

Value Engineering

Cutting-edge expertise for a client-centred approach

BESIX Engineering is the exclusive in-house design office of BESIX Group. It enables BESIX Group to offer its clients tailor-made solutions and optimisation for their projects, whilst also maintaining a strong reactive business model. The quality of the services developed by BESIX Engineering relies on more than 150 engineers in Brussels, Dubai, and Brisbane, who are experts in their respective fields. Over the years, thanks to the active contribution of BESIX Engineering, BESIX Group has conceived and constructed first-class port terminals, cutting-edge civil engineering works, and complex high-rise buildings.

“You see how the added value of our in-house design office is significant. Our dedicated team of engineers and technical experts ensures that projects are completed to the required standards, that innovative and cost-effective solutions are developed, and that efficiency is constantly improved by leveraging on the latest technology – not only when a project runs like clockwork, but also when there is a potential thorn in our side. In a nutshell: our in-house design office is an essential part of our operations and ensures the success of our clients’ projects.

Fabian Boucher, Director of BESIX Engineering

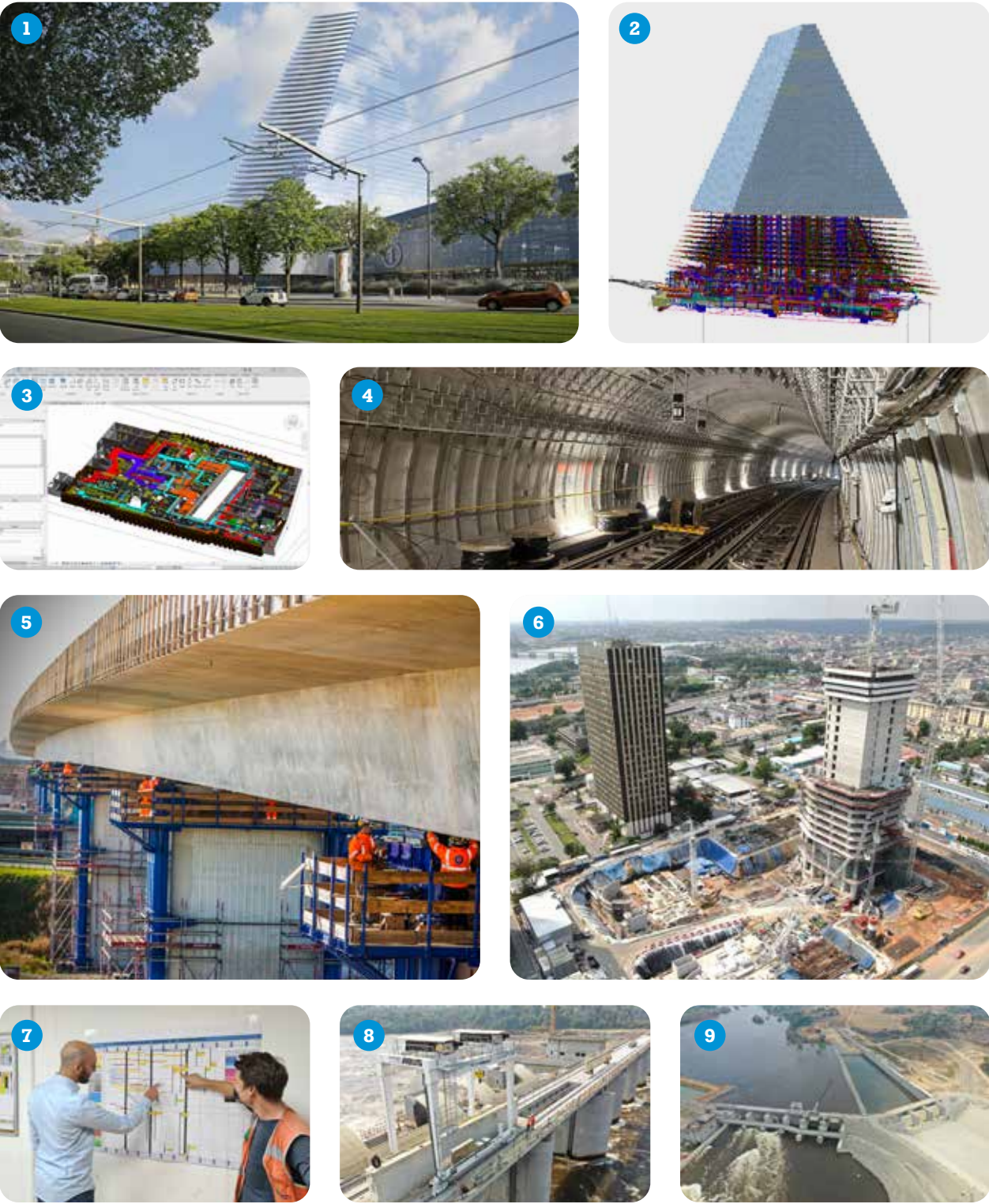
Strong competitive edge

The integration of a design office within a construction company, rare in the sector, is a considerable asset for BESIX’s clients. “Our in-house Engineering department plays a crucial role in our success and that of our clients”, explains Fabian Boucher, Director of BESIX Engineering. “It guarantees an optimal complementarity and cooperation between the design and construction teams of a project, and has positive impacts in terms of costs, risk management, choice of construction methods, and preparation. More recently, it has also taken the carbon footprint of our projects into consideration for further optimisation. The constant sharing of knowledge between the Design and Construction teams over the years is what allows us, today, to adapt to the varying, high-level requirements of our clients in order to create unique structures and, in some cases, to redefine the boundaries of engineering in construction.”

BESIX Engineering on Tour Triangle (France)

This emblematic 180-metre high tower, with its distinctive triangular shape, is located in the south of Paris (15th arrondissement) and is intended to house offices, a conference centre, and a hotel. It will change the entire skyline of the French capital, becoming the third highest building in the city after the Eiffel Tower and the Montparnasse Tower. “This project is a collaborative effort among multiple teams within BESIX Group. It involves the contributions of our structural and geotechnical experts, who are stationed both in our design office and that of our affiliates, Franki Foundations and their French branch, Atlas Fondations. Additionally, our design office is responsible for the design and definition of methods, together with our Operations colleagues who are responsible for managing the project site in Paris. To ensure that the project started smoothly, we seconded the head of our Methods department to the site.”

