intangible on the screen. In reality, it is profoundly physical.

And the point is visible everywhere. Whether one looks at Microsoft’s new AI datacenters, Apple’s server-based AI infrastructure, or the huge training systems being built by companies such as xAI, the message is the same: AI may appear on a screen, but it depends on energy, chips, datacenters, cooling, logistics, connectivity and physical infrastructure. The future does not arrive as software alone. It arrives as a system.

This is exactly why I believe BBR’s relevance will continue to grow in the years ahead. For more than 80 years, BBR has worked in the real structures and real methods that sit beneath grand technological narratives: post-tensioning, stay cables, ground engineering, energy applications, tanks and silos, maintenance, repair and retrofitting. The BBR Network’s public application portfolio spans bridges, buildings, stay cables, ground engineering, energy, tanks and silos, special applications, and MRR. That is not an adjacent story to the next industrial era. It is part of the base on which that era will stand.

For that reason, I do not believe BBR needs to imitate a software company. Our task is not to leave our roots behind. Our task is to understand how relevant those roots have become. The next 20 years will certainly require new infrastructure. But they will also require a much more intelligent way to preserve, strengthen, extend and repurpose what already exists. That, to me, is why the BBR strategy of **BBR Build+** and **BBR Care+** is so powerful.

The future will belong not only to those who can create the new, but also to those who can understand the value already embedded in the built world.

and give it a second, third or fourth life with intelligence and confidence.

There is another reason I believe BBR is well positioned for this era. In the age of generic AI, the scarce asset will not simply be more information. It will be trusted knowledge. In our world, that means references, methods, constructability, quality records, traceability, engineering judgment, repair histories and lessons learned under real conditions. BBR’s own history speaks of thousands of structures built using BBR technologies.

It also records that when the BBR Network was reshaped in 2006, that step was paired with the rollout of BBR E-Trace, a web- and cloud-based solution for sourcing, digital quality assurance, traceability and a knowledge database. Long before AI became fashionable, BBR had already understood something essential: knowledge becomes more valuable when it can move.



Marcel Poser around the time CONNÆCT was launched, as the reshaped BBR Network began defining a new shared identity.

Marcel Poser is Chairman of BBR and served as CEO from 2006 to 2011. From an apprenticeship in steel construction, his career grew from deep roots in construction engineering and real estate into leadership across governance, innovation, software, sensors, and AI-enabled technology, with work around the world. He studied engineering in Zurich and at the University of Texas at Austin, co-founded Screening Eagle Technologies, and in 2016 was recognized by UT Austin’s Cockrell School of Engineering as an Outstanding Young Engineering Graduate, the 30th honoree on the school’s published list.



Marcel Poser at the 2025 BBR Global Conference in Istanbul, ahead of CONNÆCT’s 20th edition.

This is why I prefer the language of collective intelligence to the tired language of humans versus machines. The MIT Center for Collective Intelligence asks how people and computers can be connected so that, collectively, they act more intelligently than any person, group or computer could alone. That, to me, is exactly the right question for engineering. Machines can search faster, structure faster, retrieve faster and compare faster. But engineering remains inseparable from context, consequence, accountability and judgment. The future will not be won by machine intelligence alone. Nor will it be won by human expertise pretending nothing has changed. It will be won by better combinations.

In many ways, the BBR Network itself is already a practical model of that principle. A local member brings relationships, local codes, market understanding, execution capability and entrepreneurial drive. The wider network adds specialist know-how, shared methods, support, standards and international experience. CONNÆCT has helped make that visible. BBR E-Trace has helped make parts of it operational. The next step, in my view, is clear: we should make that combined intelligence even more usable, even more accessible and even more present in daily work. That is also the right way to think about BBR Intelligence, our AI-powered toolset that goes beyond generic AI applications, supporting the strategy of network thinking and transversal assistance. Not as artificial intelligence in isolation, and not as a fashionable label.

BBR Intelligence is the digital expression of BBR's collective intelligence:

the experience of our people, the know-how of our network, the memory of our projects, the discipline of our methods, and the speed of AI brought together into one practical capability.

I would go even further. If CONNÆCT has been the printed voice of our collective intelligence, then BBR Intelligence should become its working form. It should not live outside the company as a concept, nor above the company as a slogan. It should live inside the company as a working capability. It should be present where decisions are prepared and where value is created: in engineering, tendering, quality, compliance, supply chain, technical support and business development. When we discuss an engineering option, it should help surface the right references. When we prepare a tender, it should help retrieve the right methods, precedents and arguments. When we face a compliance or quality question, it should help us move faster and with greater consistency. When we look across the network, it should help us connect people, projects and expertise with far less friction. In other words, it should strengthen how the network thinks together.

I also believe Swissness has renewed relevance in such a world. I do not mean that in a narrow political sense. I mean it in terms of signal, trust and discipline. Switzerland's official foreign-policy materials still describe neutrality as a cornerstone and a pillar of Swiss foreign policy. In a world of harder blocs, sharper rivalries and more fragmented supply chains, Swiss heritage still conveys something very valuable: steadiness, precision, credibility, discretion and independence of mind. BBR's Swiss roots and Swiss technical headquarters are therefore not decorative details. They strengthen the trust on which a global technical network depends.

So, my message in this 20th edition of CONNÆCT is both a thank you and a challenge.

Thank you for building a network in which standards matter.

Thank you for building a culture in which knowledge is shared rather than guarded.

Thank you for proving that technical quality, mutual support and long-term thinking still create real advantage.

And now the challenge is a serious one.

We should decide that BBR's next chapter will not be written only in terms of products, projects and geographies, but also in terms of intelligence. We should decide that the knowledge accumulated across decades of BBR projects, methods, references and people is too valuable to remain scattered, slow or underused. We should decide that BBR Intelligence is not an experiment on the margins, but a core capability of the Network. And we should decide that the real opportunity is not to chase generic AI, but to turn BBR's own distributed know-how into something more connected, more available and more powerful. That is what collective intelligence means in practice. It means making the best of the Network present at the moment of decision. It means making the experience of many accessible to each. It means ensuring that when one part of BBR learns, the whole of BBR becomes stronger.

That is why I am not merely optimistic. I am confident.

I am confident because the direction of travel is already visible.

The future is returning substance to the center of the story:

back to energy, back to infrastructure, back to materials, back to logistics, back to quality, back to lifecycle thinking, back to trust. The world will still need bridges and buildings. It will still need dams, energy facilities, LNG containment, wind, nuclear, geotechnical systems, strengthening and repair. It will still need people who know how to build and care for the physical world. And the more AI scales, the more visible that dependence will become.

So, if I had to leave one thought in this 2026 edition of CONNÆCT, it would be this:

The future will not be won by tech alone.

It will be won by those who know how to combine infrastructure, engineering, knowledge and intelligence into one stronger whole.

That has always been at the heart of BBR's strength.

And that is why I am confident that our next chapter can be one of the strongest we have ever written.

News in brief

Overview of events and achievements from around the BBR Network

BBR VT International and its Network Members continue to deliver projects, share expertise and contribute to technical dialogue at regional and international level. From major industry exhibitions and conferences to research partnerships and training initiatives, the following highlights provide a snapshot of recent activity. Together, they reflect the depth of knowledge, innovation and collaboration that underpin BBR VT International and the BBR Network's work across bridges, buildings, energy and ground engineering worldwide.



Xavier Mony, Managing Director, Eiffage Génie Civil (left) and Marcel Poser, Chairman of BBR VT International (right), mark the collaboration behind the qualification of the BBR VT CONA CMI N tendon system for EPR2 nuclear containment applications.

Qualification for EPR2 nuclear containment: Expanding post-tensioning options for nuclear asset owners

BBR VT International and ÆVIA, a subsidiary of Eiffage Génie Civil, have jointly qualified an advanced post-tensioning system (BBR VT CONA CMI N) specifically designed for the containment structures of EPR2 nuclear reactors. This system complies with the rigorous and evolving technical requirements of EDF (Électricité de France).

This collaborative research and development effort marks a significant step in the continuous development of PT solutions for next-generation nuclear infrastructure. It confirms the successful and long-term partnership between Eiffage Génie Civil and BBR VT International, fostered by their shared complementary technical expertise and know-how.

The qualification program, jointly conducted by BBR and ÆVIA, covered the entire process: from anchorage development to ducting, strand installation, stressing operations, and grouting, all under representative containment conditions. Full-scale, one-to-one mock-ups were used for comprehensive verification of performance, constructability, and quality control at every key stage of installation. The results confirmed the system's suitability and robustness for the extremely demanding applications of nuclear containment.

This represents a significant advancement for nuclear fleet developers worldwide, as it broadens the range of options available in the industry. With a system now ETA-approved (European Technical Assessment) and qualified against EDF's stringent requirements for EPR2 containment structures, the market gains a further proven option for high-performance nuclear post-tensioning.

Marcel Poser, Chairman of BBR VT International, emphasizes the importance of this achievement:

> "This nuclear qualification milestone shows that proven post-tensioning technology, backed by rigorous testing and strong industrial collaboration, meets the demands of the next generation of containment structures."

Xavier Mony, Managing Director, Eiffage Génie Civil underlines:

> "This achievement fully aligns with both companies' strategic decarbonization objectives, making a concrete contribution to low-carbon energy solutions."

Read more in the Technology section p85, where the full technical article explains the qualification program in detail.

Showcasing BBR expertise at Big 5 Construct Saudi

BBR VT International, together with BBR Network Member for Saudi Arabia and Bahrain, BBR Saudi Arabia, participated in Big 5 Construct Saudi, one of the region's leading construction events, bringing together more than 1,100 local and international suppliers. At the exhibition, BBR highlighted its expertise in PT solutions for buildings, energy, bridges and ground engineering, supporting the sector's ongoing decarbonization efforts.

Through its **BBR Build+** approach, promoting higher standards and more sustainable new construction, and **BBR Care+**, focused on upgrading and strengthening existing assets with active solutions, BBR reaffirmed its role as a trusted partner for durable, long-lasting infrastructure across the region.



The BBR Saudi Arabia team, along with Baran Kurutepe from BBR VT International and Gianni Moor from AQUILA, gets ready to receive visitors at one of the largest construction events in the region.

Completion of the Innosuisse-funded 3D project with Empa

BBR VT International continues to advance construction technology through applied research and industry collaboration.

At BBR's Technical Headquarters in Zurich, Switzerland, a three-year Innosuisse-funded collaboration with Swiss Federal Laboratory for Materials Science and Technology's (Empa) Structural Engineering Research Laboratory has been completed. The project brought together Swiss industry and academia to explore the use of digital design, concrete 3D printing, and post-tensioning in a single process.

The outcome is a 3D-printed stay-in-place post-tensioned formwork system, representing a step forward in combining emerging construction methods with established engineering expertise. This initiative demonstrates how BBR continues to link innovation with practical application, supporting more efficient and sustainable construction. Learn more in the Technology section p91.



Dr. Niels Pichler, R&D Engineer (right) in charge of the initiative at BBR VT International, and Dr. Mahsa Sakha (left), postdoctoral researcher at Empa.

Contributing to lifespan and sustainability at the fib Symposium 2025

BBR VT International participated in the *fib* Symposium 2025, held from 16 to 18 June in Antibes, France. The event brought together international experts to address the challenge of extending the lifespan of concrete structures while reducing environmental impact.

The symposium provided a forum for exchanging knowledge on durability, sustainability, innovative materials, prestressing and advanced construction methods. During the event, BBR presented its work on integrating PT systems into 3D-printed concrete elements, developed in collaboration with the Structural Engineering Research Lab at Empa. The presentation highlighted the potential of combining digital fabrication and established PT expertise to deliver more sustainable construction solutions.



Dr. Niels Pichler, R&D Engineer (left) and BBR VT International CEO Olivier Forget (right) on the booth ready for visitors.

Advancing post-tensioning expertise at IABSE Congress 2025

August 2025 saw BBR VT International participating in the IABSE Congress Ghent 2025, held from 27 to 29 August in the historic city of Ghent, Belgium. The congress brought together structural engineering professionals from around the world to explore "The Essence of Structural Engineering for Society". The theme closely aligns with BBR's commitment to engineering excellence across the full lifecycle of structures, from planning and design through to maintenance and long-term sustainability.

During the event, BBR shared its exhibition stand with AQUILA Built Health, reflecting their complementary expertise. Together, the joint team contributed four technical papers to the congress. This reinforced a shared commitment to innovation and knowledge exchange within the structural engineering community.



The joint BBR-AQUILA team engages with a visitor at the booth.

A highlight of the congress was a presentation by BBR VT International's Dr. Xiaomeng Wang, Senior Manager Knowhow & AI. He outlined the latest developments in the inspection and remediation of external PT systems. His presentation addressed key challenges in the field, including the selection of appropriate Non-Destructive Testing (NDT) methods and practical solutions for replacing tendons under load.

Through this contribution, BBR demonstrated how the collective expertise of its Members continues to inform best practice and advance technical standards in specialized areas of PT engineering.

Showcasing ground engineering expertise at Solscope

BBR VT International participated alongside its partner, SAMWOO Anchor Technology at Solscope 2025, held in Lyon, France, on 18 to 19 June. Recognized as a leading event for geotechnics, drilling and foundation engineering, Solscope provided a valuable platform to connect with industry professionals and exchange insights on innovative ground engineering solutions.

During the exhibition, BBR showcased its BBR VT CONA CMG Strand Ground Anchors system. The system includes the first range of cable ground anchors with a certified European Technical Assessment (ETA). Issued in accordance with the European Organisation for Technical Assessment (EOTA), the certification confirms the system's performance and long-term durability. It represents an important milestone for demanding retaining and anchoring applications.



BBR VT International CEO Olivier Forget in discussion with an attendee during Solscope in Lyon.

Strengthening expertise through BBR Training in Istanbul

In early November 2025, immediately following the BBR Global Conference, a BBR VT International training session was held in Istanbul at the same venue. Project managers from across the BBR Network came together for a focused two-day program dedicated to knowledge sharing, technical excellence and collaboration.

Hosted at the Çırağan Palace Kempinski, the BBR training combined in-depth technical sessions with open discussion. Participants received a comprehensive overview of the BBR portfolio and strategic direction. The first day focused on engineering excellence across bridges, buildings, retrofitting and geotechnical works. Discussions also addressed diversification and sustainability. There was a focus on how to deliver longer-lasting, higher-value structures with reduced carbon footprints, reflecting BBR's commitment to responsible and future-oriented construction practices.

The second day complemented the classroom sessions with a site visit to the Sular Valley Viaduct site (see p16, and CONNÆCT 2025, p26-27).

The Istanbul BBR training once again demonstrated the value of face-to-face training within the BBR Network. It brought together expertise, experience and strategic vision to support excellence in project delivery worldwide.



From left to right: De Vries' Robert Jansen, BBR Adria's Petar Džajić and Predrag Presečki participating in the BBR training

Engineering excellence in Istanbul: Kappa's record-breaking viaduct

During the BBR Global Conference 2025 and associated training program, participants visited a construction site delivered by BBR Network Member for Türkiye, Kappa Kalıp ve İnşaat Taahhüt A.Ş. The visit provided a close look at engineering expertise in action.

The Sular Valley Viaduct (see CONNÆCT 2025, p26-27) represents a significant milestone in bridge engineering in Türkiye. Kappa developed a complete alternative design for the structure, covering foundations, piers and deck. The project sets a new world record with a 90m MSS span combined with an exceptional 29m deck width.

Through careful optimization of each structural element, the Kappa team achieved 50% reductions in concrete and steel reinforcement. The design also delivered approximately 21,000t of CO_2 savings, establishing a new benchmark in sustainable large-span bridge construction.

The viaduct demonstrates how innovative design, precise execution and a strong focus on sustainability can expand the capabilities of movable scaffolding systems (MSS) construction and PT engineering.





From left to right: BBR Polska's Radosław Rzeznik, Marek Strzoda and Marcin Remiszewski



BBR Global Conference and BBR Training delegates visiting the Sular Valley Viaduct construction site.

Conference Notes
BBR Global Conference, Istanbul, Türkiye

BBR Global Conference 2025: innovation and connection in Istanbul

In early November, we gathered in Istanbul for the BBR Global Conference 2025. Hosted at the Çırağan Palace Kempinski overlooking the Bosphorus, the event brought together Network Members, partners and industry leaders for several days of technical exchange, strategic discussion and renewed connection across the BBR Network.







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Formal program

Nearly 40 speakers from the BBR Network and partner organizations contributed to a comprehensive program attended by more than 100 engineers and industry professionals from around the world. Across the sessions, we explored several key themes shaping our work. Technological excellence remained central, with updates on **BBR Build+** and **BBR Care+**, a focus on maintenance, repair and retrofit (MRR) and advanced post-tensioning (PT) applications in bridges, buildings and infrastructure. Presentations highlighted how Network Members continue to deliver complex projects while raising technical standards in their respective markets.

Lifecycle thinking, sustainability and value creation took center stage, with discussions on low-carbon construction, circular engineering and digital asset management to extend service life and reduce environmental impact. Advances in artificial intelligence (AI), data, inspection and predictive maintenance further highlighted how digital innovation is strengthening asset management across the Network.

One day was dedicated exclusively to the BBR Network, with Members presenting recent projects and outlining their 2026 priorities, highlighting the Network's regional diversity and entrepreneurial strength. Updates from BBR VT International on technology developments and supply chain strategy further reinforced the foundations for long-term resilience.

A subsequent program, co-hosted with AQUILA Built Health, Screening Eagle Dreamlab and Proceq, focused on collaboration in inspection, monitoring, material testing and infrastructure solutions. The discussions underscored how partnerships within and beyond the BBR Network continue to drive innovation in construction technology and asset management.

Finally, a panel discussion brought together the CEOs of BBR VT International, AQUILA Built Health and Screening Eagle Dreamlab to offer complementary perspectives from across the value chain on inspection, structural assessments and engineering solutions for the built world.

Social program

Beyond the technical sessions, the conference created space to connect in a more informal setting. The opening evening set the tone with a guided city and Basilica Cistern visit, followed by traditional cuisine and live performances. A Bosphorus cruise offered a different perspective of Istanbul before dinner ashore, while the final evening near Ortaköy Square provided a fitting moment to reflect on several days of intensive discussion and shared experiences.

These moments of downtime are an important complement to the demanding technical program. They allow Network Members and partners to deepen connections that support collaboration throughout the year.

Gala Dinner and charity initiative

The Gala Dinner took place in the Enderun Ballroom of the Çırağan Palace Kempinski. The evening provided an opportunity to recognize excellence through the announcement of the BBR Award winners and to come together in support of charitable initiatives.

Thanks to the generosity of donors, and with the BBR Network matching every contribution, a total of USD 19,200 was raised. In Nairobi, Kenya, USD 13,000 will support the completion of two classrooms for the Children's Garden Home orphanage. In Moshi, Tanzania, USD 6,200 will assist the Build a Roof project, helping families complete homes and improve access to education.

The evening served as a reminder that our community extends beyond engineering projects. When we come together, we strengthen not only our professional Network but also our ability to contribute positively to the communities around us.



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1 This year's BBR Global Conference brought together over 100 professionals in construction, asset management, real estate and finance from 40 countries.
2 Left to right: BBR VT International's Dr. Haifeng Fan, Stahlton's Mark Gospić and BBR Saudi Arabia's Abdulrahman ElFateh exchanging ideas during coffee break.
3 BBR Global Conference delegates taking in the beauty of the Bosphorus by night.
4 Conference participants enjoy traditional cuisine in spectacular surroundings at the Sarnic restaurant.
5 BBR VT International CEO Olivier Forget and Head of Marketing & Communications Pascale Assémat announce the total raised for this year's charities.
6 The Gala Dinner creates a relaxed atmosphere to deepen professional ties and renew personal friendships.



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BBR Awards 2025 Recognizing excellence by BBR Network Members

Awards for **Excellence**

Each year, the BBR Awards recognize and celebrate achievements by BBR Network Members across projects, innovation, collaboration, and leadership. They reflect technical rigor, strategic thinking, and measurable impact in delivering stronger, more sustainable infrastructure worldwide.

The 2025 awards highlight excellence across the full lifecycle of construction, from record-setting new builds to maintenance, repair, and retrofitting (MRR). They celebrate diversification, knowledge-sharing, and long-term commitment, demonstrating how the BBR Network continues to evolve, strengthen partnerships, and deliver value for asset owners and communities alike.

2025 BBR Award Winners

BBR Network
Project of the Year Award

Winner: Kappa
Title: The Sular Valley Viaduct, Istanbul, Türkiye

With the Sular Valley Viaduct, Kappa delivered a complete alternative bridge design from foundations to deck. The project set a world record with a 90m MSS span and 29m deck width, achieving 50% material reduction and 21,000t of CO_2 savings.
CONNÆCT 2025 p26-27.

BBR CONNÆCT
Best Article Award

Winner: FCC Construcción
Title: Widening horizons on the A9 motorway

The A9 Motorway and Schiphol Bridge, Amsterdam, The Netherlands.
Two bridge decks of 86m, weighing 1,600t and 3,000t, were lowered 1.5m into position. The project demonstrated precision, engineering accuracy and teamwork in delivering complex infrastructure within a constrained environment.
Read it in CONNÆCT 2025 p34-36.

BBR CONNÆCT
Best Photography Award

Winner: Kappa
Title: The Sular Valley Viaduct, Istanbul, Türkiye

Capturing engineering and artistry in perfect harmony, this striking night image of the Sular Valley Viaduct reveals the scale and precision of modern bridge construction. The photograph transforms infrastructure into visual poetry, reflecting both technical excellence and human achievement.
See the pictures in CONNÆCT 2025 p26-27.

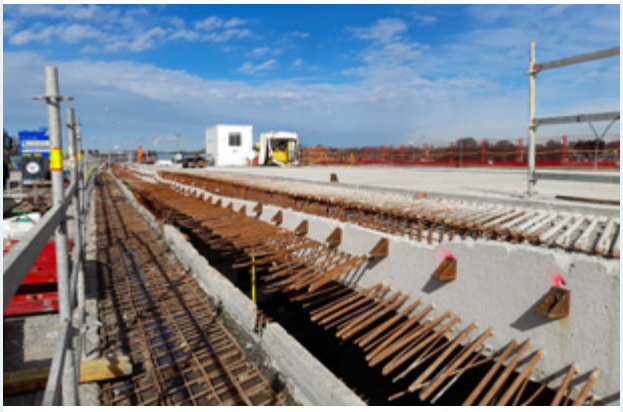
BBR Network Project of the Year Award 2025





The team from Kappa collects its award for BBR Network Project of the Year, the Sular Valley Viaduct. Left to right: BBR VT International's Olivier Forget, Kappa's Yağız Ardal, Kadir Serden, Murat Kutay, Okan Inalpolat, Efe Bayram, with two more BBR VT International colleagues Baran Kurutepe and Pascale Assémat

BBR CONNÆCT Best Article Award





FCC Construcción's Juan Manuel Linero Moya (center left) accepts the award from BBR VT International's Marco Zucconi (center right), Pascale Assémat (right) and AQUILA's Gianni Moor (left).

BBR CONNÆCT Best Photography Award





Left to right: AQUILA's Gianni Moor, Kappa's Kadir Serden and Murat Kutay, with BBR VT International's Pascale Assémat and Marco Zucconi.

BBR Network Special Awards

Bridge Champion 2025



Left to right: AQUILA's Gianni Moor, Martin Jr. L. Furigay, Joel C. Funtanilla and Rey C. D. Singh, BBR Philippines Corporation, BBR VT International's Marco Zucconi and Pascale Assémat.

BBR Construction Systems (M) Sdn Bhd
Sungai Bintangor Bridge, Kuching, Malaysia

For delivering one of Southeast Asia's most complex stay cable geometries with precision, discipline, and engineering control.

Working within tight spatial constraints and during a period of global supply chain disruption, the team demonstrated exceptional adaptability and technical coordination. The project required rigorous planning, careful sequencing, and precise execution to achieve the demanding structural geometry.

Through optimized design and material efficiency, the structure reduced overall material consumption and associated carbon emissions compared to conventional solutions. The result is a landmark bridge that combines architectural ambition with measurable sustainability performance. This project sets a benchmark for cable-stayed bridge delivery in the region and reflects the technical strength of the BBR Network in complex infrastructure.

Sustainability Champion 2025



Left to right: BBR Saudi Arabia's Mohamed Zaki, Mahmoud Taj Eldin, Ahmad Fawzy, Abdulrahman ElFateh and Nghaimish Alharbi, with BBR VT International's Olivier Forget and Baran Kurutepe.

BBR Saudi Arabia
BBR Build+ and BBR Care+ expansion

For embedding **BBR Build+** and **BBR Care+** as an operating model and delivering measurable carbon and material savings at scale.

In a record year, BBR Saudi Arabia delivered more than 1.4 million m² of PT slabs.

Through early-stage involvement and alternative design proposals, the team reduced approximately 80,000m³ of concrete and 6,800t of steel reinforcement compared to conventional reinforced concrete systems. This optimization resulted in an estimated reduction of more than 20,000t of CO_2 emissions, demonstrating how upstream technical engagement directly supports asset owner sustainability objectives.

At the same time, the expansion of maintenance, repair, and retrofitting capabilities enabled the upgrade of more than 30 existing structures. By strengthening and adapting assets rather than demolishing and rebuilding, BBR Saudi Arabia extended asset life and avoided significant embodied carbon. This award recognizes the strategic delivery of sustainability through projects, not statements.

Building Champion 2025



Left to right: AQUILA's Gianni Moor, BBR Adria's Želimir Bodiroga and Predrag Presečki, with BBR VT International's Pascale Assémat and Marco Zucconi.

BBR Adria d.o.o.
Airport City East Gate Business Complex, Business Tower No.1, Belgrade, Serbia

For delivering high-performance post-tensioned structural solutions that combine sustainability, flexibility, and commercial value.

More than 25,000m² of office space was constructed using PT slabs ranging from 22–30cm and beams up to 80cm in depth.

The optimized structural design reduced material use, supported lower embodied carbon, and enabled flexible floor layouts suited to modern workspace demands.

The project achieved LEED Gold certification, reflecting its environmental performance and long-term asset value. This development demonstrates how intelligent structural design contributes directly to sustainability targets while enhancing functionality and lifecycle performance.

Spirit Award 2025



The teams from BECOMAR – BBR Maroc, De Vries, Contech and Stahlton celebrating their joint status as Spirit Award 2025 winners, framed by their BBR VT International colleagues. Left to right: BBR VT International's Olivier Forget, BECOMAR - BBR Maroc's Adil Lakhbizi, Khalid Haddioui and Oussama Kandri, De Vries' Nihm Makkinga, Robert Jansen, Paul Posthoorn and Jorrit Smeets, Stahlton's Mark Gospic, BBR VT International's Baran Kurutepe, and finally Contech's Derek Bilby and Tony Boustred, with BBR VT International's Pascale Assémat.

