



**ACTIVITY
REPORT
2017**

COMPANY PROFILE

A MULTI-DISCIPLINARY GROUP

WITH MORE THAN A CENTURY OF EXPERIENCE

BESIX Group is a leading Belgian industrial company operating in the **construction, real estate development** and **concessions** sectors. It profiles itself as a multi-service group taking on projects of all sizes. Founded in 1909, it has grown steadily over the years.

NV BESIX SA, its largest subsidiary, offers services in the different stages of construction projects. In addition to **NV BESIX SA and its other subsidiaries**, BESIX Infra, Belemco, Cobelba, Jacques Delens, Socogetra, Van den Berg, Vanhout, Wust, Franki Foundations, BESIX Park, BESIX RED, Lux TP, West Construct in the Benelux and in France, BESIX Group operates in Eastern Europe, North and Central Africa and the Middle East through its subsidiary Six Construct, as well as in Canada and Australia.

The Group stands out in its sector by having its own **in-house Engineering Department**, with wide-ranging expertise in geotechnical engineering, concrete technology, methods, planning, and BIM, System Engineering and similar tools. The group offers “value engineering”: optimizing the design work and adapting the implementation processes so as to minimize the risks and costs of errors and optimize expenditure and lead times for the customer.

In recent years, BESIX Group has focused on **diversifying** its business both geographically and sectorally, by internal growth and by acquisitions and equity investments. In all its many projects and initiatives, the Group constantly seeks to realize its **newly-defined purpose**: “**Excel in creating sustainable solutions for a better world.**”

BESIX Group: simplified organization chart



The complete organization chart of the Group can be found on our website at: www.besix.com/en/about/group-structure



Your dedicated partner, from construction to concessions

BESIX Group has evolved from a valued construction partner to a full service company. Construction is still our core business, but our Concessions & Assets and Real Estate Development activities have also taken off. Our vast expertise allows us to take charge of projects from financing to design and construction through to long-term maintenance.

5 key dates



1909

Founding of the Société Belge des Bétons, (SBB), which undertakes prestigious construction projects.



1966

Founding of subsidiary Six Construct to take charge of major projects in the Middle East.



2004

Management Buy-Out, SBB becomes BESIX Group.



2010

Inauguration of the Burj Khalifa in Dubai (UAE), the world's tallest tower, built by our subsidiary Six Construct.



2018

BESIX signs a 50/50 co-investment partnership in the innovative A-Stay urban housing concept (more info on page 15)

5 key figures

Turnover

€2.3 billion

in 2017

Net income

€102.6 million

in 2017

Nearly

15,000

persons employed at the end of 2017

71

nationalities

22

countries



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BESIX IN 2017





Message from the CEO of BESIX Group

**SUSTAINABLE
GROWTH
CONFIRMED**

Dear reader,

2017 was a grand cru in many ways. As you will read in detail in the following pages (see page 16), it was the second best year in our history, following an exceptional 2016. Let me thank our customers and partners for their trust, and all our employees for their daily commitment. It is this trust and commitment that have driven our success.

In 2017, BESIX confirms the growth started in 2016

The Contracting business generated a turnover of €2,218 million and a net income of €58.7 million. The lower figures from the Middle East and business unit International were more than offset by the European regional entities, thanks also to the integration of the Belgian activities of the Heijmans group, acquired in April 2017 (see page 12).

Our BESIX RED real estate development business had an excellent year with a turnover of €144.4 million and a net income of €17 million (see page 132), while our Concessions & Assets activity posted a net income of €24.7 million (see page 140).

These results reflect our desire to focus our efforts on clearly identified performance drivers – contracting, real estate, concessions & assets –, while continuing to diversify the Group geographically and in terms of business sectors.

Stronger diversification

Our group pursued its diversification strategy at a sustained pace in 2017. In 12 months we strengthened our sectoral and geographic diversification with a high number of acquisitions and equity investments (see page 12). These operations consolidate our position in a coherent manner, while locking in new sources of revenue.

Projects around the world

In 2017, as in previous years, we were able to deliver very high quality projects in over 20 countries. I invite you to read in the following pages what some of our customers tell us about projects won or completed in 2017. All testify to the passion and know-how of our teams.

RIK VANDENBERGHE
CEO of the BESIX Group

“We have the broad base, expertise, knowledge and strong customer relationships required to realize our ambitions and excel at creating sustainable solutions for a better world.”