“Last summer, the team encountered a significant impediment, wherein the foundation works had to be stopped as we noticed an unforeseen uplift, by a few millimetres, of a nearby tunnel. This issue posed a critical challenge to the team, necessitating their concerted efforts to promptly identify viable solutions and restore the project to its original trajectory. Promptness, proactivity, and leadership combined with high-level technical analysis instilled all the different stakeholders with sufficient confidence to resume the work promptly, part and parcel of a trusted collaborative relationship. Through conducting daily meetings and orchestrating a comprehensive mobilisation of top in-house specialists, the team proficiently showcased their expertise and delivered an acceptable resolution”, continues Fabian Boucher.



1. 2. Tour Triangle, Paris (France)
3. 4. Saint-Denis Pleyel Metro Station, Paris (France)
5. A16 ‘De Groene Boog’, Rotterdam (The Netherlands)
6. F Tower, Abidjan (Ivory Coast)
7. 8. 9. Hydroelectric Project, Nachtigal (Cameroon)

BIM in the BESIX Community

The methodology of Building Information Management (BIM) has been used for many years in the company. “This way of virtually building, planning, calculating, and surveying our projects has had a significant impact upon our method of collaboration. Working around a virtual 3D model changes the way we interact with each other. Bringing every stakeholder – from architect to engineer to client – around a centralised, virtual project makes everyone more involved in the project. It makes it possible for us to analyse a situation or an issue virtually, within the context of the whole project. With the project in a central place, BIM makes us communicate and collaborate better together.”

The centralisation of the project data and the common way of working around the BIM-model leads to fewer mistakes and more efficiency, which leads to better designs, better communication, better collaboration, a higher stakeholder involvement, and, in the end, a better project.

These successes never come for free. “We can no longer rely on traditional methods of managing projects. New ways of working and collaborating pop up as we leave the traditional paper trails behind us. We are thinking with a digital mindset,

always with the end goal in mind. When we know what the project needs, we can better prepare the virtual models and feed them with accurate information so the site execution team can process this data in the format that they need, be that 2D drawings, quantity take-offs, or asset data for digital twins.”

The move to BIM has taken the company to the next level to become a virtual builder. “As virtual builder, we host communities, rather than teams, who all work together around a common set of information: the BIM-model!”

BESIX’s strength relies on its community of BIM experts. “At its core, you have the BESIX Engineering department, a team of BIM managers and BIM coordinators who are supporting the company’s projects, day in day out, together with a team of BIM modelers who are creating this digital information. This BESIX BIM community spreads over the whole company: from Europe to the Emirates and Australia, from contracting to subsidiaries. Everywhere, communities big and small are liaising with BIM partners. From the Engineering department onwards, the dots are connected and we let the BIM community grow”, concludes Fabian Boucher.