BECOMAR – BBR Maroc

For expanding from post-tensioned buildings into bridges, structural inspection, and maintenance, repair, and retrofitting.

Building on established PT expertise, BECOMAR – BBR Maroc is applying BBR technologies across new sectors, strengthening regional capability and reinforcing the BBR Network's lifecycle approach to sustainable infrastructure.

De Vries

For extending post-tensioning expertise into floating infrastructure through the Good Hotel pontoon in Amsterdam. (see p36 for the full story)

Traditionally active in buildings and bridges, De Vries established a new business line by combining proven BBR technology with marine innovation, demonstrating practical diversification within the BBR Network.

Contech

For leading development and implementation of maintenance, repair, and retrofitting solutions within the BBR Network.

Drawing on strong rehabilitation expertise, Contech has supported testing, refinement, and field application of new MRR technologies, strengthening collaboration and accelerating lifecycle-focused solutions across the Network.

Stahlton AG

For advancing post-tensioning innovation and strengthening the strategic role of maintenance, repair, and retrofitting.

Through collaboration and technical development in Switzerland, Stahlton AG supports new solution launch and product evolution, reinforcing durability, lifecycle performance, and long-term value across the BBR Network.

MRR Champion 2025



Left to right: AQUILA's Gianni Moor, BBR Polska's Pawel Surman and Tomasz Jendernal, BBR VT International's Pascale Assémat and Marco Zucconi.

BBR Polska Sp. z o.o.
Vistula River Bridge tendon replacement, Poland

For delivering a complex tendon replacement using BBR VT CONA CMM monostrand technology and setting a new benchmark for bridge rehabilitation in Poland.

Following electrochemical corrosion and tendon failure on a four-span bridge, the team implemented a long-term solution featuring individually encapsulated strands, sealed ducts, and integrated load monitoring. Despite confined conditions and tendons not designed for exchange, replacement was completed in three weeks, minimizing disruption.

This first application of the system in Poland demonstrates how advanced MRR solutions extend asset life and strengthen infrastructure resilience.

Outstanding Achievement Award 2025

ÆVIA – Eiffage

For achieving EDF nuclear qualification following three years of sustained investment, technical development, and capability building.

Overcoming complex engineering, resource, and full-scale validation challenges, ÆVIA – Eiffage has reached a significant milestone that strengthens its market position and expands opportunities in the nuclear sector. Asset owners now benefit from greater choice in PT expertise and system solutions from design through operation.



Left to right: BBR VT International's Olivier Forget, ÆVIA's Jérémie Baumgartner, with BBR VT International's Baran Kurutepe and Pascale Assémat.



Left to right: BBR VT International's Marcel Poser, Andrew Tan of BBR Construction Systems Singapore and Baran Kurutepe, BBR VT International.

Lifetime Achievement Award

Mr. Andrew Tan
BBR Construction Systems Singapore

For more than 30 years of leadership, innovation, and mentorship across Asia.

Andrew Tan has played a pivotal role in advancing BBR technology throughout the region, guiding teams, developing expertise, and strengthening client relationships. His long-term commitment and technical vision have contributed significantly to the growth and legacy of the BBR Network in Asia.

IN THE SPOTLIGHT

A spotlight on PT's carbon-saving potential

BBR Network Member for Saudi Arabia and Bahrain, BBR Saudi Arabia, demonstrates, with its long-established value engineering approach, how early structural optimization with post-tensioning (PT) can reduce material demand and lower embodied carbon without compromising performance.



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At a prestigious leisure and retail development in Madinah, BBR Saudi Arabia replaced a conventional reinforced concrete slab design with a PT solution that reduced material use. This structural optimization led to a measurable sustainability gain, reducing concrete use by 3,259m³ and delivering a net reinforcement steel saving of 2,714t.

That materials reduction led directly to lower embodied carbon. As shown in the tables below, the study estimates savings of 978tCO_2 from concrete and 3,650tCO_2 from structural steel, giving a total reduction of 4,627tCO_2e. Overall, the structural system's embodied carbon fell from approximately 28,982tCO_2e to approximately 24,355tCO_2e, a reduction of around 16%.

Material quantities comparison

Structural Component	RC Design	PT Design	Reduction
Foundation Concrete	26,587m³	25,828m³	759m³
Foundation Reinforcement	2,250t	2,066t	184t
Slab Concrete	36,000m³	33,500m³	2,500m³
Slab Reinforcement	5,040t	2,010t	3,030t
PT Strand	–	500t	-500t

Estimated Carbon Reduction

Material	Quantity	CO_2 emissions factor	Carbon effect
Concrete	-3,259m³	~0.30 tCO_2/m³	**-978tCO_2e**
Reinforcing steel	-3,214t	~1.40 tCO_2/t	**-4,500tCO_2e**
PT strand (added)	+500t	~1.70 tCO_2/t	**+850tCO_2e**
Total estimated reduction			**≈ 4,627tCO_2e**

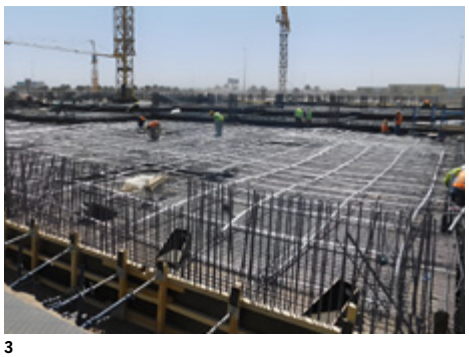
Total material savings

Material	Quantity reduction	Reduction %
Concrete	3,259m³	5.21
Structural Steel	2,714t	37.23

Embodied Carbon Comparison

Structural system	Estimated carbon
Conventional RC design	≈ 28,982tCO_2e
PT design	≈ 24,355tCO_2e
Carbon reduction	≈ 4,627tCO_2e (≈16%)

Embodied carbon was estimated using a life cycle assessment approach aligned with ISO 14040 and ISO 14044, applying standard principles for goal and scope definition, inventory analysis, and impact assessment. Product carbon emission factors were selected in line with ISO 14067, using representative cradle-to-gate values for concrete, reinforcing steel, and PT strand. Where available, emission data should be based on Environmental Product Declarations prepared in accordance with EN 15804, or on equivalent verified background datasets. The comparison therefore reflects the difference in embodied carbon between the conventional reinforced concrete option and the PT alternative on a like-for-like material quantity basis.



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1 Architectural visualization of Wasat Madinah Mall, Madinah, Saudi Arabia. The project's scale helps show that structural optimization impacts positively on both material use and embodied carbon.
2 Early construction view of the mall development in Madinah. A project of this size offered significant scope to reduce concrete and steel through a more efficient PT slab design.
3 Slab construction in progress at Wasat Madinah Mall. The PT redesign reduced slab concrete and reinforcement quantities while maintaining structural performance and serviceability.



BBR Construction Systems Pte Ltd
Malaysia to Singapore
BBR VT CONA CMI internal tendons for rail link

Unlocking economic potential for the long term

Set to open in late 2026, the Johor Bahru–Singapore Rapid Transit System (RTS) Link promises to usher in a new era of cross-border travel. Connecting Johor Bahru, Malaysia's second-largest city, to the residential district of Woodlands in northern Singapore via the Strait of Johor, smoother travel will strengthen economic ties between the two countries.

BBR Construction Systems Pte Ltd is using pre-cast post-tensioning (PT) kits for constructing the elevated viaduct of the RTS Link. This approach improves productivity by streamlining the stressing process and guaranteeing alignment of the segments along the route.



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The second rail connection of the RTS Link will run alongside the existing Johor–Singapore Causeway, a 1km-long bridge supporting road traffic and trains. It is one of the busiest land border crossings in the region with between 250,000 and 400,000 commuters currently enduring the daily gridlock.

Once built, the RTS Link will span 4km, connecting Bukit Chagar RTS station in Johor Bahru to Woodlands North MRT station in Singapore, where it will connect with the Thomson-East Coast Line (TEL). With the capacity to transport 10,000 passengers per hour in each direction, the RTS Link has the potential to transform the lives of commuters who have struggled with Causeway congestion.

The BBR Network Member for Singapore is using BBR VT CONA CMI internal solutions to construct the elevated viaducts. These viaducts will form the backbone of the new rail system, ensuring structural durability and high performance.

During the precast phase, PT kits were installed within the precast segments, streamlining the stressing process and guaranteeing alignment. From the integration of PT components to the careful stressing of viaduct tendons, these efforts are shaping a rail line that will serve commuters for many years into the future.



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Extra strength tendon stressing

A key project milestone is the tendon stressing, which ensures the structural integrity of the elevated rail sections so they can support the weight and vibrations of high-speed trains.

Beyond the immediate benefit for commuters, the RTS Link embodies a broader vision for regional progress. By improving connectivity, it will stimulate economic growth and trade and improve the quality of life for communities on both sides of the border. At the time of writing, the RTS Link project is running to schedule.

1 A map illustrating the route of the RTS Link, connecting Johor Bahru, Malaysia, to Woodlands, Singapore.
2 The RTS Link, under construction beside the Johor–Singapore Causeway, will connect Johor Bahru to Woodlands by late 2026.
3 Maneuvering of a hydraulic jack with a 1,000t capacity to stress a 37-strand tendon.
4 A pre-cast segment being carefully prepared for installation as part of the RTS Link's construction.

TEAM & TECHNOLOGY

Owner/developer – Land Transport Authority
Main contractor – China Communications Construction Company Limited (Singapore Branch)
Technology – BBR VT CONA CMI internal
BBR Network Member – BBR Construction Systems Pte Ltd



BBR Construction Systems Pte Ltd
Singapore
BBR VT CONA CMI internal tendons for rail network

Reducing congestion and noise to improve lives

The Jurong Region Line (JRL) is a much-anticipated addition to Singapore's Mass Rapid Transit (MRT) network that will improve connectivity in the country's West Region and bring 60,000 households within a 10-minute walk of a rail station.

Designed to support Singapore's 'car-lite' initiative, the JRL project aligns with Singapore's sustainability goals. Once open, it will reduce 20,000 daily car trips and ease traffic congestion. The BBR Network Member for Singapore, BBR Construction Systems Pte Ltd, is playing a key role in bringing it to life.



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The construction of the JRL presented challenges such as working within densely populated urban areas and industrial zones with complex utility networks and heavy traffic. Innovative engineering was required to allow the team to navigate narrow spaces, minimize noise disruption, and maintain accessibility for local businesses and residents.

BBR Construction Systems was awarded Contract J111, which includes the construction of Tukang MRT Station and associated viaducts, and the 'T' crosshead beams that support the station's elevated concourse and entire station above. To overcome site-specific constraints, the team deployed advanced construction methods to ensure precision and structural integrity.

Overcoming logistical complexities means staying on schedule

Work commenced in phases due to the distinct challenges in each zone. The pre-cast yard operations began in September 2023, followed by in situ portal beam construction in December. By June 2024, *in situ* form traveler and pre-cast segment launching had started, while Tukang Station work commenced in September 2024.

One of the most demanding sections was the in situ form traveler zone, originally a public park. The viaduct crosses a large drainage canal, adding complexity to the construction process. Meanwhile, the pre-cast segment launching and station works required significant preparatory efforts, as at-grade road diversions had to be completed first to create enough space for the overhead structures.

Delivering long-term safety and performance

To further minimize disruption for local communities, pre-cast segmental construction streamlined the assembly of viaduct segments, reducing on-site activity. For longer spans, the balanced cantilever method enabled construction in the middle of crossings and ensured minimal impact on traffic and waterways.

In spatially constrained areas, false cantilever construction allowed for flexible segment placement. Meanwhile, the in situ form traveler facilitated custom viaduct sections in tight or irregular spaces and the in situ crosshead beam construction delivered robust support for the viaduct's superstructure, ensuring stability and long-term durability. As a result, the viaducts can withstand high traffic loads and environmental stresses, delivering long-term performance and safety.

The team's proactive, community-focused approach maintained access for residents and businesses, while careful traffic management, noise control and stakeholder collaboration helped limit disruption for the community.

Improving lives

The JRL is set to transform commutes in Singapore's West Region, connecting key destinations such as the Jurong Industrial Estate, Nanyang Technological University and Jurong Innovation District. By improving connectivity and promoting public transport use, the JRL will mean reduced travel times, less congestion, cleaner air and an improved quality of life for residents and workers.

1 The construction of a viaduct along the JRL, a key part of Singapore's expanding MRT network.
2 The form traveler method enables the construction of custom viaduct sections in tight urban spaces.

TEAM & TECHNOLOGY

Owner/developer – Land Transport Authority
Main contractor – China Harbour (Singapore) Engineering Company Pte Ltd
Technology – BBR VT CONA CMI internal
BBR Network Member – BBR Construction Systems Pte Ltd



BBR Polska
Bug River Valley, Poland
BBR VT CONA CMI internal and BBR VT CONA CME external for bridge construction

PT and ILM bridging technologies deliver one complex river crossing

On the S19 Malewice–Chlebczyn section of the Via Carpatia corridor, the BBR Network Member for Poland, BBR Polska Sp. z o.o., is helping deliver a 660m Bug River crossing using multiple bridge-building methods that protect the river valley while strengthening a major European transport route.

The S19 Malewice–Chlebczyn project closes an important gap in the north-south Via Carpatia corridor from Lithuania to Greece. At the center of the scheme is a complex crossing of the Bug River Valley, where BBR Polska has applied different post-tensioning (PT) systems across two structures, alongside incremental launching method (ILM) on one. The resulting solution balances structural efficiency, durability, costs and environmental protection.



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The S19 Malewice–Chlebczyn investment is a strategically important section of eastern Poland's growing road network. As part of the Via Carpatia corridor, it strengthens a major transport axis running from Lithuania to Slovakia, improving connectivity through the Podlaskie and Mazowieckie regions and reducing logistical barriers for freight moving north and south through Central and Eastern Europe.

At the center of this section is one of its most demanding engineering elements: a 660m crossing of the Bug River valley. Here, the challenge was to balance high structural performance with rigorous environmental protection. The bridge not only had to carry traffic efficiently across a difficult site, but also to protect the hydrological and ecological conditions of a sensitive river environment and maintain critical migration corridors for large animals within the protected valley ecosystem. That meant selecting the right construction method for each part of the crossing rather than relying on one solution throughout.



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"This project posed a significant challenge for BBR Polska," explains the project's site engineer at BBR Polska, Piotr Dobosz. "We were invited to join the project at a late stage when construction was already underway. The anchor blocks for temporary tendons from another supplier had already been installed.

Within a short timeframe, we had to redesign the incremental launching technology from scratch and manufacture and deliver the necessary materials and equipment. This demonstrates that the BBR Network is capable of delivering even the most demanding projects, including in situations where time is an extremely critical factor."

Multiple bridge methods reduce impact on a protected valley

The Bug River crossing is formed by three integrated dual-carriageway structures: ES-1, ES-2, and MS-5. Each meets specific challenges presented by different parts of the site and together they create one coordinated crossing through the valley.

ES-1 is the southern approach viaduct. At 135.35m long, it is a five-span continuous beam system built using prestressed prefabricated T beams and a monolithic reinforced concrete deck.

ES-2 is the northern approach viaduct, positioned where the route transitions from solid ground toward the main river crossing. This 325.30m, seven-span continuous box girder was constructed using the incremental launching method (ILM) with BBR VT CONA CMI / CME tendons added, allowing the main construction process to take place in a controlled casting yard rather than across the wider valley itself.

MS-5 is the river crossing bridge and second structure. With spans of 54.00m, 90.00m, and 54.00m, it was built using balanced cantilever construction and the BBR VT CONA CMI system so the main current of the Bug River could be crossed without temporary supports in the riverbed.

Together, the structures show how different bridge-building methods can be combined to suit the topography, minimize disturbance, and meet economic, technical and environmental objectives.

Incremental launching keeps construction activity under control

Viaduct ES-2 shows the advantages of ILM on a long, multi-span bridge in an environmentally constrained location. The structure is a 325.30m, seven-span continuous box girder with a span arrangement of 36.50m + 5 × 50.00m + 36.60m. It was divided into 13 segments, each 25m long, and produced in a temporary on-site casting yard. This approach gave the team greater control over quality while reducing the footprint of construction activity within the protected valley area.

Deploying an ILM project of this kind is highly complex. BBR Polska was responsible for key elements including:

- Design of the launching nose (Avanbeck) and the ILM technology.
- Delivery and installation of special equipment such as the launching nose, sliding bearings, all the hydraulic systems, the steel grit of the casting yard, and the launching jacks.
- Operation of the launching jacks.

Production reached a rate of two segments per week, one for each carriageway. The internal structural system used BBR VT CONA CMI internal PT. The top slab incorporated 15-strand tendons, while the bottom slab used a combination of 12-strand and 15-strand tendons. After launching, BBR VT CONA CME external PT was installed using 19-strand and 22-strand tendons.

That external PT is particularly important to the long-term performance of the structure. Because the tendons remain accessible, they can be inspected and, if necessary, replaced during the bridge's lifespan. This improves maintainability while supporting the high structural performance required of a major transport route.

The launching required careful control. A 40m steel launching nose was used to reduce cantilever moments as the box girder advanced across temporary sliding bearings on the piers. Lateral guides maintained precise alignment throughout the 325m launch. The final stage required particularly close coordination, with the launching nose removed in phases to avoid collision with the adjacent MS-5 structure. Once the launch was complete, hydraulic jacks were used at each support to replace temporary bearings with permanent ones.

Balanced cantilevering protects the main river channel

The MS-5 bridge crosses the Bug River and required a different engineering response.

Balanced cantilever construction was selected because it eliminated the need for temporary supports within the riverbed. That was essential to preserving the natural flow of the river and meeting environmental and navigational requirements within the valley.

The bridge uses a mixed construction strategy. While the central span and adjacent sections were built by balanced cantilevering, the outer portions of the side spans, around one-quarter of each, were completed on stationary scaffolding where ground access was available. This combination improved cost-efficiency by using conventional scaffolding where possible and reserving cantilever construction for the sections where conditions made it essential.

Construction began with the hammerhead, or start segment, at the intermediate supports. These were stabilized using specialist mounting supports fixed to the piers to resist unbalanced moments during cantilever construction. Temporary supports were fixed using 19-strand vertical tendons.

From there, form travelers advanced symmetrically in 5m segments. Once each segment had reached the required concrete strength, 19-strand internal tendons in the top slab were stressed to support the next stage of construction. The closure phase was one of the most demanding operations, requiring close thermal monitoring and careful load balancing to achieve precise alignment between the cantilever arms before the final pour. Structural continuity was then achieved with 19-strand internal tendons in the bottom slab. After continuity stressing, the temporary pier stabilizers were removed, and the structure was transferred by BBR Polska onto permanent bearings using high-capacity hydraulic jacks.

Durability and maintainability are built into the design

One of the strengths of the crossing is that it has been designed not only for construction efficiency, but also for long-term use. Across the bridge complex, the use of BBR VT CONA CMI internal and BBR VT CONA CME external post-tensioning systems provides the structural capacity needed for efficient bridge design while also supporting durability and inspection over time. On ES-2 especially, the use of external tendons adds a clear maintenance benefit by improving accessibility for future inspections and possible tendon replacement.

That reflects a wider shift in infrastructure priorities. Clients are looking not only at how a structure is built, but at how it will perform and be maintained over many decades. On a strategic corridor such as Via Carpatia, that long-term view is essential.

One crossing, one corridor, one stronger connection

The Bug River crossing shows how technical precision and environmental responsibility can be combined on a major infrastructure project, representing a new benchmark in Polish bridge engineering. By using prefabricated beam construction, incremental launching, and balanced cantilevering across one coordinated crossing, the project responds to a highly sensitive site without unnecessary intrusion into the river valley. At the same time, it removes a key bottleneck on the S19 route and strengthens a strategically important north-south transport corridor across eastern Poland.

The project demonstrates that the BBR Network delivers even the most demanding projects, including in situations where time is an extremely critical factor, matching the right PT solution to the right construction method on each part of a complex structure. The result is a durable, maintainable, and environmentally responsive crossing that sets a strong benchmark for bridge delivery in sensitive landscapes.





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1 The 660m Bug River crossing on the S19 Malewice–Chlebczyn section combines three structures and multiple bridge-building methods to meet demanding structural and environmental challenges in a protected river valley.
2 One of the approach structures after construction, showing the clean line of the continuous box girder and the scale of the crossing through the valley landscape.
3 A key element in constructing ES-2 was the final launching stage, when the nose had to be dismantled during the final launching operation.
4 MS-5 under construction using balanced cantilevering and a form traveler, a method chosen to avoid temporary supports in the riverbed and protect the Bug River's natural flow.
5 The completed crossing in winter conditions. The combined bridge complex strengthens a strategic transport link while preserving the character of the river valley.

TEAM & TECHNOLOGY

Owner/developer – GDDKiA o/Kielce
Structural Designer – ARCADIS Sp. z o.o.
Main contractor – KOLİN İNŞAAT TURİZM SANAYİ VE TİCARET ANONİM ŞİRKETİ
PT contractor – BBR Polska Sp. z o.o.
Technology – Design, delivery, installation and operation of Incremental Launching Method (ILM) solution
BBR VT CONA CMI internal
BBR VT CONA CME external
BBR Network Member – BBR Polska Sp. z o.o.



Stahlton AG
Simplon, Switzerland
BBR VT CONA CMI internal tendons and couplers for bridge box girders

Replacing the Fura Bridge to restore resilience on the Simplon Pass route



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BBR VT CONA CMI post-tensioning (PT) and permanent ground anchors work together to upgrade both the superstructure and foundations, extending the bridge's service life.

Across the BBR Network, bridge replacement projects often show the clearest value of specialist PT and geotechnical expertise. The challenge is rarely just to rebuild like for like. It is to restore structural performance under modern loading requirements, keep traffic moving during construction, and improve long-term durability without introducing unnecessary complexity. The replacement of the Fura Bridge (Furabrücke) on the Simplon Pass route connecting Switzerland and Italy does exactly that.

As part of the N09 Simplon South EP Gabi maintenance project, studies showed that the existing bridge had to be replaced because of the structural condition and insufficient resistance to avalanche and seismic loads. The solution combines a full superstructure replacement with targeted strengthening of the substructure using ground anchors. That allows the project team to retain the existing geometry while materially improving resilience and long-term performance.

Keeping the route in service while replacing the structure

The replacement bridge is being built to match the geometry of the existing 110m three-span box girder. The alignment, longitudinal gradient and overall geometry are being reinstated almost exactly. That sounds straightforward, but it creates a demanding construction project plan. Demolition, temporary bridge construction and erection of the new bridge require precise planning, as the replacement structure occupies essentially the same position as the original bridge. In addition to the engineering, traffic management is one of the central elements of the project. During the 2025 to 2027 construction period, traffic runs in a single lane over a temporary bridge. That temporary arrangement keeps the route operational while allowing the existing structure to be removed and the new bridge to be built in place. On infrastructure projects of this kind, maintaining continuity is part of the engineering value. The project is about both the final bridge and how the crossing remains functional while the replacement is delivered.

A staged PT strategy for a controlled outcome

The new bridge is prestressed with four BBR VT CONA CMI internal 2206 tendons per deck, each coupled once. Prestressing is carried out in two phases. First, around 30% of the prestressing force is applied. The final 70% is then introduced immediately before grouting the tendon ducts. That sequence gives the project team tighter control over the structural response and helps align stressing with the broader construction process.

This is where technical discipline is vital. Before final stressing and cement grouting, all ducts are carefully blown out to remove any water that has entered. A drying system is then installed to ensure continuous dehumidification and prevent corrosion of the steel strands. Once drying is complete, and when warmer spring temperatures arrive, the ducts are grouted with cement mortar, which is central to durability. On a bridge in this environment, long-term performance depends on both execution quality and design intent.

Strengthening the foundations for avalanche and seismic resistance

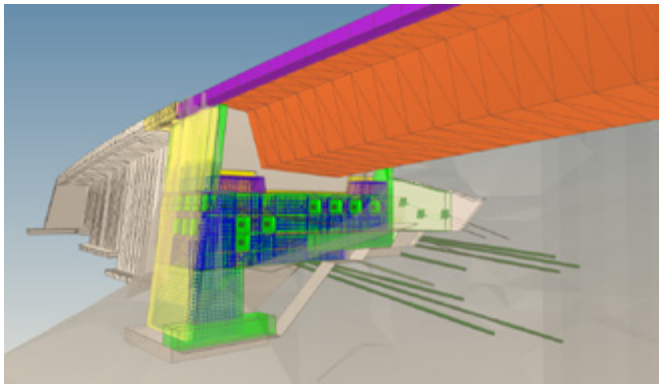
The replacement of the superstructure is only one part of the intervention. To improve resistance to avalanche and seismic actions, the foundations are being strengthened with permanent Stahlton Terra L7 ground anchors. This targeted substructure strengthening complements the complete deck replacement and upgrades the performance of the existing foundation system.

That combined approach is one of the project's

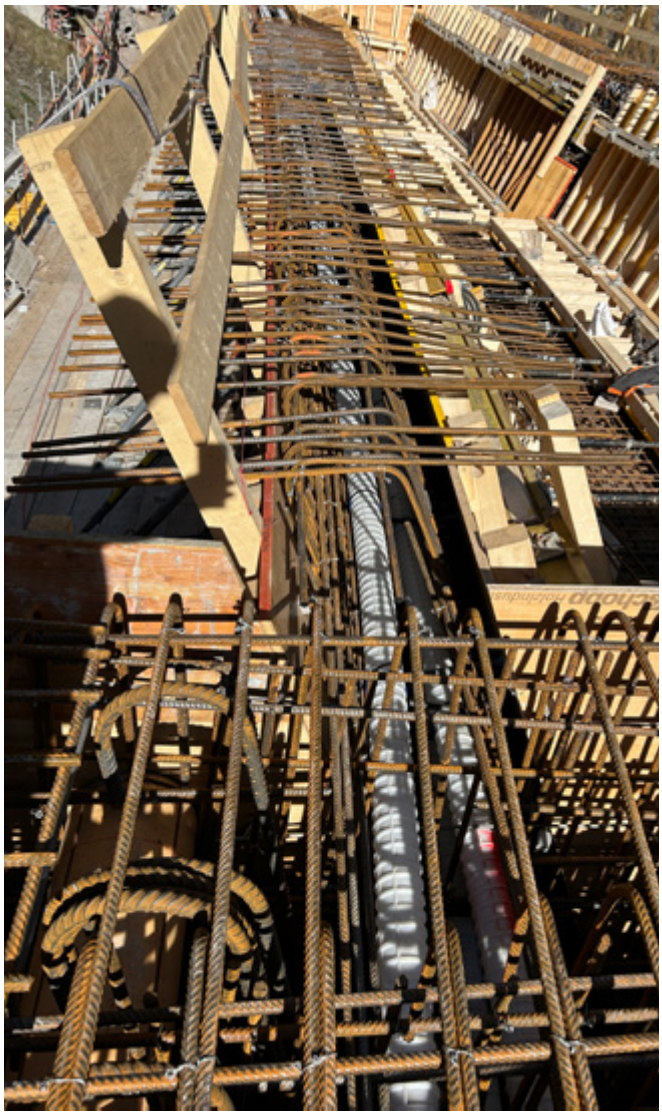




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strongest features. Rather than treating the bridge as a single isolated element, the solution addresses both the deck and the supporting structure. It restores the crossing's structural role while improving resilience against the environmental and loading conditions that made replacement necessary.

