

# Value Engineering

## Leading expertise for a client-focused strategy

BESIX Engineering is the dedicated design arm of BESIX, enabling the company to deliver bespoke solutions and project optimisations directly to its clients while ensuring agility within its business operations. The exceptional service quality provided by BESIX Engineering is powered by a team of more than 150 skilled engineers located in Brussels, Dubai, and Brisbane, each an expert in their domain. Young engineers joining the company often start in this hub of expertise, where a structural mentorship programme ensures they are well-prepared and inspired before transitioning to on-site roles in Design & Build projects. Through the years, the innovative efforts of the BESIX Engineering team have enabled BESIX to design and build premier port terminals, state-of-the-art civil infrastructures, and intricate skyscrapers.

### Distinct competitive advantage

Having a design office embedded within a construction firm is a unique benefit in the industry, significantly enhancing the value BESIX offers its clients. “The Engineering division within our group is pivotal to both our and our clients’ successes,” says Fabian Boucher, Director of BESIX Engineering. “Early collaboration with clients is immensely beneficial; the sooner we engage in the design process, the greater our ability to optimise and add value. This is why we prioritise Early Contractor Involvement (ECI) projects, which facilitate early collaboration. This approach ensures seamless integration and collaboration between the client and our project design and construction units, yielding benefits in cost efficiency, risk mitigation, construction methodology selection, and planning.”

“Lately, our design office has become instrumental in reducing the carbon footprint of our ventures, offering even greater optimisation possibilities”, adds Fabian Boucher. “The continuous exchange of insights between our Design and Construction departments over time empowers us to meet and exceed the diverse, sophisticated demands of our clients, enabling us to craft distinctive structures and, occasionally, push the frontiers of what’s possible in construction engineering.”

### BESIX Engineering on Oosterweel Link (Belgium)

The Oosterweel Link project, developed by Lantis for the Flemish government, is one of the largest infrastructure and urban planning projects ever undertaken in Belgium. It aims at completing the Antwerp ring road to improve traffic flow and reduce congestion in the region. BESIX is involved in several parts of this special project.

### An immersed tunnel

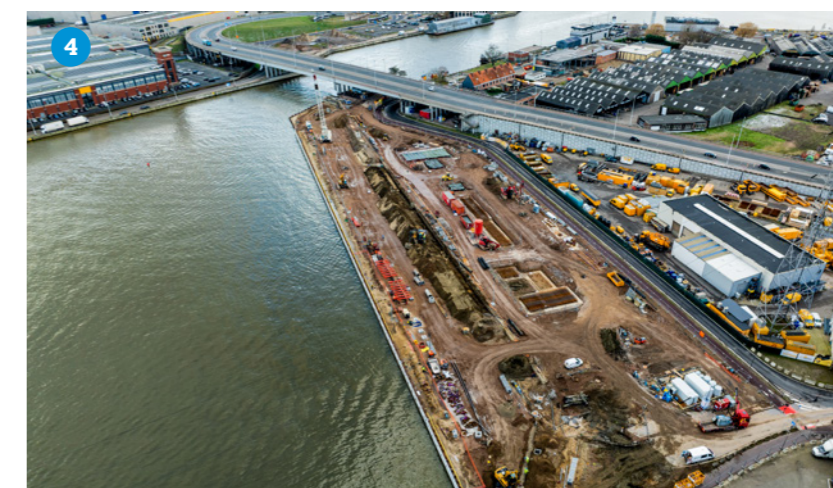
One of the endeavours of BESIX Engineering was to design the future Scheldt Tunnel. The tunnel has a total length of 1,800 metres and is currently being built using the ‘immersed tube’ method. This involves building eight tunnel elements of about 60,000 tonnes each in the Zeebrugge inner port. Once built, the eight elements will be towed afloat to Antwerp via the North Sea and the Western Scheldt. There, they will be sunk one after the other in a previously dredged sinker trench in the Scheldt. This technique, in which gravity and the buoyant force of water constantly compete, is one of the most ingenious construction methods in concrete and marine engineering.

The immersed tunnel is the crown jewel from an engineering point of view. Transporting and sinking the tunnel elements via the Scheldt is a feat. It’s also a special project where BESIX has a pioneering role in geotechnics and BIM in the design of the tunnel elements, the construction dock, the Scheldt dykes, the sinker trench, and so on.

### A stacked tunnel - and much more

BESIX Engineering is also involved on the Right Bank of the river, with comprehensive works to upgrade the Royers lock area. This part of the project involves the design and construction of a new bridge, new viaduct, and new underground stacked tunnel infrastructure. Unique in this project is the combination of different construction techniques coming together. Just about every possible technique is used: freezing grounds, making diaphragm walls, building according to the Stross method,... And all this, in a fairly urbanised area, with limited space and the presence of obstacles such as the pre-metro tubes!

“In large and complex projects, we always position ourselves as the ideal partner, combining engineering knowledge with practical experience and thus giving the customer complete



peace of mind”, explains Fabian Boucher. “This really stands out in something like the Oosterweel Link, where the client really values the expertise we bring to the table. Of course, unexpected challenges may arise, but our deep understanding of both construction engineering and field operations enables us to respond swiftly. Such adaptability is invaluable, particularly in projects characterised by their significant complexity and magnitude like this one.”

“In the Oosterweel project, our BESIX Engineering team has remarkably led the entire design process across multiple design offices. We have been able to seamlessly transition from conceptual design directly to detailed design, bypassing the basic design phase entirely. This efficient approach, facilitated by our extensive experience, significantly accelerated the project timeline”, he concludes.

### Instrumental in reducing construction’s carbon footprint

At the heart of BESIX’s design office, the Sustainability team focuses on developing innovative solutions to enhance the environmental efficiency of construction projects, notably in

the Benelux and the Middle East, where BESIX has pioneered circular construction and energy-neutral infrastructure. “Our sustainability experts play a key role in achieving solid environmental certifications for the assets they design, by considering CO<sub>2</sub> emissions as a crucial design factor, aiming to minimise the carbon footprint of the asset from inception to completion. This includes adopting materials with low embodied carbon, boosting energy efficiency, and incorporating renewable energy, with an eye on logistics to diminish overall carbon emissions”, explains Fabian Boucher.

Additionally, BESIX Engineering is actively participating in R&D efforts, in collaboration with academic entities and suppliers, to mitigate the environmental impact of concrete through the development of ‘green concrete’. This innovative material, incorporating recycled content and alternative binders like fly ash, is part of BESIX’s strategy to explore and apply low-impact concrete solutions, ensuring both environmental benefits and material durability.

**For an in-depth review of how BESIX supports its clients in the decarbonisation journey, refer to the article on the next pages.**

1. 2. Scheldt Tunnel dry dock, Zeebrugge (Belgium)
3. Fabian Boucher, Director Engineering BESIX Group
4. Oosterweel Link, Antwerp (Belgium)