Carbon footprint reduction at the core

The Sustainability team in BESIX’s design office develops advanced solutions to improve the environmental performance of construction projects. Especially in the Benelux countries and in the Middle East, BESIX has often been a frontrunner in the environmental field, developing unprecedented circular construction projects or building energy-neutral infrastructure in the Netherlands.

CO₂ as design parameter

“Our Sustainability experts contribute to the design of projects in order to achieve high environmental certifications and labels, such as BREEAM, LEED, HQE, Passive Buildings, Eco-construction, Cradle-to-Cradle, Zero-Energy, and CO₂ neutral projects”, explains Fabian Boucher. “The level of carbon dioxide emissions is systematically considered as a critical factor in our design process. This involves evaluating the environmental impact of each project and designing it in a way that minimises its carbon footprint by reducing CO₂ emissions throughout the project’s life cycle.”

Crucially, it means using or developing new materials with low embodied carbon, improving energy efficiency, incorporating renewable energy sources, and taking the logistics into consideration in order to reduce a project’s carbon footprint. “It even means designing an asset with disassembly and recycling in mind!” insists Fabian Boucher.

Material passports

“This is one of the reasons why we have increased our efforts around material passports: by providing a detailed record of the materials used in an asset, we can help identify opportunities for material reuse or recycling at the end of the asset’s life, rather than simply sending materials to landfill. As top-notch engineers, it is our duty to promote practices and strategies that reduce the amount of waste generated during the construction process, as well as developing ways to reuse or recycle materials that are no longer needed”, adds Fabian Boucher.

Green concrete

“Let me add another point: we are also actively involved in several R&D initiatives, notably with academic bodies and suppliers, which test a variety of methods and materials to reduce the environmental impact of concrete. This ‘green concrete’ can be made of recycled materials, especially crushed concrete or recycled aggregates. It can also be made of alternative cementitious materials, such as fly ash, slag, or silica fume, in place of some or all of the Portland cement. We are also testing cement using low-CO₂ production processes, as well as cement mixtures where the amount of cement used is reduced. In short, we are responsive to the market, being active in investigating and testing low-impact concrete whilst also guaranteeing the necessary performance characteristics and durability of the material.”

Onsite and offsite support, from tender to execution

The capabilities of BESIX’s design office rely on the skills of specific experts. These experts are made available according to the particularities of each project, as is the case for method engineers. The Methods & Planning services offered by the BESIX in-house design office determine the methods for carrying out the work and draw up the precise sequence of operations in order to guarantee optimal implementation in terms of cost, timing, and quality, including sustainability.

Streamlining construction with LEAN methodology

The LEAN methodology is a management approach that emphasises the elimination of waste and the continuous improvement of processes. Services provided by Methods & Planning include the implementation and organisation of this LEAN methodology. “In a nutshell, it consists of involving all the site’s stakeholders, including subcontractors and suppliers, in the planning of logistical and operational tasks. Site teams using LEAN are seeing subcontractors, workers, and managers take on more responsibility, leading to greater trust, less waste, and more efficient cost management. This in turn leads to less fire fighting and more time for anticipation and preparation”, explains Fabian Boucher. “This approach is particularly useful in large, complex projects where there are many stakeholders, with a correspondingly higher risk of delays and cost overruns. In 2022, we seconded LEAN experts on several projects, both on and offsite.”



“Our method engineers play a critical role in improving production processes to increase efficiency and reduce costs. They intervene during the project’s tender and design phases of course, but also during execution. During execution, they analyse existing processes, develop solutions for improvement, and work on site with project teams to implement and monitor those solutions. Their focus on continuous improvement helps us remain competitive and efficient in our operational processes. And that’s the reason why most of our method engineers are also skilled in applying LEAN methodology.”

Fabian Boucher, Director of BESIX Engineering

Conclusion: adding value to clients’ projects

“In conclusion, I can say that our in-house design office is a vital component to achieving success in today’s competitive market. With the ability to protect our company and our clients from design risks, provide significant engineering value to our client’s projects and function as a trusted mentor to young engineers, our in-house design office offers numerous benefits that cannot be overlooked. I see our in-house design office as the ideal platform to create a culture of innovation and continuous improvement, paving the way for long-term success.”