Integrating design, technology, engineering and execution

The Fura Bridge replacement is a strong example of multiple elements aligned and adding value. The new structure closely follows the geometry of the old bridge, but its technical performance is being fundamentally upgraded. Prestressing improves structural efficiency and construction control. Ground anchors strengthen the substructure against critical loading conditions. Careful drying and grouting procedures protect durability. And the temporary bridge arrangement keeps the route operating while the work is carried out.

Together, these measures show how specialist expertise adds value to bridge renewal projects. The objective is to replace what is there and to deliver a crossing that is more resilient, more durable, and better aligned with current performance requirements, while managing the construction process with as little disruption as possible.



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1 Aerial view of the Fura Bridge replacement project on the Simplon route showing how the new structure closely follows the geometry of the existing three-span, 110m box girder while upgrading long-term structural performance. Image source: dsp.
2 Side views of the replacement box girders. Image source: dsp
3 CAD drawing of the substructure with ground anchors highlighting the targeted strengthening of the foundations, which improves resistance to avalanche and seismic loads as part of the wider bridge replacement. Image source: dsp
4 110m PT tendon within the reinforcement cage and formwork before concrete pouring, stressing and grouting.
5 BBR VT CONA CMI internal 2206 PT tendons. Image source: Emch+Berger
6 Tendon stressing. Image source: Emch+Berger
7 Foundation and pier with anchor recesses. The image illustrates how the substructure is prepared for permanent ground anchors that strengthen the bridge against demanding loading conditions.

TEAM & TECHNOLOGY

Owner/developer – Federal Roads Office ASTRA

Designer/architect – dsp Ingenieure + Planer AG, Uster; Emch+Berger AG (construction management)

Structural /PT Designer – Stahlton AG

Contractor – ARGE Fura, Frutiger AG + Volken Group

Technology – BBR VT CONA CMI internal

BBR Network Member – Stahlton AG



De Vries VSP B.V.
Werkendam, Netherlands
BBR VT CONA CMI internal tendons for floating hospitality platform

PT enables lower-impact city center hospitality

For Good Hotel, the BBR Network Member for Belgium and the Netherlands, De Vries VSP, helped deliver a 104m long post-tensioned (PT) concrete pontoon that supports an offsite-built hotel concept designed for dense, high-value urban waterfront locations. Its final destination is Manchester, UK.

Floating hospitality, and other pontoon-based applications, is becoming an increasingly common PT application. Pontoons address a very real urban challenge. In city centers where land is scarce, expensive, or difficult to develop, a platform can largely remove the requirement for permanent groundworks, limit site disruption, and move more of the construction process offsite. That is the context for the Good Hotel pontoon project in the Netherlands. Developed as the concrete base for a future floating hotel destined for Manchester, the 104 × 18 × 5.4m pontoon shows how BBR technology can support a highly unusual structure while still delivering the familiar advantages of PT: thinner slabs, controlled material use, and efficient structural performance. The project also reflects the client's wider social and sustainability goals, with a construction approach that aligns with a business model built around community impact, re-use, and lower-impact development.



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Good Hotel describes itself as a social business. Its hotels are intended to create a positive impact in the communities where they operate, with profits reinvested into education, retraining local people for hospitality jobs, and wider social causes. The brand also emphasizes re-use and upcycling, seeking locations and building strategies that reduce waste and unlock value in places where conventional development can be difficult. That broader mission helps explain the appeal of a floating hotel concept. In expensive waterfront locations such as London and Manchester, a pontoon-based approach offers flexibility, avoids conventional foundations, and supports a more modular, offsite-led model of delivery.

For De Vries VSP, the project was part of a wider and growing expertise in PT concrete pontoons. The Good Hotel platform followed earlier floating applications, such as BBR Network Member for Australia, SRG Global's pontoon for a rowing club (see CONNÆCT 2025 p40-41). It sits alongside other pontoon projects De Vries VSP is delivering, for example for training applications on behalf of the Dutch Ministry of Defense. These show how the same technical capability can support very different end uses. In this case, the outcome was a floating hospitality platform: a concrete pontoon constructed in the Netherlands, then floated off and transported for the next stage of fit-out.

Reducing foundation demand and shifting construction offsite

The central structural element is the pontoon itself. Holland Shipyard Group acted as main contractor, De Vries Werkendam constructed the pontoon, and De Vries VSP supplied and installed the BBR PT system. The structure measures 104m long, 18m wide, and 5.4m deep. Those dimensions are substantial, but the challenge was not scale alone. Because the pontoon must float efficiently, slab and wall thickness had to be carefully balanced against the space required for PT and reinforcement. In other words, buoyancy placed direct pressure on structural efficiency. Every millimeter of concrete and every bar of reinforcement had to justify itself.

That is where PT adds value. By allowing thinner concrete sections than a conventionally reinforced alternative would require, it helps reduce self-weight while maintaining structural performance. For this project, the lower slab was particularly tight in terms of available depth, making the relationship between tendon layout, reinforcement congestion, and final section thickness one of the defining design and execution constraints. The technology itself may have been familiar to the De Vries VSP team, but the application was distinctive because the structure had to perform as both a concrete box and a floating body.

Managing construction on a moving support

One of the unusual aspects of the project was the chosen construction method. Several options were considered, including shipyard dock construction, floating dock construction, on-land production followed by skidding and submersion, and production on a submersible pontoon. The selected approach was to build on a submersible pontoon. That decision solved one set of logistical challenges but introduced others. Construction took place on a moving object exposed to wind and wave effects, which increased the importance of surveying, dimensional control, and weight management during concrete pours. As the structure grew, the pontoon characteristics changed, and at one stage the pontoon itself had to be extended. To make the submersion possible, a gravel layer was installed to manage water flow beneath the structure.

These are not conventional site conditions, even for marine construction. Yet the project demonstrates that PT can be integrated into this environment without changing its core structural role. De Vries VSP's scope covered the concrete and PT works up to float-off. From there, the pontoon moved to the next location for superstructure, façade, and fit-out works beyond its package.

Improving productivity and reducing physical strain on site

The project also became a test bed for a smaller but significant process innovation. De Vries VSP introduced a compact silo system for grouting mortar, using large bags of shrinkage-compensated casting mortar to improve production flow and reduce manual handling. According to the project team, this was the first time the system had been used in this way in the Netherlands and Belgium. The benefits were practical and immediate: higher daily output, more consistent material quality, and less physical strain on operatives who would otherwise have to handle repeated smaller bags manually. The pilot proved successful enough to carry forward into other large projects.

This aspect is significant because it extends the story beyond the pontoon itself, showing how BBR Network Members are innovating by rethinking execution methods, particularly around workforce well-being and site productivity. In a business where many operatives have long careers ahead of them, reducing physical strain is not a marginal issue. It is part of building responsibly.

A special application with wider relevance

The increasing number of PT projects of this kind demonstrates how the range of applications where PT delivers unique benefits continues to grow. The structural challenge was unusual, but the underlying value drivers were recognizably BBR: less material, more efficient sections, controlled performance, and a build strategy suited to difficult site conditions. The result is a floating platform that helps unlock lower-impact hotel development in premium urban waterfront locations, while also aligning with a client whose business model is centered on social benefit and re-use.



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TEAM & TECHNOLOGY

Owner/developer – Good Hotel Group
Structural Designer – Haskoning
Main contractor – Holland Shipyard Group
Pontoon construction – De Vries Werkendam
Technology – BBR VT CONA CMI internal
BBR Network Member – De Vries VSP B.V.

1 The 104m pontoon is at the quayside nearing completion. The hotel foundation was built largely offsite before moving to the next phase of fit-out.
2 Prepared PT strands along the pontoon edge before stressing, illustrating the linear tendon layout within the long floating concrete structure.
3 Operative carrying out PT works on the pontoon edge, showing how standard BBR site operations were adapted to a marine construction environment.
4 Compact mortar silo used during grouting operations, improving daily productivity and reducing manual handling compared with smaller bag-based methods.
5 Aerial view of the pontoon showing the scale of the floating structure. The PT strands can be seen at the base of the structure.



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ÆVIA
Bordeaux, France
BBR VT CONA CMM internal and BBR VT CONA CME external tendons for bridge enhancement

A suspended footbridge restores active travel without disrupting a major river crossing



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Passerelle Arcins, Bordeaux, France: the BBR Network Member for France and Luxembourg, ÆVIA, is delivering a suspended pedestrian and cycle link beneath the François Mitterrand Bridge crossing the River Garonne, combining prestressed UHPC slabs and external post-tensioning (PT) to reconnect both banks of the river with minimal impact on live traffic.

The Arcins footbridge shows how a carefully targeted structural intervention can add new value to existing infrastructure. ÆVIA is helping restore the Garonne crossing for cyclists and pedestrians after the cycle path on the François Mitterrand Bridge was removed in 2018 to make way for an additional traffic lane. Rather than competing for space on the bridge deck, the new solution creates a separate 650m-long suspended footbridge beneath the existing structure, giving Bordeaux a new active-travel connection while keeping one of the city's main road arteries in service.



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Reducing impact while reconnecting both banks

The design-and-build contract was awarded to the consortium of ÆVIA, MOG Architectes and SETEC ALS with an approach that moved away from a fully steel solution at roadway level. Instead, the team proposed a composite steel and high-performance concrete footbridge positioned beneath the existing deck. This improves comfort and safety for cyclists, reduces the project's visual impact, and avoids almost all interference with vehicle traffic on the bridge above. It also improves the project's carbon performance through the use of ultra-high-performance concrete (UHPC) and prestressing in the slabs.

The footbridge is supported by 92 steel brackets, each weighing 2t, anchored through the web of the box girder using Macalloy D50 prestressing bars. These brackets support 91 prestressed UHPC slabs that form the cycle path. Each slab is 6.8m long, 3m wide and 200mm thick. Ribbing and prestressing optimize the section to a weight of 4.6t, with BBR VT CONA CMM internal 0106 tendons in each rib.

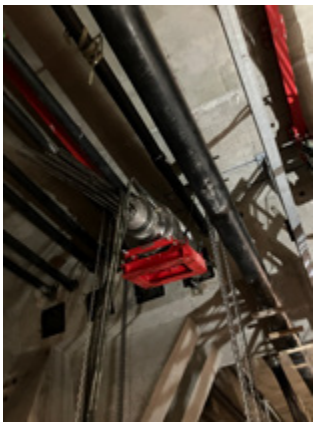
To avoid working from the bridge deck, ÆVIA developed a system of mobile platforms running on a monorail fixed to the underside of the slab. This allows the transport and installation of all structural elements from below, eliminating almost all activity on the road surface above.



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Strengthening the bridge without changing how it works

The existing bridge also required strengthening to carry the additional load introduced by the footbridge. ÆVIA installed two complementary BBR VT CONA CME external 1906 tendons. As on several similar projects, the BBR system was adapted through a transition component to connect with the existing anchorage plates from another supplier's technology. Final protection was carried out by petroleum wax injection, the only operation requiring a nighttime lane closure.

The works are due for completion in September 2026, when waterproofing, guardrails, lighting and the final riverbank connections will complete a new active-travel link across the Garonne.



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TEAM & TECHNOLOGY

Owner/developer – Bordeaux Métropole

Design-build consortium – ÆVIA, MOG Architectes, SETEC ALS

Technology – BBR VT CONA CMM internal and CME external tendons

BBR Network Member – ÆVIA

1 The Arcins footbridge is suspended beneath the François Mitterrand Bridge that crosses the River Garonne in Bordeaux, France, creating a new pedestrian and cycle crossing while keeping the road bridge in service.
2 The project visualization shows how the suspended footbridge is fixed beneath the existing structure, avoiding intervention on the bridge deck and limiting visual impact.
3 The suspended bridge allows bicycle and foot traffic without disrupting vehicle traffic flow on the busy four-lane bridge deck.
4 Prestressed UHPC slabs form the cycle path. Ribbed geometry and prestressing reduce weight while maintaining the strength needed for installation and long-term performance.
5 BBR VT CONA CME external PT tendons strengthen the existing bridge so it can carry the additional load introduced by the suspended footbridge.
6 Close-up of the strengthening detail, where the BBR system was adapted to connect with the bridge's existing anchorage arrangement.
7 Installing a system of mobile platforms running on a monorail fixed to the underside of the slab meant all work activities on the deck surface were mostly avoided, allowing the transport and installation of all the structural elements of the footbridge.



Kappa Kalip Insaat Ve Taahhut A.S.
Gaziantep, Türkiye
BBR VT CONA CMI internal for highway underpass construction

Keeping a critical junction improvement moving

Perilikaya Grade-Separated Interchange, Gaziantep, Türkiye: BBR Network Member for Türkiye, Kappa Kalip Insaat Ve Taahhut A.S., is delivering the post-tensioning (PT) works for 19 deck spans on the D850 Gaziantep-Kilis corridor, supporting a junction upgrade designed to ease congestion and improve traffic flow.

Busy junctions place pressure on the wider urban road network, and that is the context for the Perilikaya Grade-Separated Interchange in Gaziantep. The project forms part of a broader effort to improve traffic flow by separating movements, reducing congestion at surface level, and creating a more efficient route through a heavily used section of the D850 Gaziantep-Kilis State Highway. With the opening of the city's 300-bed Abdülkadir Yüksel State Hospital, the Perilikaya junction has become one of the most congested in the city. The grade-separated interchange aims to eliminate this bottleneck by diverting traffic towards the airport via an underpass. It will also aid vital ambulance and patient access to the hospital and ensure an uninterrupted connection between the city and the airport.



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Kappa's role is tightly defined, but central to delivery. As PT subcontractor, it is responsible for duct installation, strand placement, stressing, and grouting across the deck spans that enable the underpass.

Unlocking the underpass sequence

The construction sequence shows why PT is a critical part of the job. First, 1,249 piles were installed. Then 19 PT deck spans were constructed above existing ground level. Only after those spans are cast and stressed can excavation proceed beneath them, creating the continuous grade-separated underpass. Progress on the traffic improvement therefore depends directly on the PT works being completed accurately and to program.

Kappa is using the BBR VT CONA CMI internal bonded multi-strand system in two configurations: BBR VT CONA CMI 3106 on 13 spans and BBR VT CONA CMI 1906 on six spans. Across the project, that amounts to 1,540 anchorages, 627.12t of strand and 19,150.55m of ducting. These are substantial quantities and they underline the scale of the intervention taking shape beneath what will become a key urban connection.

Built-in compliance, built-in flexibility

A construction sequence staged this tightly does not tolerate gaps in material supply. With excavation held until every deck span is complete, each PT operation sits on the critical path, and 1,540 anchorages need to be on site, in specification, when the program demands them.

Meeting that kind of schedule pressure requires more than manufacturing capacity. It calls for a supply network that can draw on multiple production locations at the same time, without any variation in what arrives on site. BBR VT International operates production facilities across Europe, China, and India, each manufacturing to the same system requirements and each working within the same ETA certification and compliance framework. A component leaving one facility is technically equivalent to one leaving another. For Perilikaya, that multi-origin structure was matched with phased deliveries scheduled to suit the construction program for each span rather than a single bulk shipment. The approach reduces storage pressure on site and supports a more agile execution sequence. On a constrained infrastructure project moving span by span, that kind of supply assurance is a practical advantage. It is also an example of how BBR VT International's manufacturing and logistics model supports delivery to BBR Network Members on the ground.

The project is still under construction. Once the deck spans are complete and excavation below is finished, the structure will become a new underpass that helps traffic move more efficiently through one of Gaziantep's busiest junction areas. Kappa's PT works are helping make that sequence possible.

1 A deck span of the Perilikaya Grade-Separated Interchange takes shape in Gaziantep. Post-tensioning is central to the staged construction sequence, allowing the deck to be completed before excavation creates the underpass below.
2 The reinforcement and duct layout for one of the deck spans shows the scale of Kappa's PT works, which must be completed span by span before the underpass can be opened.
3 Close-up of the deck reinforcement and PT ducts before concreting. The arrangement highlights the precision needed to install the BBR VT CONA CMI internal system within a heavily reinforced highway structure.
4 A wider view of the Perilikaya works shows completed and in-progress deck sections along the future underpass route, illustrating how the junction upgrade is advancing in phases.



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TEAM & TECHNOLOGY

Owner/developer	– General Directorate of Highways (KGM) – 5th Regional Directorate, Mersin
Main contractor	– ORAK Altyapı Sanayi ve Ticaret A.S.
Post-tensioning subcontractor	– Kappa Kalip Insaat Ve Taahhut A.S.
Technology	– BBR VT CONA CMI internal
BBR Network Member	– Kappa Kalip Insaat Ve Taahhut A.S.



SRG Global
Queensland, Australia
BBR VT CONA SOL+ permanent strand ground anchors for dam strengthening

PT ground anchors strengthen North Pine Dam to secure safety and water supplies

At the North Pine Dam in Queensland, BBR Network Member for Australia, SRG Global, is installing 55 permanent post-tensioned (PT) ground anchors to improve the structure's stability under extreme rainfall and seismic loading, while creating a platform for future dam raising.

Across Australia, many dams designed to the standards of their time are now being reassessed against updated flood and spillway modeling, revised safety requirements, and a better understanding of extreme weather and seismic risk. North Pine Dam is part of that wider picture. Located about 30km north of Brisbane and supplying Brisbane's northern suburbs and the Moreton Bay region, the dam is being upgraded through staged strengthening works that improve structural stability now and support future long-term improvements. SRG Global's solution centers on permanent PT ground anchors that lock the dam wall to the foundation rock below, increasing resilience without rebuilding the structure itself.



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TEAM & TECHNOLOGY

Owner/developer – Seqwater
Structural Designer – SMEC
Main contractor – SRG Global
Technology – BBR VT CONA SOL+ permanent strand ground anchor system
BBR Network Member – SRG Global

The core engineering issue is straightforward, even if the execution is not. During extreme flood events, water pressure and uplift beneath a gravity dam can reduce its effective stabilizing weight. If overtopping occurs, erosion of the foundation can follow. The strengthening works for North Pine Dam are designed to increase stability by clamping the structure to bedrock. The upgrade also allows for a potential future raising of the dam, often for flood protection rather than additional storage. This makes the project both a **BBR Care+** and **BBR Build+** story: extending the life and safety of an existing asset while preparing it for future adaptation.

Improving dam safety with fewer, larger PT anchors

SRG Global was appointed in 2025 as the owner's contractor for the staged strengthening works. The final SRG alternative solution uses 55 BBR VT CONA SOL+ ground anchors, reduced from an original design of 68 after SRG Global optimized the scheme by combining smaller anchors into larger-capacity units. This reduced the number of drilled holes by around 20% while maintaining the required total force, a major benefit because drilling is one of the costlier parts of dam anchoring work.

The anchors are exceptional in scale. The longest reaches 101m and weighs about 10.5t, with the anchors used on the project ranging from 39m to 101m using approximately 246km of high-tensile steel strand. Once installed, they will provide around 75,000t of effective stabilizing force to the dam wall, the primary structural intervention that makes the staged upgrade possible.

Protecting long-term performance below the surface

Durability is central to dam anchoring. The project uses BBR VT CONA SOL+ permanent strand ground anchors with high corrosion protection through a double-protection approach: corrugated ducting, grouting, polyethylene sheathing, grease-filled void protection, and protective capping. This isolates the steel strands from water, air and other corrosive agents. That protection becomes even more important because the load transfer process may create cracking in grout zones under very high force. Without a durable barrier system, those cracks could become a pathway for moisture and contaminants. The anchor is only as reliable as the corrosion protection strategy wrapped around it.

Handling extreme length with precision and control

The installation challenge is as impressive as the anchor design. These are vertical anchors drilled from the crest through the dam into the foundation rock, with very tight alignment tolerances over long distances. The required drilling accuracy is roughly 1 in 250 to 1 in 300 over 100m deep boreholes. Even a small deviation at the top can put the hole hundreds of millimeters out of position at depth, which is unacceptable when galleries and internal dam features must be avoided.

The project uses specialized in-house equipment developed by SRG Global, including

custom transport carts for the anchor assemblies, installation frames to guide the strand bundles up and over the crest and down into the boreholes, and high-capacity drilling and stressing equipment. The site also includes noise blankets and monitoring systems to protect nearby residents, while drill cuttings and slurry material are collected and removed offsite.

Delivering resilience now and flexibility later

North Pine Dam is a critical water infrastructure asset for one of Australia's fastest-growing regions. The staged strengthening works improve safety now, support water security, and provide the basis for further upgrades in the longer-term North Pine Dam Improvement Project. The updated design is intended to address modern safety requirements and increased climate-related risk, including more intense extreme weather events.

This project demonstrates how PT ground anchoring supports both infrastructure renewal and future-proofing. The immediate task is to improve dam stability. The longer view is broader: keeping an existing structure in service, increasing resilience against extreme rainfall and earthquakes, and enabling future adaptation without starting again from scratch. That is why the project sits naturally between **BBR Care+** and **BBR Build+**. It strengthens what is already there and makes the next phase possible.



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1 North Pine Dam in Queensland, where staged strengthening works use very long post-tensioned anchors to clamp the structure to bedrock and improve long-term stability.
2 With the longest anchors over 100m in length, careful planning and staging is needed to prepare the anchors for the final journey to the dam crest.
3 The anchor assemblies are more than 100m long and are transported to and across the dam crest using purpose-built trolleys developed to handle the extreme length and weight of the strand bundle.
4 A specialized rig is used to drill the highly accurate ground anchor boreholes from the dam crest into the foundation rock below.
5 Specialized installation equipment on the dam crest, where drilling, alignment control, and cable handling all have to work together within tight tolerances.



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Stahlton AG
Laufenburg, Switzerland
Stahlton Terra and Terra CT ground anchors for excavations

Ground anchors keep a complex energy and data project moving

Technologiezentrum Laufenburg, Switzerland: Stahlton delivers Terra and Terra CT ground anchors for a complex technology center excavation.

TEAM & TECHNOLOGY

Owner/developer – FlexBase Group
Structural Designer – Schnetzer Puskas
Main contractor – JMS RISI / KIBAGI
Technology – Stahlton Terra and Terra CT ground anchors
BBR Network Member – Stahlton AG



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A new technology center is taking shape on the former Swissgrid site at Laufenburg, with more than 40,000m² of floor area, a redox-flow battery installation of more than 1.2GW and 2.1GW, and a major AI datacenter at its core. For a project of this scale, excavation support is a fundamental part of what makes the whole development possible.

BBR Network Member for Switzerland, Stahlton, supplied the geotechnical anchoring solution for the excavations using Stahlton Terra and Terra CT ground anchors. In total, the project uses 12 trial anchors and 1,600 structural anchors with 4-8 strands, supported by 120 load cells connected to remote monitoring. That combination allowed large numbers of anchors to be produced and delivered quickly enough to support parallel working across multiple sections of the excavation.

The project also required adaptation on site. Following anchor test results along the south and east walls, parts of the excavation switched to a top-down method with concrete slab bracing instead of anchors. Elsewhere, anchor heads were integrated into the structural concrete, with induction coils retrofitted so embedded anchors could still be released later. Additional shaft channels and cable extensions enabled ongoing monitoring of the anchor forces in real time.

1 Architectural visualization of the Technologiezentrum Laufenburg. The project combines major battery storage, AI data infrastructure, and a large-scale excavation package supported by Stahlton ground anchor technology. Image reproduced with kind permission of FlexBase Group Switzerland.
2 Shaft channels for removable anchors in inaccessible areas. The detail shows how the Stahlton solution was adapted to keep anchors functional, releasable, and connected to monitoring even where direct access was limited.
3 Stahlton Terra CT anchor with induction coil behind the round anchor plate. The detail shows how embedded anchors can still be released later while remaining integrated into the structural concrete.
4 12 trial anchors and 1,600 structural anchors were required to retain the walls of the excavation, from which more than 500,000m³ of earth has already been removed.



BBR Adria d.o.o.
Pula, Croatia
BBR VT CONA CMM for hotel

Naval gazing

BBR Network Member for Croatia, BBR Adria d.o.o., played a key role in transforming the Heritage Hotel & Resort Monumenti in Pula into a waterfront destination. Overlooking a 442-berth marina, the four-star complex integrates historic military structures with modern amenities using advanced post-tensioning (PT) solutions.

With an ocean view from every room, residents at the new Heritage Hotel & Resort Monumenti in Croatia, situated on the site of former Austro-Hungarian Empire military barracks, can enjoy a swim in the 12.7m pool area with a BBR VT CONA CMM-reinforced ceiling.



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Before the First World War, Austro-Hungarian naval personnel scanned the horizon for ships from buildings at the southern tip of Croatia's Istrian Peninsula. Today, guests in the new Heritage Hotel & Resort Monumenti enjoy views of its marina, the Brijuni National Park and the Adriatic Sea.

The hotel was created by connecting two renovated military buildings, housing 58 rooms (33m² each), to a new wing featuring 40 rooms (40m² each) and eight apartments (70–120m²). Developer, Kermas Istra d.o.o., also specified an underground garage and a bridge connecting the island of Santa Caterina to the mainland.

BBR Adria, in collaboration with Coin Inženjering d.o.o., was crucial in the PT design and installation across two sections of the complex. The project involved 4,950m² of PT slabs and 24t of PT strand, ensuring stability while preserving the site's architectural character.

Clever construction solutions

Most challenging was the construction of the pool and spa on the ground floor. Despite the full-height windows, which reduced the structural integrity of the facade, the design required a 12.7m span to support four floors of hotel rooms above. To achieve this, two transfer beams (250 × 80cm), each with 60 tendons, together with a non-transfer beam (200 × 80cm) with 40 tendons, span the 12.7m opening to create 240m² of open space above the pool and spa area.

More practically, a 26cm thick PT slab spanning 8.1 x 8.1m was used to support the bus parking area in front of the main entrance.

1 The Heritage Hotel & Resort Monumenti will blend restored 19th-century military buildings with new-build luxury accommodation.
2 The swimming pool and spa under construction, supported by PT transfer beams and cable stay tendons carrying the weight of the hotel rooms above.

TEAM & TECHNOLOGY

Owner/developer – Kermas Istra d.o.o.
PT Design – COIN inženjering d.o.o.
Main contractor – BIRČIĆ GRADNJA d.o.o.
Technology – BBR VT CONA CMM
BBR Network Member – BBR Adria d.o.o.



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BBR Adria d.o.o.
Belgrade, Serbia
BBR VT CONA CMM for apartment buildings

Cutting time, materials and embodied CO_2

Two residential complexes have been constructed on the Sava River as part of the ongoing Belgrade Waterfront project. BBR Adria d.o.o. has played a key role in delivering efficient, sustainable solutions.

Belgrade is short of green space. In response, two residential complexes – Queen's Park Residence and King's Park Residence – have been designed and built with a plaza imagined as a city park, adding lushness to the surrounding urban landscape.

Together, the complexes span a total area of 50,760m² and comprise 341 residential units, split between Queen's Park's eight floors and King's Park's 15 floors. The apartments were built using BBR VT CONA CMM reinforced PT slabs of 20cm thickness spanning 8-9m, allowing for greater layout flexibility and an open plan configuration.

Alongside PT designer Asmec Consultants d.o.o., the BBR Network Member for Bosnia & Herzegovina, Croatia, Montenegro, Serbia and Slovenia created a shared underground parking garage beneath the park plaza that required careful engineering.

The inter-floor slab was designed at 22cm thick, while the ground floor was reinforced with a 25cm slab, supported by 50cm capitals beneath the park area. However, these elements were omitted under the buildings for structural efficiency.

Client achieves investment goals

BBR Adria solutions contributed to meeting a four-month completion timeline and achieved significant savings in concrete and reinforcement materials. In addition to allowing the developer to recoup its investment ahead of schedule, the shorter build reduced embodied CO_2 emissions for the project.



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1 The Queen's Park Residence and King's Park Residence take shape around a green oasis
2 Belgrade Waterfront on the Sava River, home to the new Queen's Park and King's Park Residences.

TEAM & TECHNOLOGY

Owner/developer – Beograd na vodi (Belgrade Waterfront)
PT Design – Asmec Consultants d.o.o., BBR Adria d.o.o.
Main contractor – DMA Koping d.o.o.
Technology – BBR VT CONA CMM
BBR Network Member – BBR Adria d.o.o.



Phoenix Specialist Contracting Ltd (PSC)
Birmingham, UK
BBR VT CONA CMF for multi-use development

Reducing concrete and enhancing structural performance

Land that lay undeveloped for 50 years in Birmingham's Jewellery Quarter is being transformed into a dynamic new neighborhood. BBR Network Member for the UK and Ireland, Phoenix Specialist Contracting Ltd (PSC), has provided post-tensioning (PT) design, supply and installation for the project.

A multi-use development is nearing completion on a former 2.6-acre brownfield site at Great Charles Street, a project that forms part of site owner Moda Group's plans to create 5,000 new homes across the city.

The new neighborhood, designed to blend harmoniously with existing buildings in this historic part of the city center, hosts 722 homes, flexible workspaces, fitness studios and other amenities across three towers, with one standing at 39 stories high with an overall PT area of 55,100m^2.

For PSC, work began in December 2023 to construct a lower ground floor car park, topped by a podium slab, that runs across the three towers. Given the scale of the project, a PT slab solution was necessary to reduce concrete and enhance structural performance.

The PT slabs have varying thicknesses, with 225mm as typical, increasing to 250mm in terraced areas and 275mm at transfer levels to accommodate additional loads utilizing 190t of PT strands. The slabs use flat duct with 15.7mm strands arranged in configurations of two to four strands, anchored with BBR VT CONA CMF systems.



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TEAM & TECHNOLOGY

Owner/developer – Moda Group
Project consultant – WSP
Architect – Ryder Architecture
Main contractor – Sisk Group
Technology – BBR VT CONA CMF
BBR Network Member – Phoenix Specialist Contracting Ltd (PSC)

1 The BBR PT system and reinforcement installation.
2 The new Great Charles Street development during construction in Birmingham's Jewelry Quarter.



Phoenix Specialist Contracting Ltd (PSC)
Oxford, UK
BBR VT CONA CMF for science park

Saving materials and CO_2 at the Science Park

Concrete reduction is a vital part of The Oxford Science Park (TOSP) expansion project. BBR Network Member for the UK and Ireland, Phoenix Specialist Contracting Ltd (PSC), provided a value-engineered post-tensioning (PT) solution for the laboratory building to reduce concrete and CO_2 emissions.

The TOSP needs open, adaptable spaces with minimal internal supports to host a broad range of research and development disciplines.



Post-tensioning installation underway at The Oxford Science Park expansion.

In May 2024, PSC installed the first PT slabs. Incorporating a value-engineered PT slab area of approximately 12,990m² with integral engineered waterproofing ensured the durability and structural integrity of the buildings, while value engineering reduced concrete by 25%. This is significant, given the environmental impact of concrete production, and directly lowered CO_2 emissions. The design led to 15% overall savings in materials.

The ground-bearing PT raft slab with integral waterproofing forms the foundation of the three laboratory buildings, balancing structural strength with sustainability. The integrated waterproofing system protects underground levels from water ingress, preventing future deterioration and reducing maintenance needs.

PT slabs were engineered to support the specialized loads of laboratory and office spaces. Using 100t of 15.7mm strands in three- and four-strand configurations achieves high strength with reduced thickness, lowering the project's concrete demands and carbon footprint. The BBR VT CONA CMF anchorages support efficient force transfer, optimizing structural integrity and resource efficiency.

By combining PT technology with value engineering, the project achieves its goals for sustainable construction and design and sets a benchmark for future science park developments.

TEAM & TECHNOLOGY

Owner/developer – Magdalen College, Oxford
Project consultant – CampbellReith Consulting Engineers
Architect – Scott Brownrigg Ltd
Main contractor – Mace Group
Technology – BBR VT CONA CMF
BBR Network Member – Phoenix Specialist Contracting Ltd (PSC)



Contech
Tauranga, New Zealand
BBR VT CONA CMI for building construction

Glimpsing the future

The Northern Quarter, a building project in Tauranga, New Zealand, is receiving praise for meeting sustainable design and high construction standards, enabled by Contech's creative application of post-tensioning (PT) technologies.

This five-story, 5,500m² office and hospitality development in the heart of Tauranga's central business district achieved a 6 Green Star rating, surpassing the original 5-star target. It's a building that allows us to glimpse the future, and the project chimes with BBR Network Member for New Zealand Contech's commitment to stepping lightly on our planet.

1

Optimizing resilience and durability

Contech was commissioned by main contractor Watts & Hughes Construction Group Ltd to manage the PT for the building's office and hospitality space as well as foundation installation for an eight-level building on an adjacent site. For the office and hospitality space, the work required the installation and stressing of four BBR VT CONA CMI internal 1906 draped tendons to a transfer beam.

The adjacent building will employ a PREcast Seismic Structural System so that its walls return to their original position following an earthquake event. As part of this, 28 high-strength 1030-grade 50mm bars will be installed into the foundation structures and up to the ground floor, a technique already tried and tested in New Zealand.

Once the structure reaches the roof, the remainder of the bar lengths will be installed up to roof level and the bars stressed, with corrosion protection applied for durability.

Enhancing seismic and green performance

The development will include provision for 64 underground car park spaces with areas for motorbikes, bikes and e-vehicle charging docks, alongside links to local transport networks, recreational spaces and other amenities.

To achieve the target 5-star Green Star rating, the teams considered not only the building's direct environmental impact but also the broader implications for transport, the indoor environment and building management over the next 100 years. The original aim was to construct a low maintenance, energy-efficient series of buildings where people can work, socialize and relax.

Key features include well-ventilated offices, effective use of both natural light and LED luminaires, solar panels, sustainable materials such as brick, steel and glass for the exterior structure, and a 140% seismic rating.

The building has breathed new life into Tauranga. First Principles Architects + Interiors have been careful that the design blends seamlessly with the city's historic architecture. Given that Tauranga's commercial development began at the Northern Quarter's site in the early 1860s, and a toki pounamu (adze) dating back to about 1500AD was recently discovered here, motivations are strong and the purpose meaningful. You couldn't ask for a better start.



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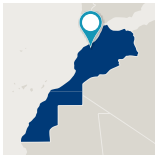


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1 The Northern Quarter has redefined Tauranga's central business district with smart design, premium spaces and a focus on sustainability.
2 Contech installing and stressing PT tendons to optimize load distribution and structural resilience.
3 Seismic bars being installed into the foundation as part of the PREcast Seismic Structural System for enhanced structural resilience and seismic performance.

TEAM & TECHNOLOGY

Owner/developer – JWL Investments Ltd
Designer/architect – First Principles Architects + Interiors Ltd
Structural Designer – Kirk Roberts Consulting Ltd
Main contractor (Stage 1) – Watts & Hughes Construction Group Ltd
Technology – BBR VT CONA CMI internal tendons
BBR Network Member – Contech



BECOMAR - BBR Maroc
Zenata Eco City, Casablanca, Morocco
BBR VT CONA CMM and BBR VT CONA CMF for residential construction

Post-tensioning delivers faster housing at Side Park

At Side Park in Zenata Eco City, BBR Network Member for Morocco, BECOMAR - BBR Maroc, is using BBR VT CONA CMM and BBR VT CONA CMF post-tensioning systems (PT) to reduce steel reinforcement, speed up slab construction, and keep six residential blocks moving with close engineering and site coordination.

Side Park shows how PT creates value in mainstream residential construction. In Zenata Eco City near Casablanca, BECOMAR - BBR Maroc is applying BBR systems across a large multi-block housing development, helping reduce materials, maintain quality, and accelerate delivery on a demanding construction schedule.

Side Park is a planned urban district designed to support the growth of Greater Casablanca through organized development and modern infrastructure. The project comprises six housing blocks ranging from seven to sixteen floors, making it a significant residential scheme both in scale and in delivery complexity. Three blocks are currently under construction, with the remaining three expected to follow in the coming months. BECOMAR - BBR Maroc is responsible for the PT works on the three active blocks, covering both design engineering and on-site execution of the PT. Across these three buildings, the total PT floor area exceeds 60,000m², with more than 32,000m² already completed. This level of progress shows that the PT works are well integrated into the overall construction program and support steady delivery on site.



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Fast engineering decisions keep the slab cycle moving

One of the project's strongest advantages is the direct link between engineering and execution. BECOMAR - BBR Maroc's engineers are responsible for structural design and calculations, creating a clear technical line from design office to site. When changes or adjustments are needed during construction, the same team can update the design quickly, often within the same day.

Responsiveness and agility help avoid stoppages, keeps the different site teams aligned, and protects the slab cycle. In residential construction, where repetition and sequencing are critical, that level of responsiveness becomes a direct project benefit.

Less steel, greater efficiency

At Side Park, PT has been used not only as a structural solution, but also to improve material efficiency. BECOMAR - BBR Maroc optimized the passive reinforcement ratios in the slabs, reducing the amount of conventional steel rebar required while still meeting the structural performance needed for multistory residential buildings. The result is a slab system that works more efficiently, using the advantages of PT to reduce material intensity without compromising quality or buildability.

This is an important point as projects such as Side Park show that PT is not just for landmark bridges and towers or specialist infrastructure. It is equally relevant in large-scale residential development, where gains in speed, material use, and construction rhythm can be repeated floor after floor.

Repeatable systems support consistent delivery

The project uses BBR anchorage solutions from the BBR VT CONA CMM and BBR VT CONA CMF families. This combination supports a consistent installation method across the different buildings and helps maintain repeatability from one block to the next.

That repeatability is especially valuable when several residential buildings are being delivered in parallel. It simplifies site operations, supports quality control, and helps the teams maintain a steady pace as the project expands.



2

Productivity on site shortens the route to completion

BECOMAR - BBR Maroc's site teams have demonstrated strong productivity throughout the current phase of the project. PT tendon installation is completed in one day, while the slab casting cycle is running at one slab every five days. That pace reflects more than site efficiency alone. It depends on good planning, coordination with the other project teams, just-in-time logistics (JIT) and quick technical support when issues arise.

Together, these factors improve the overall delivery model. Faster slab cycles support earlier project completion, shorten the time for asset owners from development concept to post-completion revenue, and help the client bring residential units to market more quickly.

A strong case for PT in residential construction

As Side Park progresses and the remaining three blocks move toward mobilization, BECOMAR - BBR Maroc is aiming to maintain the same combination of speed, organization, and technical control already established on the first phase. The experience gained on the current blocks provides a strong platform for efficient delivery as the residential development grows.



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1 Side Park is a six-block residential development in Zenata Eco City in Casablanca, where post-tensioning is helping deliver efficient, repeatable slab construction across multiple mid-rise and high-rise buildings.
2 The development ranges from seven to sixteen floors and shows how PT supports efficient residential construction at scale.
3 BECOMAR - BBR Maroc's direct link between engineering and site execution helps maintain a fast slab cycle and allows design updates to be implemented quickly when changes are needed on site.
4 More than 32,000m² of PT slabs have already been completed on the first three blocks, helping keep the project aligned with its construction schedule.

TEAM & TECHNOLOGY

Owner/developer – URBA PERFECT
Designer/architect – NOKTA Architectes
Post-tensioning Designer – BECOMAR - BBR Maroc
Main contractor – PBS (Parthenon Building Services)
Technology – BBR VT CONA CMM and BBR VT CONA CMF
BBR Network Member – BECOMAR - BBR Maroc



BBR Adria d.o.o.
Poreč, Croatia
BBR VT CONA CMM for hospitality space

Long spans and slender structures for a new generation resort

At Hotel Pical in Poreč, Croatia, post-tensioning (PT) enables long spans, large cantilevers and complex load transfer, supporting both architectural ambition and structural efficiency across a major tourism development.



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Hotel Pical 5*, with an investment value of approximately €200 million, represents the largest single investment to date in Croatian tourism. Designed as a multi-functional resort with 514 accommodation units, the complex combines luxury, family and active tourism with business and conference facilities. For the structural design, the challenge was to deliver large open spaces, long spans and slender elements while maintaining efficiency and buildability. PT plays a central role in achieving these requirements across several key areas of the development. BBR Adria, the BBR Network Member for Bosnia & Herzegovina, Croatia, Montenegro, Serbia and Slovenia, more than met that challenge.

Across the Pical complex, PT is applied in multiple zones where conventional reinforced concrete solutions would not achieve the required spans, slenderness or architectural intent. These areas represent a clear step beyond standard structural solutions, particularly in the treatment of load transfer, cantilever behavior and structural depth.

Delivering large cantilevers without increasing structural depth

One of the most demanding areas is the V level, a P+2 structure defined by a large atrium and a prominent cantilevered volume





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extending 10.5m. At the junction of the two wings, the structure is formed by a grillage at a height of 6.9m, using shallow PT beams with dimensions of 400 x 80cm and 500 x 80cm. These span 17m longitudinally and terminate in a semi-circular cantilever. The result is an open, transparent restaurant space oriented toward the surrounding forest and sea.

The structural behavior of this cantilever is carefully controlled. The slab thickness reduces from 80cm to 30cm toward the cantilever tip, while two additional floors above act as significant imposed load. A wall element above the upper levels contributes to the overall stiffness of the system. Although this wall is not continuous with the internal structure, force transfer through horizontal slabs provides additional rigidity. PT forces are introduced into the wall in the direction of the tensile diagonal, reducing tensile stresses and limiting long-term deflection. Survey measurements following formwork removal confirmed that deflection at the cantilever tip was approximately 30% lower than predicted. Within the atrium, further cantilevered elements extend 3.5m at corridor level, with a roof cantilever supporting a skylight spanning 4.5m. These elements are also executed using PT, maintaining structural efficiency while achieving the required architectural openness.

Managing complex load transfer between structural systems

In the central part of the complex, the lower floors are arranged on a grid of 7.4 × 10.0m, supported by PT slabs with thicknesses of 24cm and 26cm. Above this, three accommodation blocks are arranged on a different structural grid, requiring the introduction of a transfer slab. This slab, with a thickness of 60cm, is stressed in stages as the upper floors are constructed. At one edge, it forms a 3.9m cantilever supporting four levels above.

Additional complexity arises in the pool area, where column lines from the upper structure are interrupted. This creates a double span of 14.8m, resolved using post-tensioned shallow beams measuring 200 x 75cm. The solution allows for open, unobstructed spaces below while maintaining structural continuity above.

Creating large, flexible interior spaces for high occupancy

The congress center introduces another set of structural requirements, defined by a large hall with plan dimensions of 38.9 × 23.9m. The primary span of 23.9m is achieved using wide, shallow PT beams measuring 200 x 70cm. Between these beams, a monolithic slab of 22cm thickness completes the structure. Edge columns measuring 50 x 100cm allow partial frame action, while perimeter beams of 40 x 340cm provide additional stiffness. The result is a large, flexible interior space capable of accommodating up to 1,200 participants.

Across all areas of the project, PT enables a consistent approach: reducing structural depth, increasing span capability and controlling deflection under both short-term and long-term loading. This allows the architecture to remain open and flexible, while ensuring structural performance and durability.



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1 Panoramic view of the Pical resort complex
2 Cantilevered end of the V level structure extending 10.5m
3 Atrium of the V level showing large roof cantilevers and open internal space
4 Restaurant area beneath the 17m span and 10.5m cantilever
5 Installation of PT cables within the 60cm transfer slab
6 Concreting of the PT roof slab in the congress hall
7 Interior of the congress hall with a clear span of 23.9m

TEAM & TECHNOLOGY

Owner/developer – VALAMAR Riviera d.d.
Structural Designer – KONSTRUKTA d.o.o.; BBR Adria d.o.o.
Main contractor – Kamgrad d.o.o.
Technology – BBR VT CONA CMM Two/Four monostrand system
BBR Network Member – BBR Adria



Aergon Prestressing Systems Pvt Ltd.
Mumbai, India
BBR VT CONA CMF and BBR VT CONA CMI for mixed-use development

Large floor plates, no expansion joints, one integrated solution

Aergon Prestressing Systems Private Limited (Aergon) is using BBR VT CONA CMF and BBR VT CONA CMI internal tendons to help deliver Prestige 101, a major mixed-use development in Bandra Kurla Complex, Mumbai, India. An innovative post-tensioning (PT) solution removes the need for expansion joints across the large floor plate.

In one of Mumbai's busiest commercial districts, Prestige 101 is being constructed on a constrained and congested city-center site with an ambitious and demanding architectural vision. BBR Network Member for India, Aergon, is using PT to create large, efficient floor plates without expansion joints, improving durability, reducing maintenance and supporting faster construction.



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1 Prestige 101 is rising in Bandra Kurla Complex where Aergon is using PT to create large, joint-free floor plates in a major mixed-use development.
2 Prestige 101 is a premium development located in Mumbai's financial district with a restricted footprint for construction.
3 The development occupies a prominent site in central Mumbai.

Prestige 101 is a large mixed-use development in the Bandra Kurla Complex, Mumbai's premium financial district. Planned as a landmark destination for offices, banking, retail, and hotel use, the scheme occupies a prominent central location and brings together two combined plots into a single major development. The project is a strong example of how PT can solve a specific structural problem while also supporting buildability on a congested urban site.

The scale of the structure is one of the defining challenges. The combined floor plate is around 24,920m², creating a very large concrete footprint across two connected plots. On a structure of this size, creep and shrinkage become increasingly important because the concrete expands and contracts over time. Designers would typically address that movement by introducing expansion joints. For Prestige 101, however, the architectural requirement was clear: the structure was to be built without them.

That requirement was not simply aesthetic. In Mumbai's heavy rainfall conditions, expansion joints create a long-term maintenance burden. They require inspection, servicing, and eventual replacement, all of which add cost and operational disruption over the life of the building. Removing them would improve continuity, reduce maintenance demands, and support long-term performance. But it also created a difficult structural challenge. If movement from creep and shrinkage is not properly understood and controlled, the result can be cracking that continues to develop during the early years of the structure's life.

Innovative modeling helps manage movement risk

Aergon developed the solution in collaboration with Buro Happold. Since creep and shrinkage cannot be modeled directly in the available structural software, the team adopted an innovative workaround. First, they calculated the strain that the concrete would experience as it shrank or expanded over time. They then identified the equivalent temperature changes required to reproduce that equivalent strain. By applying those temperature loads as a dedicated combination of load cases, the team could see where rigidity within the structure prevented movement and where additional reinforcement or PT was required to accommodate it.

This approach enabled the design team to refine the detailing of reinforcement and PT so the structure could better absorb movement. In areas of higher strain, additional rebar and, in some cases, prestress were introduced to improve control and ductility. The result is a joint-free structural concept tailored to the realities of a very large floor plate, balancing architectural intent with long-term durability and structural performance.

PT supports scale, efficiency, and structural optimization

The PT solution also supports the wider performance of the project. Aergon is designing and executing a structure that will use about 750t of PT and approximately 6,000 BBR VT CONA CMF S2 anchorages across a 195,000m² building area within the overall 381,000m² development. The primary PT system is BBR VT CONA CMF S2. In addition, BBR VT CONA CMI internal 1206 tendons have been used for selected beams at podium level, where longer spans and heavier loads required further optimization.

This is also a project where buildability matters as much as design. Located in the center of Mumbai's financial hub, the site offers very limited working space. Material deliveries must be carefully planned on a just-in-time (JIT) basis, with minimal opportunity for storage. Once the project reached ground level above the three basements, Aergon designed the slab so it could safely carry stacked construction materials, helping the contractor create temporary storage capacity on site and supporting faster progress in a tightly constrained environment.

Construction is underway, with four slabs already completed and around 200t of PT installed on site at the time of writing. One part of the building is arranged for hotel use and another for commercial offices, creating different structural demands within the same development. Above ground floor level, large steel transfer girders also manage changes in load path and column positions associated with the mixed-use arrangement. Against that backdrop, the PT strategy remains central to delivering efficient floor construction and the required open, uninterrupted plate geometry.

A project that shows PT solving more than span challenges

For the wider BBR Network, Aergon's innovative solutions for Prestige 101 are important because they show how PT can be applied not only for efficiency and speed, but also to resolve a highly specific structural challenge. The project demonstrates the versatility of BBR PT systems in a demanding commercial setting and shows how PT can simultaneously support architectural intent, buildability, and long-term asset performance. In one of India's most prominent business districts, that combination is helping shape a development designed for the future of work and urban growth.

TEAM & TECHNOLOGY

Owner/developer – Prestige Group
Designer/architect – Hafeez Contractor
Structural Designer – BURO HAPPOLD
PT Designer – Aergon Prestressing Systems Private Limited
Main contractor – L&T Constructions
Technology – BBR VT CONA CMI and BBR VT CONA CMF
BBR Network Member – Aergon Prestressing Systems Private Limited



BBR Saudi Arabia
Saudi Arabia and Bahrain
BBR VT CONA CMF for buildings

Ambitious projects across Saudi Arabia and Bahrain are built faster using post-tensioning

Across Saudi Arabia and Bahrain, post-tensioning (PT) is helping asset owners, developers and contractors deliver larger spans, slimmer slabs, and more flexible buildings without losing control of speed, serviceability, or buildability. These seven projects by BBR Network Member for Saudi Arabia and Bahrain, BBR Saudi Arabia, show **Build+** in practice: proven PT expertise applied where architectural ambition, commercial pressure, and structural efficiency all must work together.

From Riyadh towers to Qiddiya hospitality schemes, and from Al Khobar to Bahrain's Marassi Island, the pattern is consistent. PT is not being used as a specialist extra. It is being used as a practical structural strategy. That is significant in a region where Saudi Arabia's Vision 2030 is accelerating investment in hospitality, mixed-use destinations, housing, and leisure infrastructure. In that context, PT helps project teams do more with the frame itself: reduce slab thickness, limit reinforcement congestion, control deflection, and create wider spans that modern building types increasingly demand.

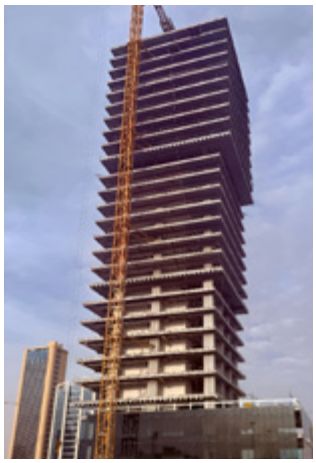
The technical principles are established. What is changing is the scale and range of projects where they are being applied. These seven developments show how PT, in the hands of expert BBR Network Member for Saudi Arabia and Bahrain, is supporting faster delivery, more efficient use of materials, and buildings that are easier to plan, construct, and operate.



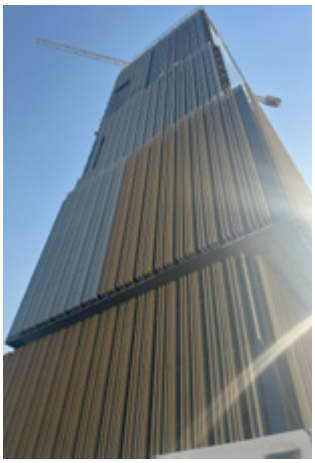
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1 Long cantilevers demand tighter deflection control enabled by PT

Rosais Tower, Riyadh

Rosais Tower in Riyadh is a clear example of PT being used to meet a very specific structural challenge. The tower uses the BBR VT CONA CMF S1 flat bonded PT system with 50MPa concrete, supported by approximately 120t of tendons and nearly 2,000 BBR VT CONA CMF S1 anchorages. PT beams and slabs form the primary structural framing system.

The critical engineering issue was not scale but control. The structure had to achieve 7.0m cantilevers while limiting deflection to a maximum of 10mm to satisfy demanding façade and cladding requirements. That pushed serviceability to the front of the design problem. Optimized tendon profiling and controlled stressing procedures allowed the structure to meet those limits while also improving crack control and long-term performance.

That is where PT creates real value. Instead of forcing compromise into the architecture or adding unnecessary structural mass, it allows the frame to work harder and more precisely. On a project like Rosais Tower, that means buildability is improved without weakening the design intent.

2 Complex slab geometry calls for a more controlled structural response

Water Park Hotel, Qiddiya

The Water Park Hotel at Qiddiya, Towers A and B, shows the value of PT on a hospitality project where slab geometry is far from straightforward. The building uses the BBR VT CONA CMF S1 flat bonded PT system across approximately 54,934m² of slabs, with nearly 265t of PT strands and around 4,000 BBR VT CONA CMF S1 anchorages. The average slab thickness is 260mm.

The main challenge came from multiple sunken slab areas. These required careful coordination of tendon profiles and local reinforcement detailing, especially where columns sat adjacent to depressed slab zones. Those conditions created critical punching shear issues and demanded precise tendon draping, localized strengthening, and strict serviceability control.

This is exactly the kind of problem that needs PT expertise. The system had to maintain adequate tendon eccentricity while also accommodating architectural constraints and changing slab levels. The result is a structure better able to deal with demanding geometry without overcomplicating the slab build-up or increasing structural depth beyond what the building requires.

That supports the larger point behind many projects in Saudi Arabia today. Ambition in hospitality and leisure development increases the need for efficiency.



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3 High-rise hospitality needs span efficiency without structural compromise

Fairmont Hotel, Al Khobar

The Fairmont Hotel in Al Khobar is a five-star hospitality tower rising more than 40 stories. Projects at this level are shaped by a difficult mix of structural demands: complex geometry, high loads, and large cantilever zones, all within a building type where serviceability and coordination are critical.

To address that combination, the project adopted the BBR VT CONA CMF S1 flat bonded PT system for the slab structure. Approximately 110t of PT strands have been installed across about 20,948m² of PT slab area, supported by around 2,500 BBR VT CONA CMF S1 anchorages. The PT slabs extend across podium floors and typical tower levels up to the upper stories.

The benefit is both longer spans and better structural behavior where the building needs it most. PT improves deflection control and supports efficient slab performance in the large cantilever zones, while also improving constructability through a more rational tendon layout and reliable anchorage performance.

For premium hospitality, the structure has to support operational quality as well as architectural expression. In practice, that means keeping the frame efficient enough to serve planning, fit-out, and guest experience, not just the calculations.

4 Large column-free spaces give mixed-use development more value

The Point, Abha

The Point in Abha is a clear example of PT directly enabling a commercial concept. The mixed-use development combines retail, cinema, hotel, and leisure functions in a single destination. That demands large, open spaces and a structure capable of supporting different uses without overloading the floorplate with columns or depth.

The project uses bonded PT with the BBR VT CONA CMF S2 flat bonded PT system, incorporating approximately 650t of PT strands and 16,250 BBR VT CONA CMF S2 anchorages. The system creates the large column-free areas required for mall zones, cinema halls, and hotel floors, while also optimizing slab thickness, controlling cracking, and limiting long-term deflection.

This is where PT becomes more than a technical decision. It becomes part of the commercial logic of the building. Open floorplates improve usability. Better span efficiency supports tenant flexibility. A leaner slab solution helps preserve height and space while still meeting demanding hospitality and retail requirements.

The PT scope was completed within 12 months, which adds an important delivery point. Structural efficiency only matters on paper if it also works on site. Here, it clearly did both.



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5 Slimmer slabs support a more efficient high-rise residential frame

Al Majidiya Residence, Riyadh

Al Majidiya Residence in Riyadh uses PT to solve a familiar but important urban building challenge: how to maintain efficient slab thickness while accommodating significant spans and cantilever areas in a high-rise residential structure.

The building includes 23 PT slabs from Basement 1 to roof level. The slabs are 280mm thick with drop panels and are designed for average spans of around 9.0m, along with several larger spans and cantilever zones. The BBR VT CONA CMF S2 flat bonded PT system includes approximately 70t of strands and around 1,500 BBR VT CONA CMF S2 anchorages.

Here, the case for PT is straightforward and strong. It controls deflection, improves crack resistance, and reduces reinforcement congestion while keeping slab thickness within economical limits. That is a practical gain for the whole project team. The contractor gets a buildable structural solution. The developer benefits from efficient use of material and space, plus the lower embodied carbon. The building gains a frame better suited to long-term residential performance.

This is exactly the kind of project where BBR Saudi Arabia's specialist PT design input adds value early. General structural requirements are only part of the challenge. The real gain comes from shaping a solution that is efficient to build, technically sound and lower in carbon.

6 Flat slabs and longer spans create more freedom at residential scale

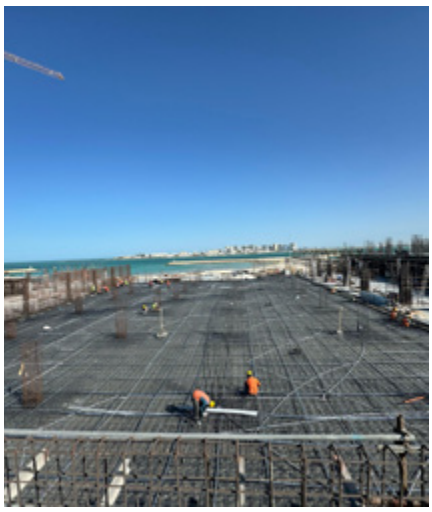
Marassi Views, Marassi Island, Bahrain

Marassi Views, Plot 7, on Marassi Island in Bahrain, shows how PT can improve residential delivery at large scale. The project uses the BBR VT CONA CMF S2 flat bonded PT system as the primary structural solution across approximately 85,000m² of flat slabs, with nearly 340t of PT strands and around 8,500 BBR VT CONA CMF S2 flat anchorages.

The structural layout is based on average spans of 9.6m, with slab thicknesses between 260mm and 300mm, designed as flat slabs without drop panels. That configuration is important because it combines efficient load distribution with cleaner soffits, better material use, and more architectural freedom, all while maintaining strict serviceability and deflection criteria.

For residential buildings, those are important gains. Cleaner slab systems can improve planning flexibility and simplify coordination. Efficient span arrangements can help protect saleable space and reduce structural intrusion into layouts. That translates directly into value for both developers and occupants.

The full PT scope was delivered within 12 months, demonstrating that PT can support speed as well as technical performance. Although outside Saudi Arabia, the project strengthens the wider GCC story by showing the same **BBR Build+** principles applied at scale in Bahrain.



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7 Heavy loading and long spans make PT the practical choice

Grand Hotel, Qiddiya

Grand Hotel in Qiddiya adds another hospitality project to the portfolio, but with a different structural profile. The building includes approximately 27 PT slab levels from Level 1 to roof, with typical slab thickness of 300mm. The structure also has long spans of about 11m, high imposed loads, and large cantilever areas.

Those conditions make PT the logical solution. Approximately 132t of PT material and around 2,500 BBR VT CONA CMF S1 flat anchorages have been used, with the BBR VT CONA CMF S1 system selected to meet both structural and serviceability requirements. In particular, the system supports deflection control, span efficiency, and reliable performance under heavy loading and cantilever action.

The PT value proposition is clear. Hospitality buildings at this scale need more than raw structural capacity. They need a floor system that remains efficient, coordinated, and practical to construct while supporting demanding use conditions.



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1 PT technologies, designed and delivered by BBR Saudi Arabia, play a vital role in enabling some of the leading public, commercial and residential developments throughout Saudi Arabia and Bahrain.
2 Rosais Tower, Riyadh, during construction. The image gives a clear view of the building frame, where PT beams and slabs form the primary structural system.
3 Rosais Tower, Riyadh, under construction. The rising frame shows how PT supports a leaner structural solution on a high-rise project with demanding cantilever and deflection requirements. The structural form and repetitive floorplates highlight the value of PT in maintaining buildability, span efficiency, and tight serviceability control.
4 Architectural visualization of Rosais Tower, Riyadh. The image illustrates the finished tower expression supported by a PT structural frame designed to manage 7.0m cantilevers with tightly controlled deflection while protecting façade alignment and long-term serviceability.
5 Water Park Hotel, Qiddiya, Towers A and B, under construction. The image shows the active structural works behind a hospitality project where PT had to respond to sunken slab areas, varying levels, and localized punching shear demands.
6 Architectural visualization of Water Park Hotel, Qiddiya, Towers A and B. The project demonstrates how PT can help deliver complex hospitality structures with demanding slab geometry and tight serviceability requirements.
7 Architectural visualization of the Fairmont Hotel, Al Khobar. The tower's complex geometry and prominent cantilever zones reflect the kind of high-rise hospitality design where PT improves span efficiency, serviceability, and buildability.
8 Fairmont Hotel, Al Khobar, under construction. The image shows the rising tower and podium structure, where PT supports the long spans, large cantilever zones, and efficient slab performance needed for a high-rise hospitality development.
9 Architectural visualization of The Point, Abha. The image highlights the development's leisure and hospitality character, supported by a PT structural solution that enables open, commercially flexible floorplates across multiple uses.
10 The Point, Abha, under construction. The image shows the scale of the slab works required for a mixed-use destination where bonded BBR VT CONA CMF S2 creates the large column-free areas needed for retail, cinema, hotel, and leisure uses.
11 The Point, Abha, during construction. Active slab reinforcement and site progress show how the PT solution supports efficient floorplates, controlled cracking, and long-term deflection performance across a complex mixed-use development.
12 Architectural visualization of Al Majidiya Residence, Riyadh. PT supports the longer spans and leaner structural frame needed for a high-rise residential building with efficient, commercially usable floorplates.
13 Al Majidiya Residence, Riyadh, during construction. The image shows the tower frame taking shape on site, where PT helps control slab depth, manage cantilever demands, and support efficient floor-by-floor progress.
14 Marassi Views, Bahrain, under construction. The image shows active slab construction in a waterfront setting, where flat-slab PT design helps create longer spans, cleaner soffits, and greater layout flexibility.
15 When completed, Marassi Views will be a distinctive prestige residential complex.
16 Grand Hotel, Qiddiya. This luxury high-rise features large dramatic internal spaces only made possible by BBR VT CONA CMF PT.

TEAM & TECHNOLOGY

1 ROSAIS TOWER, RIYADH
Owner/developer – Abdulaziz Al Rosais Real Estate Company
Designer/architect – Faris Alfaris Consultants
PT designer – BBR Saudi Arabia
Main contractor – Al Nofoth Contracting Company
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia

2 WATER PARK HOTEL, QIDDIYA
Owner/developer – Qiddiya Investment Company
Designer/architect – DSA Architects International
PT designer – BBR Saudi Arabia
Main contractor – BUJV, a joint venture of Al Bawani and UCC
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia

3 FAIRMONT HOTEL, AL KHOBAR
Owner/developer – Ajdan
Designer/architect – Afniah
PT designer – BBR Saudi Arabia
Main contractor – Building Specialized Contracting Co. (BSCC)
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia

4 THE POINT, ABHA
Owner/developer – RASM, Red Sea Markets Company – Asir
Designer/architect – DLR Group
Structural designer – ECG Engineering Consultants Group
PT designer – BBR Saudi Arabia
Main contractor – Built Industrial Company
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia

5 AL MAJIDIYA RESIDENCE, RIYADH
Owner/developer – Dar Al Majed Real Estate, Al Majidiya
Designer/architect – ZK Engineering & Architecture
PT designer – BBR Saudi Arabia
Main contractor – YCOON Build
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia

6 MARASSI VIEWS, MARASSI ISLAND, BAHRAIN
Owner/developer – Eagle Hills Bahrain
Designer/architect – MSCEB, Mohamed Salahuddin Consulting Engineering Bureau
PT designer – BBR Bahrain
Main contractor – Kooheji Contractors
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia

7 GRAND HOTEL, QIDDIYA
Owner/developer – Qiddiya Investment Company
Designer/architect – PROMONTORIO
PT designer – BBR Saudi Arabia
Main contractor – Al Bawani
Technology – BBR VT CONA CMF flat
BBR Network Member – BBR Saudi Arabia



Contech
New Zealand
BBR VT CONA CMF for industrial floors and warehouse buildings

A long-term partnership built on better floors

Contech's Southern Regional Manager Peter Higgins explains why Calder Stewart keeps coming back.

For nearly three decades, Contech, the BBR Network Member for New Zealand, has helped Calder Stewart deliver large-format industrial and logistics buildings with its post-tensioned (PT) floor solutions enabling fewer joints, lower maintenance demands and greater confidence in construction.

The strongest client relationships are rarely built on price alone. They endure because one team keeps solving the same problem better than the alternatives. That is the story of Contech's long-standing relationship with family-owned developer and asset manager Calder Stewart in New Zealand. Over more than 26 years and across some 70 building projects, the partnership has grown because PT floor slabs have consistently delivered what these buildings need most: durable, high-performing floors that support modern industrial, logistics and storage needs, reduce maintenance, and work at scale.

The relationship began in the early 2000s, when large warehouse and industrial buildings were becoming more demanding in terms of performance. Logistics operators needed bigger floor areas and harder-working buildings. Conventional floors, with sawcut joints, were increasingly vulnerable to wear from constant forklift traffic. Over time, those joints would deteriorate, creating maintenance problems for both the building and the machinery running across it. This meant downtime for repairs and loss of revenue. PT offered a better answer. It enabled larger floor areas with significantly fewer movement joints, improving long-term performance in exactly the environments where reliability and load bearing mattered most.

That technical advantage aligned well with Calder Stewart's model. As both a commercial builder and a long-term asset owner, it had good reason to look beyond the lowest upfront cost. Higgins describes a client that takes a longer view, one shaped by asset performance, maintainability, and tenant needs over time. For logistics, dairy, and distribution buildings, that makes the floor part of the business case.



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Why the relationship lasted

Trust in this partnership appears to come from the way the two teams work together early in the project development phase. Where Calder Stewart sees a project that suits a PT floor, Contech is brought in during the design process, alongside the lead structural engineer and Calder Stewart's construction team, to help shape the slab solution. The design is then refined to suit both technical requirements and the realities of site construction. That early involvement helps Calder Stewart move through consenting with confidence while giving Contech visibility of the pipeline and time to procure proprietary materials.

This is more than a subcontractor relationship. Contech is part of the delivery thinking, adding value because industrial buildings are often won or lost in the details of how they are built. Floor layout, pour sequence, site constraints, and long-term operational demands all need to work together. The value of the relationship is that these issues are resolved collaboratively, not left to chance late in the program.

What PT changed for warehouse buildings

PT slab floors minimize joints, which reduces the long-term wear caused by forklifts and other heavy traffic. That can lower maintenance demands, reduce operational disruption, and improve total cost of ownership for both asset owners and occupiers. In dairy and food-related facilities, fewer joints also support hygiene by reducing places where debris and microorganisms can collect and deterioration can start.

In New Zealand, there is another advantage. Following the Canterbury earthquake sequence, Contech inspected a significant number of PT slabs and found that they had performed well. In one case, a slab floor of around 3,500m² had moved significantly, yet the slab itself remained intact. That kind of performance is important in an earthquake-prone market. Steel fiber floors are specified in some situations, but Higgins is clear about the added resilience that comes with PT tendons holding a slab together under tension.

Projects that prove the model

Several projects help explain why the partnership has endured. Higgins points to early work at PrimePort Timaru as an important marker in the relationship, after an initial dairy project at Edendale in 2002. Later, major jobs such as Fonterra Darfield and Synlait showed how far the model could be extended.

These later two projects combined dry store construction with heavily loaded external pavement slabs for container stacking and rail loading. At Darfield, the external slabs were around 300mm thick and designed to deal with demanding container storage and loadout conditions across very large areas alongside rail sidings. Without PT the likely alternative would have meant thicker, more heavily reinforced slabs and more joints.

The next phase of the relationship is now taking shape in the North Island. Calder Stewart has increased its presence in Auckland and Waikato, and Contech's Auckland team has been supporting that growth on projects including the Briscoes Distribution Centre and the New Zealand Safety Blackwoods facility. These schemes were developed with input from Contech's more experienced South Island team during the design stage, before being delivered locally. It is a good example of a mature partnership scaling into a larger market without losing the methods that made it successful in the first place.

Looking ahead, the story still has room to grow. New Zealand continues to need logistics and distribution space, while warehouses themselves are becoming more automated and more demanding. According to media reports, in just the last three years across New Zealand, Calder Stewart has constructed over 750,000m² of industrial facilities and it holds a further 900ha of industrial zoned land for future developments.

Higgins notes the growth of ultra-flat level floors and robotic picking systems guided through warehouse aisles. That trend makes joint-minimized floor slabs even more relevant. The underlying advantage of PT has not changed. It still helps clients build floors that perform better for longer.

1 Contech's PT ground slab work in New Zealand has reached industrial scale, delivering the large, joint-minimized floor areas that support efficient logistics and long-term asset performance. Fonterra Darfield's milk processing and storage facility features 80,900m² of PT slabs, including an external heavy duty pavement area for loading.

2 Port Nelson warehousing facilities built in 2017 providing a warehousing, distribution and logistics hub for wine industry bottles and bottled wine destined for export. Calder Stewart was appointed as main contractor with Contech designing and installing a 13,000m² PT floor.

3 PT creates large clear load-bearing floor areas needed in modern industrial buildings, reducing joints and supporting more efficient long-term use. The site is Fonterra, Darfield, and was Contech's seventh project on the site in 2019.

TEAM & TECHNOLOGY

Client/partner/developer – Calder Stewart

BBR Network Member – Contech

Application – Industrial floors and warehouse buildings

Technology – BBR VT CONA CMF flat

Key value delivered – Large floor areas with fewer opening joints, lower maintenance demands, improved operational performance, and better long-term asset value



BBR Polska Sp. z o.o.
Zembrzyce, Poland
BBR Care+ for bridge repair

Restoring bridge performance in a complex cable-stayed system

Skawa River bridge, Zembrzyce, Poland

Maintenance, repair, and retrofitting (MRR) works on cable-stayed bridges demand a combination of technical understanding, adaptability, agility and execution precision. These projects rarely follow standard solutions with each system presenting unknowns.

The BBR Network Member for Poland, BBR Polska, was engaged to assess, diagnose, and intervene on a cable-stayed structure originally completed in 2010, the Skawa River bridge in Zembrzyce. The project required detailed inspection, identification of hidden defects, and targeted replacement works, all delivered under constrained access and operational conditions.

The result demonstrates how experience-led engineering, practical innovation and high-quality structural components can restore performance and confidence in critical infrastructure.

"It does not often happen that you get a chance to fully apply all your expertise, in-depth professional knowledge and implementation capabilities. Many projects involve everyday solutions and simply do not provide that chance. However, on this project, BBR Polska was lucky enough to get such an opportunity."

Michał Chrostek, Site Manager, BBR Polska



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Understanding the structure

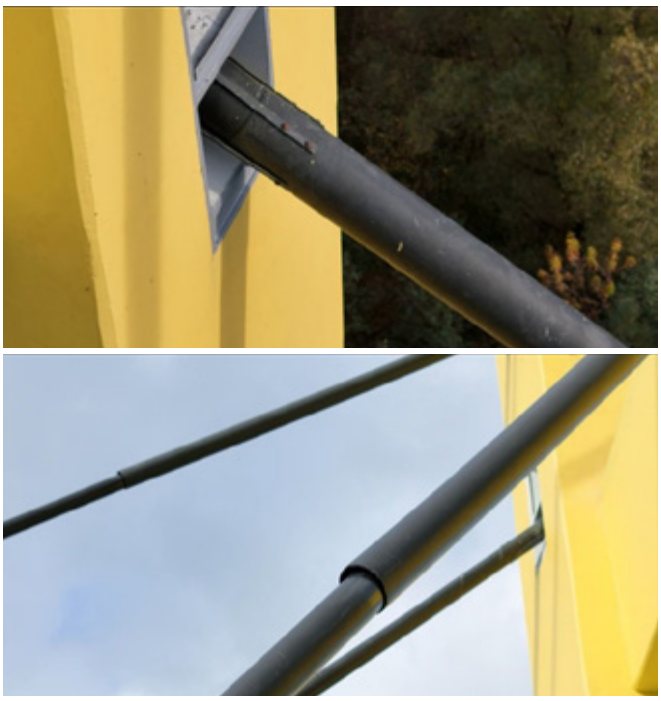
The bridge is a single-pylon cable-stayed structure carrying a regional road across the Skawa River in southern Poland. It also serves as a visual landmark within the surrounding mountainous landscape. The prestressed concrete deck spans 21+35+105+83m. A 50m high concrete pylon supports 20 stay cables arranged in five pairs across the two main spans. Cable stays range from 24-48 strands, with lengths from 29-92m. All strands are 150mm² with 1770MPa tensile strength. The system uses deck-level stressing anchorages and pylon-level fixed anchorages, with no saddle configuration.

The inspection of a third-party stay cable system generally introduces immediate complexity and, on this project, the BBR Polska team was working without system transparency. Detailed system data was not available in the original documentation and BBR Polska had to rely on engineering judgment rather than predefined specifications. This is where experience is critical. Knowledge gained from global cable-stayed projects allowed the team to interpret system behavior, anticipate risks, and adapt inspection methods accordingly.

Inspection strategy and access constraints

A client-approved structured inspection program was developed using archival data and site-specific constraints. Access to the upper anchorages presented a significant challenge. With no internal pylon access, works were carried out during night closures to road traffic using a 50m lifting platform. Operations were often conducted with minimal site support, which required detailed planning and implementation by self-sufficient teams.

When assessing stay pipe integrity, visual inspection focused on identifying defects that could allow water ingress. The lower sections were inspected from deck level and the upper sections were assessed using drone-based video inspection, capturing full-length recordings from two directions. Minor defects were identified at deck level only. These were repaired using PE electro-weldable sleeves, which minimized access risk while ensuring full coverage.



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Anchorage inspection and protection systems

Both lower and upper anchorages were opened for inspection, and the steel protection caps were removed and filling materials partially extracted. The filling material was identified as wax and, while generally effective, localized water accumulation was found in one anchorage. This indicated drainage blockage rather than systemic failure. All the protection caps were refurbished, repainted, and reinstalled with new seals. Recovered wax was reused where suitable and new material was introduced where required, including a thixotropic gel for upper anchorages for added corrosion protection.

Deeper inspection identified serious hidden anchorage issues. Inspection complexity increased due to non-standard anchorage configurations, as oversized anchorages had been used. In all the shortest stay cables, a 27-strand anchorage had been used for 24-strand stay cables, leaving three unused holes in the anchor head. In addition, there were examples of 37-strand anchorages with 32 working strands and 48-strand anchorages with 34 working strands. As these were covered in wax, this made visual identification difficult. Despite these constraints, several defects were identified:

- One strand with an anchorage defect in a 48-strand anchorage discovered during an inspection of lower ends.
- Three additional defective strands across different cables during the upper ends inspection.

On further inspection of the upper anchorages, the team found the anchorages were in steel inserts inside the pylon with very limited working area. These findings required immediate technical evaluation and informed the next phase of intervention.

Accurate force assessment without intrusive intervention

During inspection, one strand in each stay cable was randomly selected for stressing force verification, typically from the outermost layer of the anchorage for ease of access. The longer strand protrusions at stressing anchorages allowed the use of a single-strand monocoupler to extend the strand for testing.

Force measurement was carried out using a monojack supported on the anchorage via a stressing chair. Two stressing chairs from BBR Polska's inventory were adapted in-house to fit all three anchorage sizes present on site, avoiding the need for bespoke fabrication. The monojack was equipped with a strain gauge load cell developed by BBR Polska instead of a conventional pressure gauge, enabling highly stable readings with an accuracy of approximately 0.1% and eliminating typical pressure-related fluctuations.

An indirect method was used, measuring the lift-off force of the wedge and recalculating it using the force–elongation relationship for each stay cable. This provided the final stressing force in the strand after wedge seating. The measured value was treated as a representative average per strand and multiplied by the number of strands in each stay cable to determine cable forces. These results were then compared with archival stressing data from 2010, forming the basis for evaluating the current condition of the structure.



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1 Originally completed in 2010, the Skawa River bridge in Zembrzyce, Poland, required a unique **BBR Care+** solution developed and delivered by BBR Polska.
2 Anchorage inspection showing strand anchoring defects. Close-up view of anchorage head revealing malfunctioning strand seating identified during inspection.
3 Drone-based inspection of stay pipe condition. High-resolution video inspection was used to assess upper pipe sections because there was no direct access.
4 Stay pipe repair using PE electro-weldable sleeves. Before and after comparison showing localized repair at deck level to prevent water ingress.
5 Anchorage with water-contaminated wax. Localized accumulation of water within wax protection layer due to blocked drainage.
6 Refurbished protection caps repainted with new seals restoring long-term corrosion protection.
7 Precision force measurement using monojack system. Lift-off force measurement supported by adapted stressing equipment.
8 Strand removal using rope and pulley system. Optimized method enabling safe extraction with minimal equipment.

Verifying long-term performance under fatigue conditions

In accordance with *fib* (Fédération internationale du béton) recommendations, one strand was removed from a selected stay cable for laboratory testing. The chosen cable showed slightly greater angular misalignment at the lower anchorage, suggesting higher fatigue demand. Analysis confirmed sufficient strand protrusion at the stressing anchorage to allow full destressing, and the outermost lower strand was selected to simplify removal and replacement. The removal process was optimized to minimize equipment and labor. A mono-wire connector linked the strand to a rope system routed through blocks and reels mounted on the pylon. Based on preliminary calculations, manual pulling was sufficient to extract the strand, which proved effective in practice.

The strand was safely removed with continuous support of its upper end, and a replacement strand was installed using the same method and then tensioned. The extracted strand was tested at a Polish technical university, including an axial fatigue test at a stress range of 300MPa with an upper load of 45% GUTS (Guaranteed Ultimate Tensile Strength) over two million cycles, followed by tensile strength verification. All results met *fib* requirements, with no reduction in guaranteed tensile capacity observed.

Delivering complex intervention in confined and constrained conditions

Following inspection, four strands with confirmed anchorage defects were identified for replacement. BBR Polska was appointed to supply and install the new strands. This phase was more complex than the initial replacement, as the defective strands were in less accessible positions. Building on experience from the initial operation, the installation method was refined. The rope and pulley system was retained but reconfigured to improve alignment control. A dedicated frame was designed and fabricated to position blocks and rollers within the confined anchorage zones inside the pylon. Mechanical pulling replaced manual handling due to increased strand length and friction. The works were carefully planned and executed by a four-person team. All four defective strands, located in separate stay cables, were successfully removed and replaced within one week, supported by close coordination with the main contractor.

Extending service life through precise, experience-led MRR intervention

This project highlights the growing need for early-stage MRR interventions on cable-stayed structures entering their first maintenance cycle. BBR Polska combined inspection, force measurement, laboratory validation, and targeted strand replacement within a single coordinated scope, delivered under restricted access conditions and with limited resources. The successful identification and replacement of defective strands, supported by high-accuracy force measurement and testing, ensured continued structural reliability and extended the service life of the bridge.

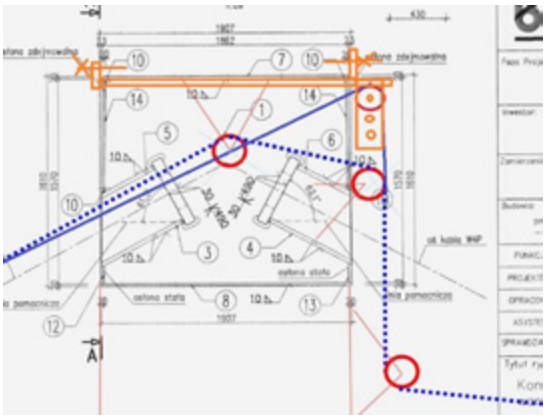


8

TEAM & TECHNOLOGY

Owner/developer – Zarząd Dróg Wojewódzkich w Krakowie
Main contractor – Strabag
Technology – BBR Care+
BBR Network Member – BBR Polska Sp. z o.o.







BBR Saudi Arabia
BBR Care+ MRR range for structure reinforcement and life extension

Extending asset life through targeted structural upgrading

Across four projects in Saudi Arabia, BBR Saudi Arabia combined investigation, analysis and post-tensioned (PT) strengthening technologies to restore structural performance, enable change of use and avoid the carbon cost of demolition and rebuild.

Maintenance, repair and retrofitting is no longer about purely fixing defects. Increasingly, it is about recovering value from existing assets, adapting buildings for new demands and extending structural life where demolition and new build would be more disruptive, more expensive and more carbon intensive. That is the logic behind **BBR Care+**: understanding what a structure can safely do, identifying where performance falls short, and applying the right PT strengthening solution to bring it back into service or prepare it for a new role. The BBR Network Member for Saudi Arabia, BBR Saudi Arabia, demonstrates how that approach works in practice. The team combines assessment, modeling and targeted interventions to solve different structural problems while delivering the same outcome: a usable, safe and more durable asset.



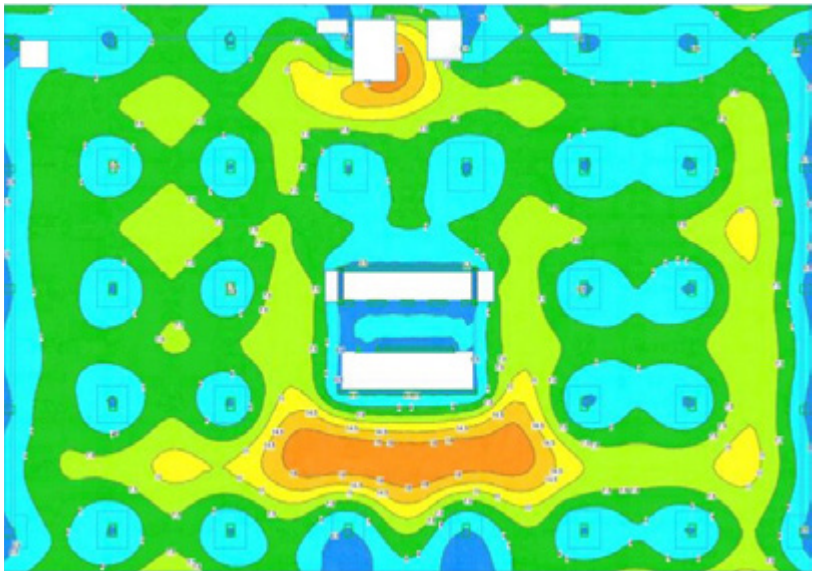
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1 Restoring structural integrity and extending service life through integrated strengthening

KBP Project, Al Khobar

The KBP Project in the port city of Al Khobar is the clearest example of why structural rehabilitation begins with diagnosis rather than product selection. An office building presented concerns in its slabs, columns and foundations, so the first challenge was to establish what was happening structurally and where the critical weaknesses lay. BBR Saudi Arabia completed a detailed assessment program using a range of non-destructive testing (NDT) approaches. These included rebound hammer testing, ultrasonic pulse velocity (UPV), pull-off tests, ground penetrating radar (GPR) scanning, corrosion assessment and structural analysis to verify concrete strength, reinforcement layout and the condition of the structure.

That work identified several issues: slab stress failures, excessive long-term deflection, punching shear deficiencies at columns and foundation settlement concerns. The response was an integrated strengthening scheme, because no single measure could solve every issue. Drop panels were added at critical slab-column connections to improve punching resistance. External PT using the BBR SSK system was introduced to reduce stresses and control slab deflection. Carbon fiber strengthening was used where structural modifications were constrained, while concrete jacketing increased the capacity of critical columns. At foundation level, 521 BBR SDX T73 micropiles were introduced to improve bearing performance and reduce settlement. The benefit of this combined approach is that each intervention addressed a specific structural weakness, but together they restored overall performance. Rather than accepting progressive deterioration or major reconstruction, the project recovered the building's strength and serviceability and returned it to safe long-term use.



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2 Recovering load-bearing capacity and ensuring long-term structural safety

Makkah University, Makkah

At Makkah University, the challenge was more fundamental. Structural investigation identified very low concrete compressive strength in several columns, raising immediate concerns about load-bearing capacity and long-term safety. Testing indicated compressive strengths in the range of 10-20MPa, well below what would normally be expected for primary structural elements. This was not a case of minor local repair. It required a strengthening strategy that could compensate for poor concrete quality and restore confidence in the structure's ability to perform.

BBR Saudi Arabia began with assessment and analysis, using core testing and non-destructive inspection to define the extent of the problem and the degree of intervention required. From there, a strengthening program was developed using concrete jacketing, steel jacketing and CFRP strengthening according to the severity and location of the deficiencies. That was important because it shows the value of a tailored rehabilitation strategy rather than a standard response. The result was a structure with restored capacity and improved long-term reliability. For the client, the key benefit was straightforward: retaining the asset and making it safe for continued use rather than facing the cost and disruption of replacement.

3 Improving slab performance and operational reliability in a critical transport hub

Haramain High-Speed Train Station, Makkah

The structural issues facing Haramain High-Speed Train Station centered on very low concrete strength and excessive slab deflection in parts of the station. In a transport environment, where reliability, safety and operational confidence are essential, these are not cosmetic problems. They affect both structural behavior and the future performance of the building. The challenge was to strengthen the affected areas quickly and systematically while improving slab behavior at column locations.

The solution focused on approximately 365 drop panels formed through concrete jacketing around column zones. These were designed to reduce slab deflection and enhance punching shear capacity at the slab-column connections. Although simple in principle, the intervention is a good example of matching the strengthening method to the structural problem. Here, the issue was not just insufficient capacity in abstract terms, but the local behavior of slabs under load and around supports. By improving those zones directly, BBR Saudi Arabia was able to address both serviceability and structural safety. The works were completed within six months, demonstrating another important aspect of MRR work: effective structural upgrading must not only be technically correct, but also practical to deliver on site and within program.



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1 KBP Project, Al Khobar: integrated strengthening combined column upgrading, slab intervention and foundation support to restore structural performance. A BBR Saudi Arabia engineer is tensioning the SSK external PT strands.
2 Stress modeling for the KBP project in Khobar. All **BBR Care+** MRR projects begin with detailed investigations and modeling to determine and deliver the optimal solutions.
3 KBP Project, Al Khobar: external slab strengthening components were introduced where structural performance had to be improved, in this case slab deflection, without major reconstruction.
4 KBP Project, Al Khobar: CFRP strips bonded to floor slabs alongside BBR SSK external PT provide highly targeted structural strengthening.
5 Makkah University, Makkah: column strengthening restored load-bearing capacity where poor concrete quality had compromised structural safety.
6 Ministry of Energy, Jeddah: steel jacketing on the columns enhances load-bearing capacity.

4 Enabling structural adaptation to support new layouts and increased loading demands

Ministry of Energy, Jeddah

The Ministry of Energy project in Jeddah shows how architectural change can drive major structural consequences. Significant modifications to the building layout altered loading conditions and affected the performance demands placed on the existing structure. Before any strengthening could begin, BBR Saudi Arabia carried out a full structural evaluation and engineering study to verify what the building could support under the revised requirements.

The resulting intervention again combined several methods. CFRP strips were applied to selected slabs to compensate for missing or insufficient reinforcement and improve flexural capacity. External PT using the BBR SSK system was introduced to reduce excessive slab deflection, increase stiffness and improve load-carrying performance. Columns were upgraded with steel and concrete jacketing to take additional axial and shear demand, while structural walls were strengthened to improve stability and overall capacity. The value of this approach lies in how directly it links technology to outcome. CFRP provided a low-profile strengthening measure where added reinforcement was needed. External PT actively improved slab behavior. Jacketing increased the capacity of the vertical system where new loads had changed the structural balance of the building. Together, those measures allowed the structure to meet new functional and architectural requirements without sacrificing safety.

BBR Care+ in action: extending asset life and reducing carbon

Taken together, these four projects illustrate what **BBR Care+** means in practice. The starting point is always understanding the structure properly: its condition, its weaknesses and the demands now being placed upon it. The next step is selecting the right combination of strengthening measures, whether that means external PT, CFRP, jacketing, micropiles or a mix of several techniques. The outcome is not only repaired concrete or strengthened slabs, but assets that can continue to serve, adapt and create value while reducing carbon. In that sense, MRR is both an engineering discipline and a sustainability strategy. By extending structural life and enabling change of use, BBR Saudi Arabia is helping clients preserve built assets that might otherwise be lost.



6

TEAM & TECHNOLOGY

1 KBP PROJECT, AL KHOBAR

Owner/developer – Nesma and Partners

Technology – Structural assessment and analysis; non-destructive testing; external PT using the BBR SSK system; CFRP strengthening; concrete jacketing; drop panels; micropiles (BBR SDX T73)

BBR Network Member – BBR Saudi Arabia

2 MAKKAH UNIVERSITY, MAKKAH

Owner/developer – Makkah University

Technology – Structural assessment and analysis; core testing; non-destructive testing; concrete jacketing; steel jacketing; CFRP strengthening

BBR Network Member – BBR Saudi Arabia

3 HARAMAIN HIGH-SPEED TRAIN STATION, MAKKAH

Owner/developer – Saudi Binladin Group

Technology – Structural assessment and analysis; concrete jacketing; drop panel strengthening; slab strengthening at column zones

BBR Network Member – BBR Saudi Arabia

4 MINISTRY OF ENERGY, JEDDAH

Owner/developer – Ministry of Energy

Technology – Structural assessment and analysis; CFRP strengthening; external PT using the BBR SSK system; steel jacketing; concrete jacketing; wall strengthening

BBR Network Member – BBR Saudi Arabia



Stahlton AG
Zurich, Switzerland
StüKo® punching shear reinforcement for parking garage

Extending a parking garage life by upgrading punching resistance

At City Parkhaus Gessnerallee in Zurich, Stahlton AG uses the StüKo® prefabricated column head strengthening system to upgrade punching resistance, meet modern standards, and minimize disruption in a constrained urban structure – a classic **BBR Care+** approach.

In dense urban environments, upgrading existing structures often requires more precision than new construction. The challenge for Stahlton's team working on the City Parkhaus in Zurich was twofold: to improve structural performance, and to achieve this within tight access conditions, limited shutdown windows, and without compromising the existing asset. The BBR Network Member for Switzerland, Stahlton, applied its StüKo® column head strengthening system to upgrade punching shear resistance across multiple levels within the garage, restoring compliance with current standards while maintaining the integrity of the existing structure.



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After nearly 20 years of operation, the four-level underground parking structure at Gessnerallee, a few hundred meters from the city's Central Rail Station, was reassessed to verify its structural capacity. Following the installation of cathodic corrosion protection, the asset owner City Parkhaus AG decided to upgrade the columns to meet updated design standards. The objective was to improve structural performance without weakening or significantly altering the existing concrete structure.

Enhancing structural capacity without invasive intervention

The selected solution was Stahlton's StüKo® column head strengthening system, designed to improve punching resistance at slab-column connections. The system provides a clear and direct load transfer mechanism while avoiding the need for major structural modifications. This is critical in existing structures, where intrusive interventions can introduce additional risks or complexity.

Installation is carried out at the column head, where punching forces are highest. By strengthening this zone, the system increases load-bearing capacity while preserving the surrounding structure. The approach allows the existing building fabric to remain largely unchanged, which is particularly important in operational facilities such as parking structures.

Delivering upgrades within tight construction windows

Execution was defined by strict time constraints. This is a busy city-center location in constant demand from motorists so each parking level could only be closed for a limited period, requiring a highly coordinated installation process. Within a six-week window, 47 column head strengthening units were installed on a single level, with works repeated across two levels for a total of 94 units.

The process followed a precise sequence. Corrosion protection was first removed from the upper section of the steel columns, and the underside of the slab was prepared by grinding. The prefabricated StüKo® units were then bonded in place and mechanically connected to the steel columns using welded support rings. Once installed, corrosion protection was reapplied to ensure long-term durability.

Minimizing disruption through prefabrication and coordination

Prefabrication played a central role in achieving the program. All StüKo® units were manufactured in advance in Stahlton's factory workshop, allowing rapid installation on site. This reduced on-site fabrication requirements and helped maintain consistency across all units. The project required close coordination between multiple trades working within confined conditions. Activities such as surface preparation, installation, welding, corrosion protection and fire protection had to be sequenced carefully to maintain progress within the restricted closure periods.

After installation, each unit was enclosed with prefabricated fire protection shells, including sealed joints at the top and bottom. Final finishing was carried out in line with architectural requirements, ensuring that the upgraded structure remained fully integrated with the existing environment.

Achieving performance gains with minimal spatial impact

One of the key advantages of the solution is its compact footprint. The strengthening system requires minimal additional space above parking areas, preserving headroom and usability. This is a critical factor in parking structures, where even small reductions in clearance can affect functionality.

Material usage reflects the scale of the intervention. The project involved more than 20t of steel, approximately 2,500 M16 connections, around 1,600l of epoxy adhesive, and 150m² of fire protection cladding formed from over 1,500 CNC-cut components.

These figures highlight the balance achieved between targeted strengthening and efficient use of materials. Rather than large-scale reconstruction, the intervention focuses on specific structural weaknesses, delivering measurable performance improvements with controlled resource input.

Extending service life through targeted strengthening

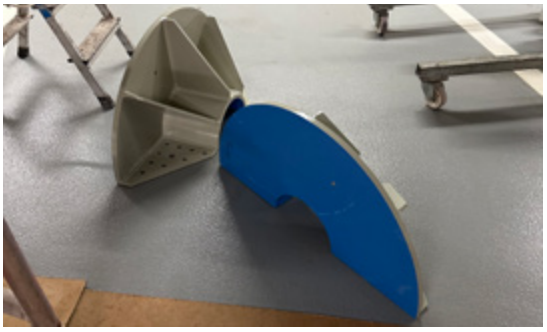
The City Parkhaus project is a demonstration of **BBR Care+**, showing how existing structures can be upgraded to meet modern standards without major reconstruction. By focusing on critical structural zones and applying a prefabricated strengthening solution, Stahlton AG restored punching resistance, improved durability, and extended the service life of the parking facility.

For the BBR Network, this project reflects a broader approach to building rehabilitation, the core of the **BBR Care+** approach. The value lies in both technology and how it is applied: precisely, efficiently, and with minimal disruption to the asset. In urban environments where space, time and access are limited, that combination becomes essential.



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1 Upgraded underground parking levels at City Parkhaus, Zurich, where targeted strengthening restores structural performance while maintaining full functionality.
2 Delivery of prefabricated StüKo® strengthening system units to site, enabling efficient installation within restricted construction windows.
3 A key feature of the StüKo® system is ease of installation.
4 Stahlton's new column head system is custom-dimensioned for each individual project application.

TEAM & TECHNOLOGY

Owner/developer – City Parkhaus AG
Structural Designer – K2S Bauingenieure AG
Main contractor – Stahlton AG
Technology – StüKo® column head strengthening system
BBR Network Member – Stahlton AG



Contech
Tokoroa, New Zealand
Titanium bar strengthening for bridge life extension

Strengthening a busy state highway bridge without rebuilding it

State Highway 1 North, Ngutuwera Stream Bridge, near Tokoroa

The SH1N Ngutuwera Stream Bridge, around 12km north of Tokoroa, has undergone strengthening works by BBR Network Member for New Zealand, Contech. The solution is designed to extend the life of this important section of State Highway 1, a vital transport artery spanning New Zealand's North Island. The project focused on targeted upgrades that could be delivered efficiently and with limited disruption to a live route, avoiding the cost and impact of major reconstruction.

A key feature of the project was the use of titanium bars for flexural strengthening of the bridge superstructure. Titanium was well suited to the job because it combines high strength, strong fatigue performance, and exceptional corrosion resistance. That gave the project team a way to increase flexural capacity without adding significant weight or changing the bridge's overall geometry, both critical advantages on an existing structure carrying live traffic.

Contech was involved early, working with Beca to provide constructability input and practical advice on strengthening methods and installation. That early collaboration helped shape a solution that was technically sound, practical to deliver on site, and straightforward to integrate into Waka Kotahi Contract 2925. The result is a durable, low-maintenance upgrade that improves structural performance through a precise intervention rather than a larger rebuild. The project shows how advanced materials, combined with early contractor involvement, can help extend the working life of key transport assets while keeping delivery proportionate to the problem.



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1 Ngutuwera Stream Bridge, near Tokoroa, during strengthening works. The image shows the underside of the bridge as the flexural strengthening intervention is installed, extending service life without major reconstruction.
2 Close-up of the strengthening works at Ngutuwera Stream Bridge. The targeted intervention increases flexural capacity while keeping added weight and disruption to a minimum.
3 Installing the strengthening system beneath the bridge deck. The project used titanium bars to improve structural performance while preserving the bridge's existing geometry.
4 Applying FRP shear strengthening as part of the bridge strengthening works. Durable detailing is critical to achieving the low-maintenance, long-life outcome the project required.

TEAM & TECHNOLOGY

Owner/developer – Waka Kotahi NZ Transport Agency
Designer – Beca
Main contractor – Contech
Technology – Titanium bars for flexural strengthening of the bridge superstructure
BBR Network Member – Contech

AQUILA Built Health®
A clearer view of structural condition, from first inspection to long-term asset care

Give every built asset a memory

AQUILA Built Health® brings together Proceq's world-leading IoT-enabled inspection sensors, Screening Eagle's connected inspection ecosystem, Apple's secure mobile environment, real-time cloud collaboration, Eagle INSPECT AI, engineering expertise, structured training and franchise support. Together, these elements form an integrated Built Health platform that helps owners understand what they have, protect what they own and plan what comes next. AQUILA is part of a broader Built World Intelligence vision, combining connected sensors, AI and digital asset records to create continuous structural intelligence. The pages that follow explore the value for asset owners, the role of "birth certificate" inspections, the technology in action and the early commercial success of AQUILA's franchisee Interspan in the UK.

Why owners need a clearer picture

Globally, built assets are aging, defects are often hidden until they become serious, experienced inspectors are in short supply, and valuable asset data is still too easily lost between one intervention and the next. At the same time, asset owners are under growing pressure to avoid unnecessary replacement and extend asset life in an economical and more carbon-conscious way.

AQUILA turns live inspection data into a cloud-based digital health record, creating a single source of truth for decisions throughout the asset lifecycle.

AQUILA has been built for that reality. Its connected inspection ecosystem links Proceq's IoT-enabled NDT devices with Apple's secure mobile environment, real-time cloud visualization and AI-assisted engineering assessment. Data captured on site is synchronized immediately, giving inspectors, engineers and clients a shared view of condition while the inspection is still under way. The same information then becomes part of the asset's permanent digital record.

AQUILA combines connected sensors, cloud services, AI-assisted engineering assessment, digital asset records, training and global support in one integrated platform.

From inspection to stronger asset value

Asset owners benefit most when inspection results become a cloud-based digital health record that remains useful long after the site visit. AQUILA brings field observations, sensor data, photographs and engineering records together as a single source of truth for condition, maintenance priorities and future comparison. The record grows throughout the life of the asset, supporting better timing, clearer decisions and stronger protection of long-term value.

That wider story is explored across the pages that follow. We look at how AI is supporting structural health assessment, the practical value for asset owners, the role of "birth certificate" inspections, a selection of case studies, and the early commercial success of AQUILA's UK franchisee Interspan.

For franchisees, AQUILA offers a faster and lower-risk route into connected inspection and digital asset intelligence.

Why AQUILA now?

- Aging built assets
- Pressure to reduce CO_2 emissions
- Hidden defects
- Shortage of qualified personnel
- Scattered data and slow decisions

A new service line with clear synergies

AQUILA is a natural extension of the BBR Network's DNA. For decades, BBR Network Members have built and strengthened structures around the world with BBR technology. AQUILA now adds Proceq's connected inspection devices, Screening Eagle's inspection intelligence platform, real-time cloud collaboration and Eagle INSPECT AI. This creates a direct route from verified condition data to targeted BBR Maintenance, Repair and Retrofitting (MRR) solutions. For prospective franchisees, it provides a structured route into non-destructive testing (NDT) and asset management, with the connected technology platform, training and global support already in place.



Gianni Moor, CEO of AQUILA Built Health, which combines connected inspection devices, real-time cloud synchronization and AI-assisted engineering assessment to create enduring digital asset records.

What the AQUILA model brings together

AQUILA combines a connected inspection ecosystem with engineering support, theory and field training, market development and a growing global network in one scalable model.

AQUILA's strength comes from the way the full offer works together. Franchisees enter a structured system built around connected Proceq devices, Screening Eagle's cloud-based inspection intelligence platform, field workflows delivered through Apple's mobile ecosystem, AQUILA engineering know-how, technical support, theoretical and field training, marketing and access to a wider international network. This structure shortens the distance between signing, capability and commercial delivery.

The AQUILA franchise system offers world-class support

Remote and In-Person Training

Detailed, visual, and interactive training in multiple languages, with AQUILA certification

Global Community and Collaboration

Annual conferences, technical webinars, and a collaborative network to share best practices and strengthen the global community.



Market Entry and Development Support

Support with market research, business plans, pricing strategies, and sales materials.

Centralized Brand and Marketing System

Global brand with customized microsites and marketing tools that drive efficient franchise growth.

Ongoing Project Support

Specialized technical and commercial support, ensuring timely, high-quality deliverables.

AQUILA drives franchisee success through standardized training, centralized support, and proven marketing strategies, delivered consistently around the world.

The offer works because the stack is complete

Proceq sensors. Screening Eagle intelligence. AQUILA know-how and expertise.

The value comes from the way the complete stack works together. Connected inspection devices send data through Apple's mobile ecosystem into Screening Eagle's cloud-based platform, where Eagle INSPECT AI inventories and correlates the evidence and supports engineering assessment. AQUILA adds the methods, training and expert review required to turn the technology into a consistent, repeatable service.

"AQUILA gives franchisees a connected technology platform, a proven teaching and service model and the support to scale both."

Training built to scale

AQUILA Academy gives franchisees a three-level learning path: global e-learning, on-site field training and ongoing project-based expert support. The platform now includes multilingual content, with English, French, Spanish and Portuguese already in place or being added.

A support model built for growth

AQUILA is also putting the support structure in place for expansion. Its strategy is to create representation in the key markets where owners are looking for connected inspection intelligence, cloud-based asset records and enterprise portfolio visibility, while giving franchisees a faster and lower-risk route into this specialist market. The target for 2026 is to continue growing the network all around the world while further developing systems and processes. Sales and promotion are supporting that ambition through conferences, webinars, newsletters, social media and direct participation in industry events.



AQUILA organizes annual conferences for knowledge exchange, continuous learning and professional networking.

AI trained on more than 70 years of expertise. Engineer-approved every time.

Dual benefits: AI with humans in the loop (HITL), always.

Artificial intelligence (AI) is now essential for effective structural health assessment because the inspection challenge has changed. Assets are aging faster than teams can inspect them, data is often captured across disconnected notes, photos and reports, and decision-making slows as the volume of manually recorded information grows. AQUILA addresses that pressure through Eagle INSPECT, the AI layer within Screening Eagle's connected inspection intelligence platform. Built on Apple's secure mobile ecosystem, it synchronizes field observations, connected sensor data and cloud records in real time, giving inspectors and engineers a shared view from capture through engineering assessment and reporting. The platform also benefits from an iOS-based field environment, helping inspectors move more easily from capture to review to reporting.

Why inspection needs more than manual effort

Inspection demand is rising faster than available specialist capacity, while asset information remains spread across too many formats and locations. AQUILA combines connected data capture, instant cloud synchronization and AI-assisted engineering assessment to shorten the route from field observation to usable engineering information, with expert review retained throughout.

The AI engine draws on more than 70 years of Proceq inspection expertise and is continuously enriched by expanding global inspection data and validated engineering knowledge. Eagle INSPECT AI automatically inventories, classifies and correlates photographs, videos, engineering documents, drawings, scans, historical reports, inspection records, defects, deterioration and recommendations. The result is a continuously growing digital asset memory and an emerging system of record for the asset.

Actionable reporting starts with better structure

This intelligence becomes useful because it is structured. Eagle INSPECT works with predefined templates for analysis, assessment, recommendations and proposed next steps, so the output arrives in a consistent format. Reports are clearer, easier to compare, and less dependent on the writing style of individual inspectors. Across large projects, that consistency helps with readability, pattern recognition and root cause analysis as well as speed.

Six times faster inspections: AI shortens the route from photograph to report, which saves time in the field and again at the desk.

AQUILA keeps a human in the loop at every key stage, with reviews and approvals completed by trained inspectors. AI organizes and correlates the evidence, proposes classifications and prepares structured assessment outputs. The engineer checks the information, corrects it where required and approves the result. This safeguard preserves accountability, supports engineering reliability and delivers speed without weakening quality control.

Six times faster in the field

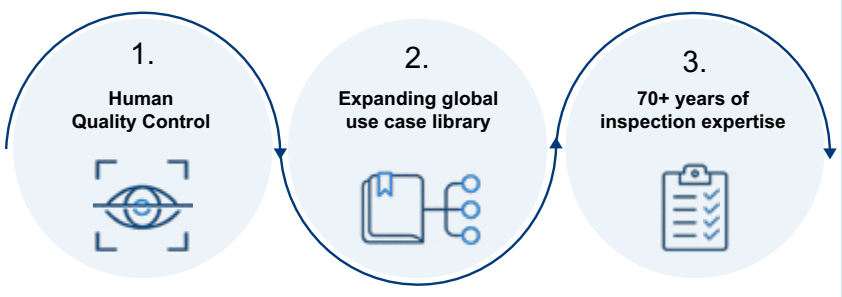
Eagle INSPECT can reduce recording time from around one minute per spot to less than 10 seconds, up to six times faster, with further savings carried through into reporting and project delivery. Real-time cloud synchronization makes findings available to colleagues and clients as the inspection progresses. The platform also supports enterprise portfolio management, bringing together asset histories, findings, severity levels, due dates and recommendations across multiple structures in one cloud-based view.

The assessment evolution

	Traditional Inspection	AQUILA Connected Inspection Intelligence
Data Capture	Manual field notes & scanned photos	**Cloud-synchronized records with visual and sensor context**
Speed	Reactive manual hours	**6x faster in the field**
Output	Inconsistent, fragmented reports	**Predefined engineering assessment structures and templates**
Visibility	Isolated, single-asset views	**Enterprise portfolio management**
Reliability	Subject to individual variance	**AI trained on 70+ years of expertise and validated by engineers**

The case for AI starts with the market reality: aging assets, scattered data and a growing decision bottleneck.

Continuous intelligence: the AI trust flywheel



Eagle INSPECT shows how AI suggestions and engineer validation work together in one field workflow.

One record. Everybody wins.

Asset owners feel the pain first, but the value of better structural records spreads much further.

The pressures set out on the pages above land most directly with the asset owner. Aging built assets, incomplete records, hidden defects and fragmented inspections all make it harder to plan maintenance, justify budgets, and act early enough to avoid disruption. AQUILA's offer is built around that problem: real-time condition data, a cloud-based digital health record that provides a single source of truth, and a better basis for intervention throughout the asset lifecycle.

Bad data is expensive data.

When condition information is incomplete or inconsistent, every maintenance decision carries more uncertainty than it should.

Clearer data. Better timing.

One of the biggest challenges for asset owners is not knowing enough, early enough. Reliable condition data is often incomplete, inconsistent or too fragmented to support confident decisions. For the Swiss Rhätische Bahn (RhB), that matters at scale. The railway company manages 385km of railway, 116 tunnels, 603 bridges and 102 stops across Switzerland's Graubünden region, much of it in difficult alpine terrain and much of it aging. In that context, execution quality, data integrity and predictive maintenance directly affect the efficiency of an annual operating and renewal budget of more than CHF 250 million. Rail is just one example. AQUILA serves owners of every kind of built asset, from residential and commercial buildings to heritage structures.

Hidden defects cost more later

Risk grows when defects stay out of sight. Problems that are not identified early can lead to costly repairs, downtime, safety concerns and loss of confidence. Condition-based maintenance helps asset owners act sooner and more proportionately. It can reduce total maintenance costs by 10-15% while avoiding the delays and disruption that come with failure-driven interventions.

Scattered records weaken decisions

The problem is not only what owners cannot see. It is also what they cannot compare. Traditional inspections are often slow, expensive and difficult to use as a basis for planning because data sits across different reports, tools and formats. That makes it harder to build a clear view of condition across an asset, let alone across a wider portfolio.

A clearer record from the start

AQUILA addresses this with three connected offers for asset owners. The first is a cloud-based digital health record that provides a single source of truth throughout the asset lifecycle. For existing assets, Eagle INSPECT AI inventories and correlates inspection records, photographs, videos, drawings, scans, engineering documents, defects and recommendations. For new assets, "birth certificate" inspections establish the verified baseline at handover. The record grows as new evidence is added, supporting lifecycle planning, maintenance prioritization and future comparison.

Built health supports business health.

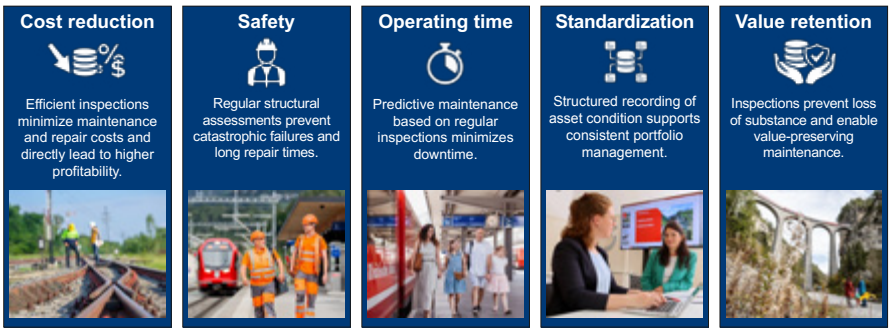
For owners, the value lies in clearer priorities, steadier budgets and stronger protection of long-term asset value.

Act earlier. Spend smarter.

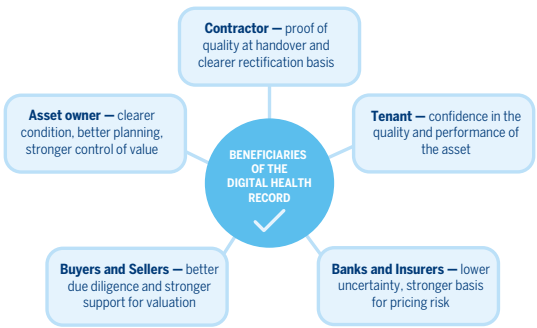
The second is a more efficient inspection model. Proceq's connected IoT devices, Screening Eagle's real-time cloud visualization and synchronized digital workflows reduce time in the field, improve data quality and help owners limit disruption. That supports a predictive maintenance approach, allowing interventions to be planned at the right time, before maintenance turns into repair and repair turns into crisis. For owners, the benefit is practical: lower overall cost, less downtime and a stronger basis for protecting asset value. Condition-based maintenance reduces direct maintenance costs, avoids delays and helps large annual investment programs deliver better value.

Support that fits the asset

The third is flexibility in deployment. AQUILA supports asset owners with a connected inspection intelligence platform, Proceq sensors, AQUILA methods, theory and field training, and ongoing technical support. The model can be used for a pilot project, project-based inspections, a structured digital twin or enterprise portfolio management across multiple assets.



Cost control, safety, operating time, standardization and value retention are the pressures that shape asset-owner decisions.



Who benefits across the value chain?

When a building tells the truth, value spreads in every direction. Owners gain clearer priorities. Contractors gain evidence of quality. Tenants gain confidence. Banks and insurers gain certainty. Buyers and sellers gain a stronger basis for due diligence. AQUILA's value is wider than inspection alone.

Predictive maintenance reduces risk, costs and asset replacement cycles. Its advantage lies in avoiding failure-driven replacements, smoothing capital expenditure, reducing risk exposure and maximizing asset availability through built asset lifecycles.

A birth certificate for your building

From handover to lifetime value: the "birth certificate" inspection.

A logical next step is to turn that need for reliable data into a formal baseline. That is what the birth certificate provides. We've established that asset owners need reliable data, early visibility of risk and a stronger basis for predictive maintenance. This starts with establishing a dependable baseline. AQUILA's "birth certificate" approach does that by investigating and documenting key aspects of the structure's initial condition, geometry, durability and construction quality at completion, creating a reference point that can be used throughout the asset's life.

The industry now defines the standard

What makes this process especially important is that the concept is no longer informal. fib Bulletin 93, Birth Certificate and Through-Life Management Documentation, gives the industry a formal framework for documenting the condition of a structure at handover and using that information through its service life. For the first time there is a recognized definition of the concept, giving asset owners, engineers, contractors, financiers, insurers and all other stakeholders in an asset a common point of reference.

From verified inspection to digital twin

AQUILA's "birth certificate" approach builds on that framework with a practical, data-rich methodology. Visual inspection, targeted non-destructive testing, and subsurface scanning are used to verify key parameters such as reinforcement layout, concrete cover, permeability, workmanship quality and internal condition. The result is a cloud-based digital twin and digital health record that provide a single source of truth from handover onward.

The digital twin evolves as new inspections, connected sensor data, photographs, engineering documents and maintenance records are added throughout the asset's life.

Paper handover is not the same as baseline truth.

AQUILA replaces assumptions and incomplete records with verified structural data.

Value now, value later

That has immediate value at handover. It helps owners identify hidden or latent defects before final payment is released or warranty periods expire, and it gives contractors a clearer basis for rectification where required. It also has long-term value. Once the baseline is established, the "digital twin" can support future comparison between design assumptions and actual in-service behavior. It also opens the door to scenario testing, allowing owners to explore what-if questions around maintenance, repair, adaptation or change of use with a stronger factual base.

If you know the starting condition, you can manage the lifecycle.

The digital twin provides a live reference point for maintenance, warranty management, future comparison and scenario planning, and it becomes more valuable with each new inspection.

The foundation for lifecycle management

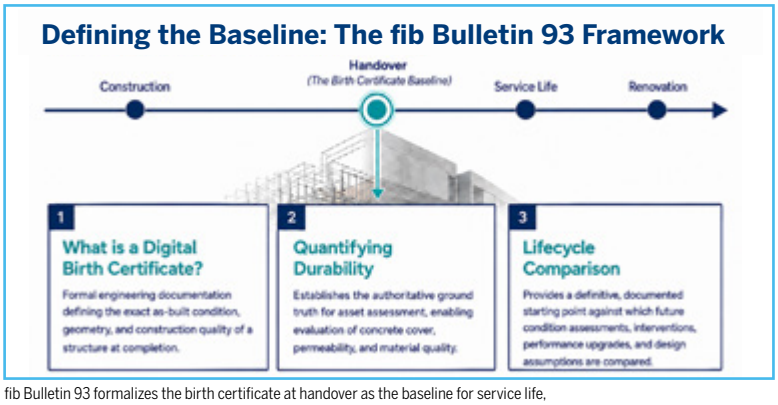
The "birth certificate" inspection turns handover into knowledge. It replaces paper assumptions with verified baseline data and gives the owner a cloud-based single source of truth from day one. As new inspection and maintenance information is added, that record supports coherent lifecycle asset management.

The Methodology:

From physical investigation to digital twin



AQUILA's process moves from physical inspection and connected NDT to a cloud-based digital twin that evolves throughout the asset lifecycle.



fib Bulletin 93 formalizes the birth certificate at handover as the baseline for service life, maintenance and later renovation.

fib Bulletin 93

Birth Certificate and Through-Life Management Documentation defines the birth certificate as formal engineering documentation for structures. Its importance lies in giving the industry a common, recognized framework for establishing the baseline at handover and using that information through the structure's life.

Four assets. Four clear answers.

These four projects show AQUILA's connected inspection ecosystem and engineering know-how in practice across Switzerland, the UK and Saudi Arabia, from bridge investigation and airport parking structures to heritage assets and "birth certificate" inspections of new apartment buildings.

Tegerfelden, Switzerland: targeted checks on a PT bridge

AQUILA was asked to assess the condition of the post-tensioned (PT) system in a road bridge built in the 1950s, without opening up more of the structure than necessary. The team combined sources such as GPR, ultrasonic pulse echo and historic data to focus attention on the areas most likely to need verification. Targeted openings for more in-depth investigation were then made only where the scans suggested higher risk. The result was reassuring. Even at the selected locations, the PT system was found to be in good condition. For the owner, that meant stronger evidence, less invasive investigation, lower disruption to traffic and improved future maintenance planning.

Bristol, UK: one day, not five

At one of Bristol Airport's multistorey car parks, the challenge was scale. The structure needed a detailed assessment of visible and hidden conditions, while the work also had to fit a live construction program. AQUILA and its UK franchisee combined Proceq's multi-channel GPR scanning with Screening Eagle's connected inspection ecosystem. Field observations, photographs and scan data were synchronized through the cloud, allowing the team to visualize tendon and rebar layouts, review anomalies and maintain a shared record while the inspection progressed. Using AQUILA's processes and connected technology platform, the inspection was completed in a single day rather than five. The owner received a structured report and access to the evolving digital twin, giving the project team a stronger basis for decisions while work was still under way.

"The value was both in the individual findings and in the shift from isolated observations to a structured, multi-asset view of the whole property."

Saudi Arabia: one site, four assets, one clearer record

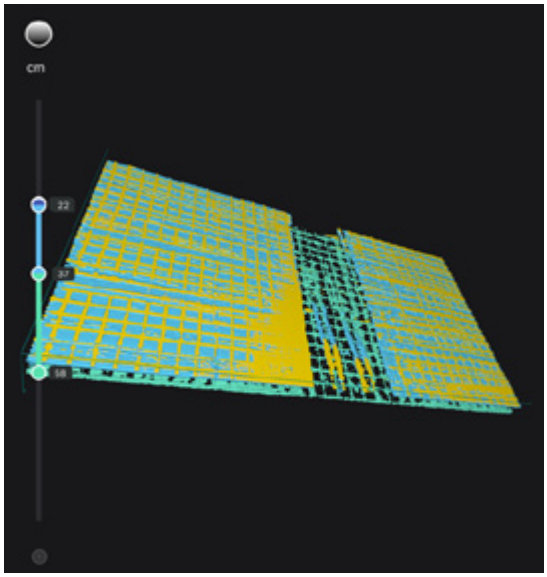
At the Falcon Historic Palace (name changed to maintain confidentiality) in Saudi Arabia, AQUILA was working on a very different kind of asset. The need here was to understand condition across a historic site made up of several structures, not just a single element. AQUILA divided the palace into four assets and recorded 383 inspection points across the complex. The work combined visual inspection, NDT and GS9000 subsurface mapping to identify deterioration, disturbed ground, buried utilities and hidden structural features. The outcome was a far clearer basis for future decisions. Instead of isolated observations, the owner received a cloud-based, multi-asset condition record showing where deterioration was concentrated and where further action should be prioritized. The result was a practical portfolio view of the whole site.



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Switzerland: a verified handover for 48 apartments

On a newly completed residential building in Switzerland with 48 apartments, the challenge was an informed handover which reassured the asset owner that they were accepting a completed, high-quality structure. Before final payment was released and warranty periods began, the owner needed a verified record of what had been built. AQUILA carried out a "birth certificate" inspection in line with fib principles and identified several issues that the asset owner was very interested to learn about, enabling them to be addressed while the contractor was still on site. That gave the owner something much stronger than a standard handover file: a factual baseline for the building at the start of its life, and a clear basis for follow-up with the contractor while corrective action was still possible.

"A "birth certificate" inspection provides a factual basis for contractor accountability before final payment is released or warranty periods expire."



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50 antennas. One pass. A different commercial equation.

The Proceq GS9000 multi-channel subsurface mapper shows how the connected inspection ecosystem changes the pace of large-area assessment. Scan data can be visualized and synchronized through the cloud as work progresses, giving inspection teams and clients real-time access to the evidence. That's because, with its multi-channel sensor modules for high-resolution and deep subsurface mapping, it does not need the same crisscross scanning pattern as a single-channel system. On the parking garage project delivered by AQUILA and Interspan (see p83), for a six-level 36,000m² structure, using the multi-channel scanner could reduce scanning distance from 360,000m to 42,352m, cut field time from 90 hours to 11 hours, and lower indicative scanning cost significantly. The initial device investment is higher, but the break-even point in this example is reached after about four parking structures. That difference saves labor, shortens site occupation, speeds up decision-making, and makes large-scale scanning far more practical on live projects. For large decks, this represents a different business model.



6

1 Proceq's connected inspection devices and Apple's secure mobile ecosystem give site teams real-time visualization and instant cloud synchronization.
2 GS9000 scanning on the Tegerfelden bridge deck, where AQUILA used targeted investigation to check PT condition with minimal opening-up.
3 3D visualization of a GPR scan at Bristol Airport Multistorey Car Park, where connected scanning and cloud-synchronized records helped the team visualize hidden construction details and investigate anomalies quickly.
4 The Falcon Historic Palace in Saudi Arabia was assessed as four separate assets, giving the owner a cloud-based, multi-asset condition record across the whole site.
5 AQUILA carried out a "birth certificate" inspection for the owner of a newly constructed apartment block in Switzerland.
6 Large deck areas tell the story clearly: the Proceq GS9000 covers the same asset with far less walking and much less field time.

Seven projects. Two six-figure contracts.

A strong example of what the full AQUILA model can deliver commercially. In the UK, AQUILA combined its connected inspection ecosystem, training, technical support, market-facing help and structured delivery model to give a new franchisee a much faster route into inspection services and early revenue.

Case study: UK franchisee's first nine months of operational excellence



This case study demonstrates how quickly an AQUILA franchisee can progress from onboarding to the successful delivery of multiple projects. Within just a few months, the franchisee had already secured significant inspection work, including a project worth CHF 240,000 in March 2026.

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From signing to site work in weeks

Interspan signed its franchise agreement in September 2025. Within the same month, the NDT equipment had been ordered and delivered to its London headquarters. In October, with expert colleagues, AQUILA CEO Gianni Moor visited the team to launch the franchise formally, provide access to AQUILA Academy, and begin the first stage of training. That training did not stop at the screen. It continued on live projects, with boots-on-the-ground support covering equipment use, Eagle INSPECT, and interpretation of results in real site conditions.

Five months. Six projects.

From franchise agreement to six delivered projects in just five months, including a six-figure contract.

Training that earns its keep

The link between training and live work is central to this rapid success. AQUILA's three-level model combines e-learning, practical on-site training and project-based support, so franchisees learn how to use the connected inspection platform while delivering live work. Bristol Airport is a good example, as the project provided valuable experience in a live inspection environment while demonstrating what the franchise partnership could deliver.

Early contracts proved the model

The commercial result came fast. By February 2026, five projects had already been delivered. In March, a sizeable inspection contract worth six figures was secured, followed by another six-figure contract in May. By the end of the first eight months, the total had reached seven projects. AQUILA supported that progress through training and a wide range of additional help including bidding support, technical backup and a dedicated microsite that helped position Interspan in the market. Participation in the AQUILA annual conference in Istanbul added visibility and helped connect the UK team to the wider network.

Training that earns its keep

AQUILA's three-level model links e-learning, on-site coaching and project-based support, helping franchisees build capability while they build revenue.

UK first. Germany and Belgium next.

By May 2026, the UK franchisee expressed interest in entering the German market, and potentially the Belgian market, a strong signal to prospective franchisees and BBR Network Members. AQUILA shortens the distance between signing, capability and contract award. It provides a ready-made connected technology platform for companies that want to build inspection and digital asset services quickly, with expert support already in place. AQUILA has built a practical service model for a market that can no longer rely on fragmented inspections and incomplete records. For asset owners, it provides real-time inspection intelligence, cloud-based digital health records and a single source of truth for risk, maintenance and long-term value. For franchisees and BBR Network Members, it opens a route into inspection and digital asset intelligence with the connected technology platform, training and support already in place. This creates a strong platform for growth.

For the BBR Network, AQUILA completes the circle. The Network that builds and strengthens structures with BBR technology can now create and maintain their digital memory. Connected inspection intelligence identifies where targeted MRR work will protect safety, performance and service life.



8

7 UK franchise launch from onboarding to live project delivery.
8 UK franchisee and AQUILA on site at Bristol Airport, where training, delivery and client-facing experience came together on live projects.

EDF approval gives nuclear asset owners a qualified new tendon option for the latest EPR2 containment design

BBR VT International and BBR Network Member for France, ÆVIA, have qualified the BBR VT CONA CMI N post-tensioning (PT) system for EPR2 nuclear containment structures, completing a full-scale testing program developed to meet EDF's demanding requirements for next-generation reactors. In this article, ÆVIA's Deputy Director of Cables and Handling Jérémie Baumgartner and Dr Haifeng Fan, Head of Technology at BBR VT International, explain in detail.

As electricity demand continues to rise, nuclear energy is returning to the center of the low-carbon power discussion. Renewable generation remains essential, but wind and solar energy intermittency continues to challenge grid stability. In that context, the need for next-generation new nuclear energy projects is clear. These reactors require containment systems with proven structural performance, high durability, and tightly controlled construction quality. Prestressed concrete containment vessels depend on PT to maintain compression in the concrete and limit cracking under extreme loading conditions.

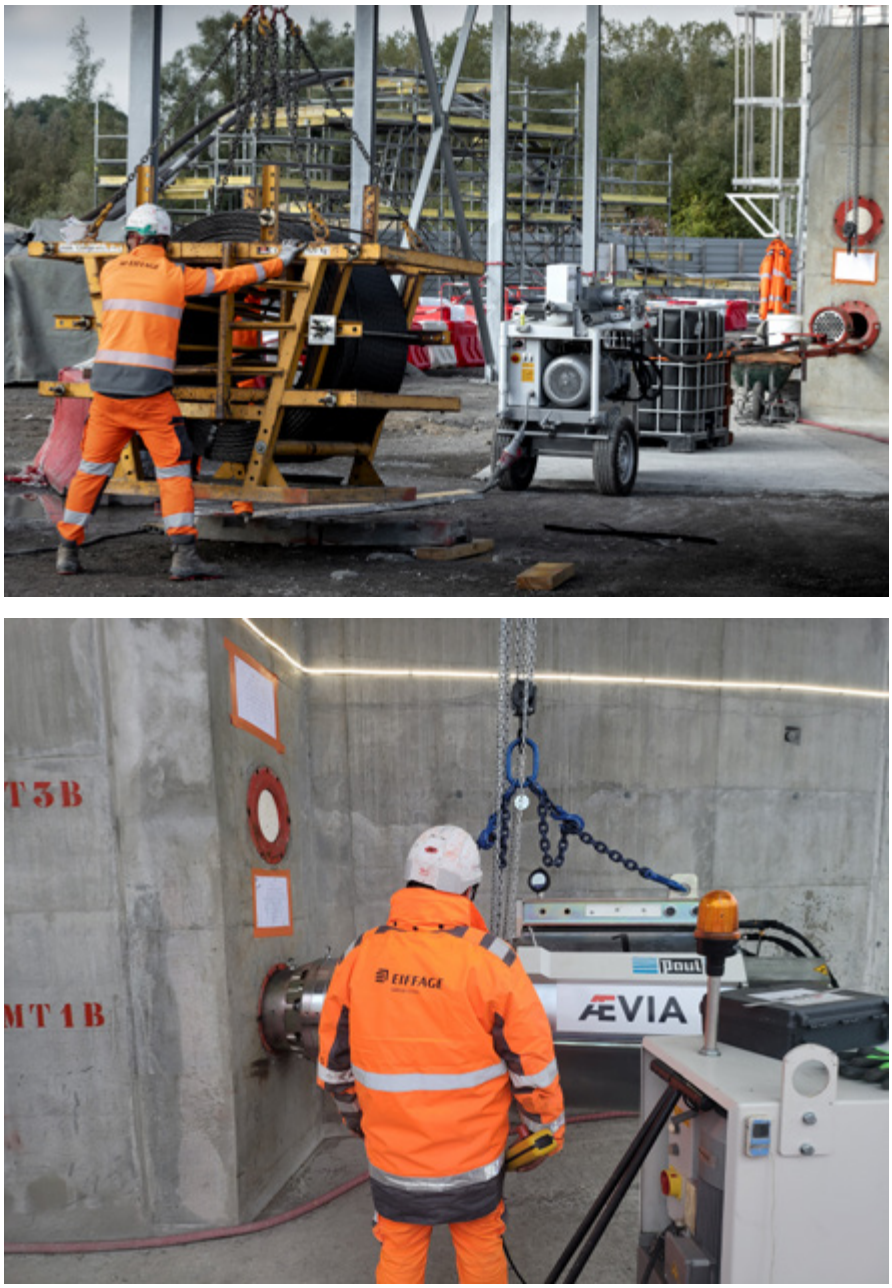


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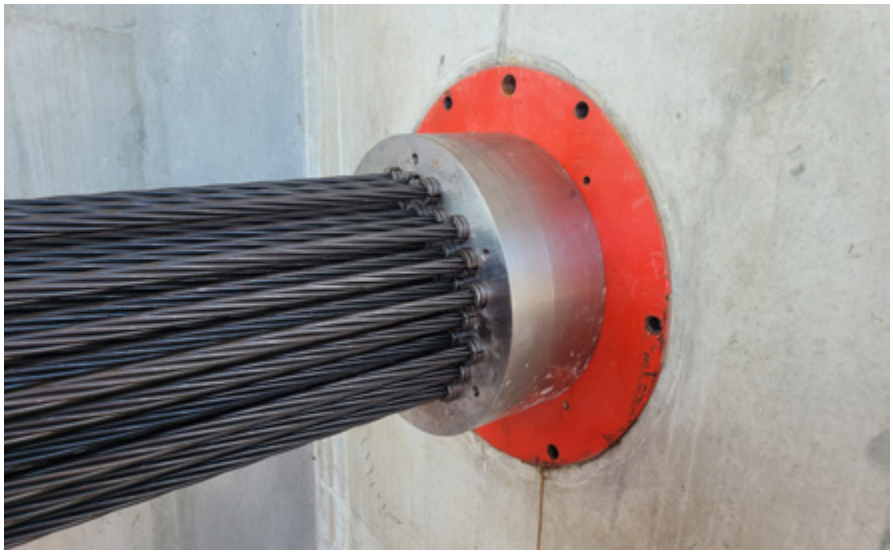
A qualified new option for EPR2 containment

The result is an important step forward for BBR VT International and ÆVIA. In 2025, the BBR VT CONA CMI N tendon system was incorporated into BBR's European Technical Assessment (ETA) 06/0147 and has now completed the formal qualification process with EDF for application to the EPR2 project at Penly. For nuclear asset owners, that approval and BBR's ETA widen choice in a market where qualification standards are exceptionally high and where traceability, reliability, and long-term performance are fundamental.

The scale of the EPR2 containment system shows why this is significant. A single containment structure includes 225 bonded tendons made up of 109 horizontal tendons, 32 vertical tendons, and 84 gamma tendons extending through the dome. Altogether, that amounts to 450 size 55 anchorages, nearly 1,900t of prestressing steel, and tens of kilometers of ducting. These are not standard building conditions. They demand a system that can perform consistently across long tendon lengths, complex tendon geometry, high grouting demands, and tightly monitored stressing procedures.



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Full-scale testing under representative conditions

Qualification therefore covered the whole process, not just individual components. The program included development of a size 55 anchorage system compliant with both European Technical Assessment (ETA) requirements and EDF's project-specific specifications. It also included dedicated ducting systems designed for low friction and leak-tight connections, grout formulations adapted to different tendon geometries, and a full range of specialist equipment for strand installation, stressing, grout production, and injection. Each of the main construction stages was then validated through one-to-one mock-up testing.

Proving grouting and stressing in practice

Grouting was one of the most demanding parts of the program. Vertical tendons introduce high hydrostatic pressure, which can result in bleeding and create the risk of voids. Long horizontal tendons bring different challenges, particularly at deviation zones where air can be trapped and complete filling with grout becomes harder to control. To respond to those conditions, two separate grout formulations were developed. A more fluid grout was used for vertical tendons up to 65m high. A more viscous grout was developed for long horizontal tendons of about 165m with vertical deviations of around 4m. After injection and hardening, the mock-ups were opened and inspected directly to verify homogeneity and confirm the absence of internal defects or voids.

Installation and stressing in full-scale mock-up

A full-scale containment mock-up was also built to validate how the system would work in practice. The 4m-high concrete ring, with an external diameter of 51.20m, reproduced the geometry and constraints of an EPR2 containment structure. It was used to verify duct installation, support positioning, sealing performance at connections, topographic control, strand threading, and stressing operations. This part of the program moved the work from laboratory development into a representative construction environment.

Stressing equipment and procedures were tested just as rigorously. ÆVIA developed dedicated hydraulic tensioning equipment to meet EDF specifications, including monitored multi-strand jacks able to apply balanced forces across all strands of size 55 tendons. Validation began on a dedicated test bench under workshop conditions, then continued on the full-scale concrete mock-up. The tests confirmed compliance with specified friction limits and gave precise control over elongation, hydraulic pressure, total anchorage force, and force distribution between individual strands. EDF's requirements included strict limits on force dispersion between strands, so equipment accuracy and repeatability were critical.

The approval demonstrates that the BBR VT CONA CMI N system has been shown to work under representative EPR2 conditions, with validated procedures for anchorage, ducting, strand installation, stressing, and grouting. In nuclear construction, that level of evidence is essential. It gives designers, contractors, and asset owners a qualified additional option for one of the most demanding structural applications in the built environment.



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1 Full-scale EPR2 containment mock-up used to validate duct installation, strand threading, and stressing operations under representative site conditions.
2 Stressing operations on the full-scale mock-up, strand installation (top) and stressing (bottom).
3 Close-up of the size 55 anchorage used in the qualification program for the BBR VT CONA CMI N system.
4 Testing the horizontal tendons in the scale mock-up.
5 Full-scale horizontal grouting mock-up. Long tendon lengths and deviation zones required grout behavior to be proven under demanding injection conditions.

Towards the first ETA-approved EIT ground anchor

A successful CMG PL3 EIT site test in the Netherlands is the next major step after BBR's world-first ETA-approved strand ground anchor system. It moves the market closer to the first ETA-approved electrically isolated tendon (EIT) strand anchor. BBR VT International's Senior Manager Knowhow & AI, Dr Xiaomeng Wang, explains the context of the research and the field testing results.

As the world's first strand ground anchor system to receive a European Technical Assessment (ETA), the BBR VT CONA CMG set a benchmark for geotechnical anchors. It introduced a regulatory framework for technology used in demanding ground conditions, a framework that has been missing due to the historic absence of harmonized product standards. The CMG system answered that gap with a clear corrosion-protection concept, rigorous testing, and full quality assurance. Today, the PL0 to PL2 solution kits cover applications from temporary anchors through to permanent solutions with service lives of up to 100 years. The next stage is PL3 - electrically isolated tendon. As infrastructure becomes more electrified and environments more aggressive, durability must address both electrical insulation and corrosion protection.



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From PL0-PL2 to PL3

CMG PL3 EIT (electrically isolated tendons) builds on the ETA-approved CMG PL2 double-corrosion-protection concept. It adds electrical insulation components at the critical anchorage and transition-zone interfaces, strengthening the EIT performance over the full length. It is intended for aggressive environments, including conditions with stray current that result in electrochemical reactions with high corrosion risk. At the same time, practical installation flexibility is maintained, still allowing demanding measures such as steel-casing methods. As with the wider CMG family, it is supported by factory quality control, GT specialist installation, and full BBR E-Trace traceability.

The PL3 concept follows directly from the earlier CMG development path. BBR's analysis of anchor failures showed the highest corrosion risks concentrated in the anchorage and free-length zones, while bond-length durability required robust but economical protection. That understanding shaped the CMG product family and the progressive corrosion-protection layer concept behind it.

PL0 and PL1 address short-term or temporary needs. PL1+ strengthens protection for extended temporary service life. PL2 provides the permanent solution, with two continuous protection layers over the full tendon length, a single corrugated duct, sealed transitions, and purpose-designed components. This PL0-PL2 platform achieved ETA approval and gave the market an international benchmark for strand ground anchor performance.

PL3 extends that base for the most demanding condition in the CMG design matrix: non-aggressive and aggressive ground conditions and/or exposure to critical stray currents. In practical terms, PL3 is PL2 plus EIT, aimed at protection against both conventional corrosion mechanisms and the electrochemical risks associated with electrified infrastructure.

The importance of EIT

In geotechnical construction, anchors are installed in soil or rock and exposed to moisture, chlorides, variable ground chemistry, and typically have long service lives. Near railway systems, metro corridors, or other electrified assets, stray current adds further risk. If conductive paths exist through the anchor system, these currents can accelerate corrosion and reduce long-term reliability.

Electrically isolated tendons add a further layer of defense where conventional durability provisions are not enough. In BBR's CMG design framework, PL3 is positioned for applications where both service life and electrochemical exposure require a higher-performing solution.

Clients and designers need an anchor kit that is technically robust, testable, installable on site, and suitable for approval within the same demanding regulatory logic that governs the rest of the CMG range. The recent PL3 site-test success addresses that requirement directly.

Engineering the CMG PL3 EIT solution

A key strength of CMG PL3 is continuity with PL2. Most of the PL2 component philosophy remains in place, while complementary insulation elements are introduced at the critical transition zone. In the current PL3 configuration, these include dedicated insulating and sealing components such as the insulation flange and EIT bellow-sleeve set, together with strengthened detailing at the joint between the end cap and the corrugated duct.

Ground anchor innovation has to work on both the technical drawings and on site. The CMG approach combines high technical performance with constructability. It maintains flexibility at the transition zone, accommodates installation tolerances, and enables reliable sealing where tendon geometry or working space is difficult.

A recent field-based study conducted at a site in the Netherlands illustrates this point. Because of soft soils, clay, and high groundwater levels, local practice in the Netherlands often uses double steel casing during drilling, and those steel casings must be removed after the tendon has been inserted into the borehole. During casing removal, the sharp edge of the casing tube can touch the duct continuously, causing abrasion damage and breaking the duct. Special measures are implemented to provide mechanical protection around the standard PL3 tendon and preserve encapsulation. The PL3 development therefore considers not only the anchor in theory, but the anchor as it is actually built.



CMG PL3: electrically isolated tendon (EIT)



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Testing in the lab and on site

The PL3 program is built on test evidence. It began with investigation of each core component contributing to EIT performance. More than 70 tests were specified by the European Assessment Document (EAD 160071-00-0102) to verify electrical resistance combined with water-tightness of the protection layer of the anchor, including the duct, cap, and all sealing joints, under stringent pre-treatment conditions and under both internal and external pressure.

The program then moved from workshop checks to full site verification of the assembled system. Immediately after production of the standard anchor kit, the integrity of the bond length was checked in the workshop by immersing the end of the bond length in water and measuring electrical resistance from the stressing end.

The site-test program transferred the question from workshop conditions to real installation conditions, in this case in the Netherlands. Five test anchors were produced and installed using the local steel-casing drilling method. The anchors were proof-loaded in accordance with the EAD and ISO test framework, then reloaded to lock-off. Electrical resistance was measured before and after stressing, and again after time in service under dry and rainy conditions.

The key result was that the anchors met the required EIT criteria on site. Performance also remained stable after stressing, which is the point at which sealing integrity and insulation continuity must be demonstrated.

A further special test was conducted. Fresh grout was injected into the transition zone to simulate water ingress between the steel recess pipe and the insulation flange, a realistic long-term durability scenario.

Quality assurance, traceability, and the road to ETA

BBR's assurance approach rests on three linked elements: product performance, constancy of conformity, and quality of installation. CMG is supported by factory production control, GT specialist installation, and full traceability from material to project. Through BBR E-Trace, the process from kit generation and purchase order through production, delivery, and installation can be managed within one connected platform, strengthening transparency and quality assurance.

This is particularly important for PL3. Electrically isolated anchors are specified for critical infrastructure in demanding environments, and asset owners expect proof, consistency, and documented quality. The success of the field tests in the Netherlands shows that CMG PL3 is close to meeting that expectation as the basis for the world's first ETA-approved EIT strand anchor.

The original CMG ETA established a new level of performance for strand ground anchors. PL3 now has the potential to set the next benchmark for anchors used in aggressive, electrified environments. The successful site test marks a milestone in the evolution of the CMG system and a decisive step toward another world first.



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1 Ground anchors being tested at a site in the Netherlands.
2 Workshop test.
3 Installation of a PL3 EIT anchor under stringent site conditions.
4 From drilling and anchorage preparation to stressing and electrical-resistance checks, the test program verified EIT performance under real installation conditions.
5 Testing the PL3 system under real-life conditions.

3D printing and PT open a new path to lighter floor slabs

BBR VT International's R&D team and the Structural Engineering Research Lab at Empa (Swiss Federal Laboratory for Materials Science and Technology) are combining digital design, concrete 3D printing, and post-tensioning (PT) to develop a lightweight stay-in-place slab formwork system that reduces material use, increases geometric freedom, and points to a more automated approach to floor construction. BBR VT International's R&D Engineer Dr Niels Pichler showcases the recent research findings and practical applications.



1

Digitalization, automation, AI, and robotics are reshaping construction. Technologies such as robotic concrete 3D printing, digital twins, and embedded fiber optic sensors are opening new possibilities for material efficiency, planning, asset management, and structural health monitoring. Within that shift, BBR VT International's R&D team and Empa's Structural Engineering Research Lab are exploring how PT can work with concrete 3D printing to unlock new structural forms and lower embodied CO_2.

At the same time, the project aimed to utilize concrete 3D printing to reduce the high labor demand and long construction time associated with conventional on-site floor construction, which can account for up to 75% of total construction project duration and 35-50% of the total structural cost. In this way, the project contributes to addressing broader challenges such as skilled labor shortages and housing shortages by introducing robotic and automated fabrication methods that enable faster, more efficient, less labor-intensive and structurally resilient construction.

Helping transform innovative ideas into real-world impact and reinforcing Switzerland's position as a global innovation leader, the Swiss Innovation Agency, Innosuisse, awarded the project a four-year research grant in recognition of its high commercial potential.

1 Embedded BBR VT CONA CMS Anchorage 106 cast directly into the end of the 3D-printed formwork.
2 The full-span slab under dead load, demonstrating the structural behavior of the 3D-printed PT formwork concept.
3 Slab four-point bending: large-scale four-point bending test used to assess the cracking behavior and bending capacity of the post-tensioned formwork.
4 Load transfer from the anchorage to the 3D-printed concrete: testing the transfer of force from the anchorage into the 3D-printed concrete formwork, a key step in validating the structural concept.
5 Formwork printing: robotic printing of the stay-in-place slab formwork, showing the layer-by-layer construction process that enables shape optimization and material efficiency.



2



3

3D concrete printing meets post-tensioning. Concrete 3D printing deposits material layer by layer, placing concrete only where it is needed. Unlike conventional construction using timber formwork, it is not limited to simple prismatic shapes. That gives engineers greater freedom to optimize geometry and reduce unnecessary material while simultaneously reducing labor requirements and construction time. One of the current challenges, however, is reinforcement. Traditional steel reinforcement conflicts with the printer toolpath, making it difficult to integrate into a layered printing process. This is where PT offers a strong complementary solution.

Reinventing floor slab construction

The system developed by BBR VT International and Empa uses a 3D-printed stay-in-place PT formwork to create a shape-optimized slab. The formwork geometry is generated through a shape-optimization workflow designed to meet span and slab depth constraints, after which the printing toolpath is generated automatically for a commercial concrete 3D printer. Once printed, BBR VT CONA CMS 106 anchorages can be cast directly into the ends of the formwork, without special anti-bursting reinforcement. After the concrete reaches the required strength, the formwork is post-tensioned. At that stage, it can carry its own weight and future construction loads without additional support. Once installed on site, concrete is poured into the formwork to complete the slab. The concept is shoring-free for spans of up to 7.5m and can be printed either on site or in a pre-cast facility.

Proven through large-scale testing

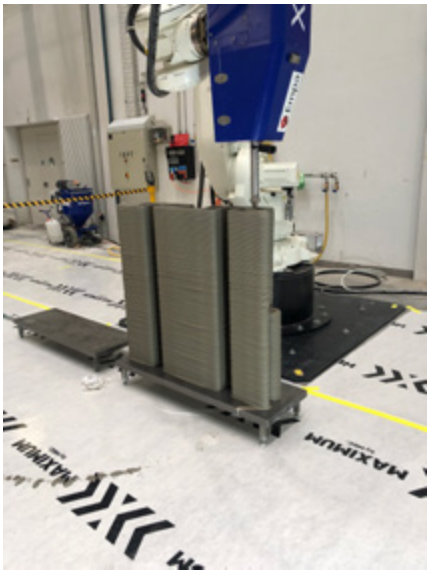
The concept has been supported by a sequence of large-scale tests. These began with testing how force is transferred from the anchorage into the 3D-printed concrete formwork. The bending moment cracking capacity of the post-tensioned formwork was then assessed through a large-scale four-point bending test. This helped validate both the finite element (FE) model and the wider concept. The final proof-of-concept stage involved producing and testing a full-span slab. The resulting bending moment cracking capacity confirmed that the slab could achieve the required serviceability and ultimate limit states. The slab was estimated to use 46% less concrete than a conventional reinforced concrete slab, underlining the potential CO_2 savings enabled by the system. In addition, the slab construction method saves labor and time as no temporary formwork is required, which is typically used in conventional construction.

Expanding the future of post-tensioning

The jointly developed 3D-printed stay-in-place PT slab formwork system shows how PT can continue to evolve into new applications. For BBR VT International, the importance of the work lies not only in material reduction and faster construction, but also in demonstrating that PT remains highly relevant to the challenges now shaping the built environment. While BBR VT International's core focus remains **BBR Build+** and **BBR Care+**, research and development continues to explore where PT can deliver new value.



4



5



Our expanding global network
Czech Republic and Slovak Republic

MI Roads a.s.

A technically advanced road and bridge contractor with its own prestressing capability

MI Roads a.s. is a construction company focused on road transport infrastructure, with activities centered on the delivery of roads, motorways, and bridges across the Czech Republic and Slovak Republic. Its work is carried out primarily for the Czech Road and Motorway Directorate, while also extending to regional and municipal projects.

The company is part of the Metrostav Group, the Czech Republic's largest construction group, bringing the strength of a business with more than 50 years of history together with the agility of a technically driven specialist contractor. MI Roads has also invested in its own structural technology capabilities, including its own bridge prestressing center, underlining a clear commitment to engineering quality and in-house expertise.

MI Roads' CEO Zdeněk Ludvil describes its ambition clearly: "We aim to be a dynamic and efficient construction company built on the skills of professionally competent and responsible staff, using modern technologies and procedures, and maintaining our position as a premium brand in the Czech road construction market. That focus on technical competence, delivery quality, and continuous development makes us a strong fit for the BBR Network."

MI Roads' goals are equally direct: to deliver customers' plans efficiently, quickly, and to a high standard, while maintaining respect for the environment and for safety on site. With strong roots in transport infrastructure and a growing technical platform of its own, MI Roads adds further depth to the BBR Network in a sector where quality, reliability, and execution matter every day.



Olivier Forget, CEO of BBR VT International, and Ing. Michal Nečas after signing the agreement that brings MI Roads into the BBR Network.



MI Roads and BBR VT International teams at the start of a new partnership in the Czech Republic and Slovak Republic. From left: Ing. Michal Nečas, Head of Post-tensioning for Bridges & Construction, MI Roads; Bc. Karolina Žáková, Assistant to the Head of Department, MI Roads; Olivier Forget, CEO of BBR VT International; and Dr. Haifeng Fan, Head of Technology, BBR VT International.



MI Roads' bridge prestressing center reflects the company's investment in its own structural technology capabilities and in-house expertise.



Bridge construction on the D3 Kaplice–Nažidla project, illustrating MI Roads' role in major Czech transport infrastructure works.



The D11 Trutnov–Czech-Polish border project shows the scale and strategic importance of MI Roads' highway and bridge delivery work.



Site teams working with bridge prestressing equipment, highlighting the practical engineering capability behind MI Roads' specialist operation.



Our expanding global network
The Netherlands and Belgium for geotechnical applications

Deepro B.V.

A specialist ground anchor partner, anchored by engineering

Deepro B.V., based in the Netherlands, joins the BBR Network as a specialist partner for ground anchors, tie-back systems and engineered solutions for deep excavations, quay walls, retaining structures and infrastructure works. The New Network Member brings together practical site experience, strong technical judgment and reliable execution in one dedicated organization.

Working closely with system license holder BBR VT International, design partner Deepro has helped to translate the engineered anchor concept into a safe, practical and easy-to-install method. Its input focused on the real construction details: drilling sequence, grout control, anchor head detailing, stressing access, testing, tolerances and site logistics. These are the aspects that determine whether a strong design can be delivered correctly under project conditions.

"The value of Deepro is in the connection between design intent and site reality," says Robert Jansen, Technical Commercial Manager at Deepro. "We understand the structure, the ground conditions, the load path and the execution risks. Our role is to make sure the system can be installed, tested and delivered with the level of control expected within the BBR Network."

With more than 25 years of experience in prestressing and anchoring technology, Robert brings deep sector knowledge to Deepro's development. The company's approach is practical and direct: clear engineering, safe execution, careful testing and open communication with designers, contractors and asset owners.

As part of the BBR Network, Deepro aims to strengthen the international exchange of specialist knowledge in ground anchoring and structural retention systems. Its guiding principle is simple: anchored by engineering, delivering technically sound solutions where reliability, constructability and long-term performance matter most.



Robert Jansen, Technical Commercial Manager at Deepro, brings more than 25 years of experience in prestressing and anchoring technology to the BBR Network.



Multiple ground anchors installed along a sheet pile retaining structure, showing the repeatability and technical discipline of specialist anchor works.



Robert Jansen (left), Deepro's Technical Commercial Manager, with BBR VT International CEO Olivier Forget.



Anchor head and bearing plate arrangement, forming the visible load transfer point between tendon and retaining structure.



Electrical resistance measurement during anchor inspection, supporting durability control and performance verification on site.

The people who grow the BBR Network

Growing with BBR celebrates the people behind the projects. It is about how careers develop through experience, responsibility, teamwork, and trust. Across the BBR Network, people grow by solving real challenges, learning from others, and building the skills that keep the business moving forward.
In this first Growing with BBR, we feature six BBR Network team members whose careers have developed in different ways, but with clear common threads. Across countries, disciplines, and generations, their stories reflect the same foundations: technical commitment, steady growth, shared knowledge, and the value of being part of a strong network.



Manuel Vitorino, Superintendent
Canadian bbr Inc.,
BBR Network Member for Canada

Manuel "Manny" Vitorino joined Canadian BBR in 1981 at the age of 19. What began as a job quickly became a career that has now spanned more than four decades in post-tensioning across Ontario. Over that time, Manny has worked across a wide range of applications, including rock anchors, soil anchors, bridges, cast-in-place structures, form travelers, precast beams, parking garages, and high-rise buildings. Much of that work was in Ontario, especially Toronto, where he contributed to many of the region's major developments.

What he enjoyed most was the complete PT process: placing castings, installing ducts, winching in cables, stressing strands, and grouting the systems.

For Manny, the satisfaction came from seeing precision, sequencing, and teamwork turn into a finished structure.

His career has included both strand and bar systems, from grease-filled monostrand cables in parking structures and buildings to major bridge works across the province. Among the projects he remembers most are the Rogers Centre, Toronto Pearson International Airport parking structures, and Highway 407. Altogether, he has worked on over 200 bridges.

After more than 40 years in the industry, Manny still takes pride in building the structures and infrastructure people use every day: **"From the early days pulling cables by hand to today's modern systems, it has been an incredible journey, and I am proud to have spent my life helping build Ontario."**

Jeff Babbage joined SRG Global in 1984, when the business was still known as BBR Australia. Four decades later, his career reflects the kind of experience that can only be built over time: practical, hands-on, and shaped by some of the most demanding anchoring and post-tensioning projects in the field.

He began as a laborer and progressed through leading hand and supervisor roles before becoming a superintendent. Along the way, he built deep expertise across permanent dam anchoring, bridge post-tensioning, LNG tanks, heavy lifting, offshore structures, and remedial works. His project experience has taken him across Australia and overseas, including major dam upgrades in New Zealand, Sudan, and South Africa.

A defining theme in Jeff's career has been dam strengthening, from Chichester Dam in New South Wales to record-setting work at Canning Dam in Western Australia. Throughout, he has built a reputation for practical problem-solving, calm leadership, and safe delivery. His personal motto says a lot: **"Make memories and stay safe."**



Jeff Babbage, Superintendent
SRG Global
BBR Network Member for Australia



Daniele Santalucia, COO

Stahlton AG
BBR Network Member for Switzerland and Liechtenstein

Daniele Santalucia's career at Stahlton AG spans more than 30 years, evolving from production to overall operational leadership. Since joining in 1995, he has built his experience from the ground up, developing a detailed understanding of both processes and people.

His early years in production shaped a practical approach to engineering. Understanding how things are made, how systems behave in reality and where inefficiencies arise has remained central to his leadership style.

As Head of Production Operations from 2018, he focused on strengthening processes and improving consistency across the production unit in Frick, Switzerland. His work combined technical control with team development, ensuring that performance improvements were sustainable.

Since becoming COO in 2026, he has taken responsibility for operational management across the company. The focus remains the same: clarity, reliability and continuous improvement.

His contribution reflects a broader principle within the BBR Network. Long-term experience, combined with steady progression, creates leaders who understand both the detail and the wider system.

"What I value about Stahlton is the strong sense of teamwork and the opportunity to continuously develop myself over many years."

Working in construction since 1994, Jack Tan has spent more than three decades on site across Asia, from major infrastructure to residential developments. His career spans Thailand, Taiwan and the Philippines, with experience across almost every type of construction environment.

For Jack, the defining characteristic of construction is not technical complexity, but uniqueness. Every project brings new conditions, new constraints and new people. The challenge is not just to build, but to adapt.

His work on projects such as the MSS interchange in Thailand and the Taiwan High-Speed Rail exposed him to scale and coordination at the highest level. These are environments where planning matters, but where execution depends just as much on experience and judgment.

What has kept him in the BBR Network is continuity. Working alongside the same people over time, particularly mentors such as John Mo, has shaped his approach to both projects and teams.

His perspective remains simple: **"Construction is difficult, but it is a human adventure."**

That balance between technical delivery and human collaboration continues to define his work today.



Jack Tan, Project Manager

BBR Construction Systems Pte Ltd
BBR Network Member for Singapore, Malaysia and the Philippines

Jacek's connection with BBR Polska began at the end of his studies, when he joined the company to create technical drawings. Right from the start, he could see that this was not ordinary project work. BBR Polska was involved in some of Poland's most significant infrastructure projects, and that early exposure shaped the direction of his career. Nearly 20 years later, Jacek is still growing with the company.

His progression has been steady and upwards, moving from drafting designs into bid preparation, then into site delivery and project leadership. Over time, that meant growing from a young engineer into the manager of some of BBR Polska's largest and most demanding projects.

One moment stands out. During construction of the motorway bridge in Grudziądz, northern Poland, then Poland's longest concrete span at 180m, Jacek was responsible for PT works and operating the form travelers used in balanced cantilever construction. Standing above the river at the end of a 90m prestressed cantilever, he saw the scale of the work in a new way and understood what it meant to help deliver it.

Since then, Jacek has gone on to lead projects involving PT, cable stays, arch bridge hanger systems and a wide range of construction technologies. The variety is part of what has kept the work interesting, but so has the constant opportunity to take on more responsibility.

For Jacek, one of the strongest parts of working at BBR Polska is the team. Over the years, that shared experience has shown him that even the most difficult challenges can be solved with the right people around you.

As he puts it: **"With the BBR Polska team, you learn that even the toughest challenges can be overcome, and that is what makes the work so rewarding."**



Jacek Sowa, Project Manager
BBR Polska Sp. z o.o.
BBR Network Member for Poland



Simon Sun, Senior Supervisor
Contech
BBR Network Member for New Zealand

Simon Sun's route into engineering began early. His father worked in the profession, and that shaped Simon's interest in construction from a young age, later leading him to study civil engineering and begin his own career in the industry.

What continues to motivate him is the process of turning ideas into reality. For Simon, engineering is at its best when drawings, planning, teamwork, and problem-solving come together on site to create something tangible.

One of the strongest influences on his development has been learning from other people.

Simon values asking questions, listening carefully, and drawing on the experience of colleagues with different skills and perspectives. That openness, combined with a willingness to share his own experience in return, has helped shape his approach to both work and teamwork.

A key point in Simon's growth came on the Orakei Main Sewer (OMS) Repair Project, an emergency sewer repair that involved working for six months in a live sewer with all work done at night. It was highly challenging technically and tough on the team. What stayed with Simon was the way the team kept working positively together, solving issues as they arose and supporting each other throughout.

As he puts it: **"The OMS Project taught me the importance of teamwork, communication, and staying positive under pressure. That is also what I value most about working in the BBR Network."**

Our global presence

With clients active in over 50 countries, our global presence is a vital asset.

We can share our international experience locally, provide solutions adapted to specific conditions and be on hand to offer a personalized service.



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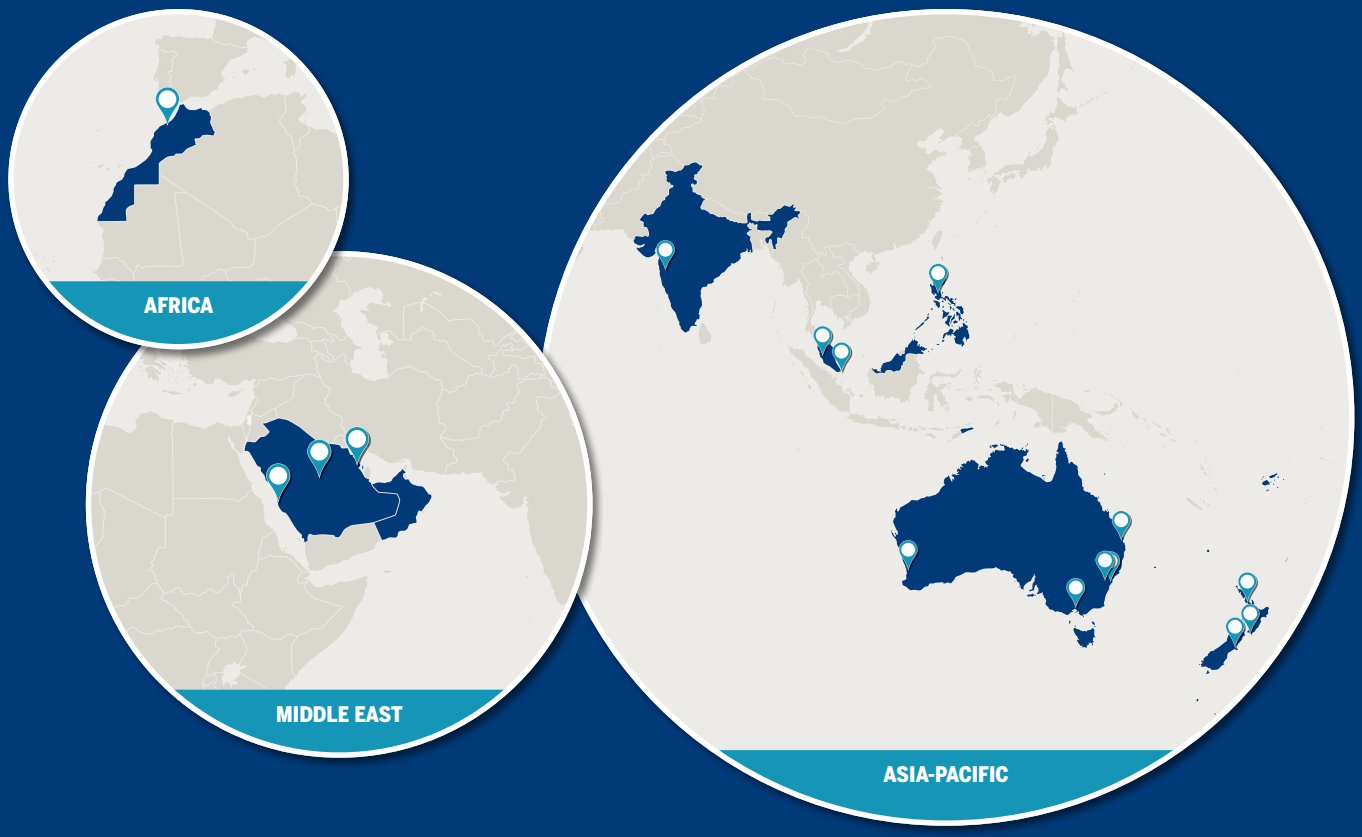
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