Whether modest or emblematic, each project is important to the customer - and therefore to us. Some gather international attention. Others are less known, but still vital: nursing homes, municipal swimming pools, care centers; roads, bridges, bypasses; luxury or social apartment blocks; piping, cabling and drainage networks; parking lots; and the like. Every day, the Group's employees, from Schelle to Namur, via Dubai, Brisbane and Vancouver, carefully develop integrated and tailor-made offers for their customers and prospects, seeking all the time to create value that goes beyond 'simple' construction.

Driven by a noble purpose

As these projects well illustrate, we are ideally positioned to assist customers and communities wherever we operate around the world. For them, we take over the design, financing, development, promotion, construction and/or operation of a wide variety of projects. We believe that our role in society is to support economic, social and environmental progress, and improve people's quality of life. In 2017, we crystallized this purpose: “Excel in creating sustainable solutions for a better world”. This noble purpose is our source of inspiration and motivation, one shared by all BESIX employees (see page 26).

Favourable prospects

On 31 December 2017 our order book stood at €3.0 billion, against €2.9 billion a year before. In the first quarter of 2018, our teams won several large-scale contracts, including the renovation of the Leopold II tunnel (Brussels), the A16 motorway (Rotterdam), a thermal Waste-to-Energy recovery plant (Dubai) and a desalinization plant (Jebel Ali).



International framework agreement on fair trade standards signed with the Building and Wood Worker's International (BWI) and the BESIX European Works Council.

Our range of projects demonstrates a mastery and leading expertise in many areas. Thanks to our expertises, our order book can still increase significantly in the months to come. Finally, our co-investment in A-Stay (see page 15) will be taking up our full attention. Our target here is to place 7,000 housing units onto the market worldwide in the next five years, to meet the growing demand for innovative urban habitat solutions for stays of one night to one year.

In conclusion, after just over a year in the BESIX Group, I have no qualms in stating my admiration for the vision and tenacity that the company - and especially its CEO for 13 years Johan Beerlandt - have displayed since 2004. He made BESIX a unique success story. We are a 'family' of proud and dedicated people, characterized by a positive mentality and a truly customer care and client-driven approach - as well as a passion and a determination to set out our hands to the plough in order to achieve results.

With these solid foundations, we have the broad base, expertise, knowledge and strong customer relationships required to realize our ambitions and excel at creating sustainable solutions for a better world.

Rik Vandenberghe

Our societal commitments signed in 2017

- Renewal of the status of active member of the United Nations Global Compact.
- International framework agreement on fair labour standards signed with the Building and Wood Worker's International and the BESIX European Works Council.
- 5-year sponsorship of the Royal Belgian Football Association.

Recognition by our peers

- BESIX Nederland won the "Betonprijs 2017" with two flagship projects: the renovation of the Velsertunnel and the Lammermarkt car park in Leiden.
- At the first BIM Awards 2017 for the Benelux, BESIX Group took home no less than three top awards - including the BIM Award of the Year for the Beatrix Lock and the broadening of the Lekkanaal, two Silver Awards and a Bronze Award in 5 categories out of 6.
- BESIX Infra gained a creditable second place in the 'Minder Hinder (= less nuisance to neighbours) Awards' by Aquafin to companies that, in carrying out remediation works for it, have displayed outstanding levels of quality, safety and respect for the environment.
- Cobelba won the public prize at the Belgian Green Awards, in the "Neighbourhoods" category, with its Namur "Les Jardins de Baseilles" eco-neighborhood.

Chairman's message

SUCCESSFULLY PASSING THE TORCH IN 2017



JOHAN BEERLANDT
Chairman of the Board of Directors

“The acquisitions of 2017, made largely in Belgium, reinforce what is very dear to me: the Group's Belgian identity.”

After 42 years in the company, including 13 years at the helm, Johan Beerlandt accepted his appointment as Chairman of the Board of Directors of BESIX Group, leaving the position of CEO to Rik Vandenberghe as from 3 April 2017.

He leaves behind a company in very good health, with 2016 as a year of exceptional results, confirmed by the positive outcome of 2017.

He is pleased to see that his strategy of diversification through organic creation and acquisition has continued to bear fruit and even accelerated in 2017. Johan Beerlandt: “In line with our ambition to explore new ways to continue to grow the business, BESIX made a significant number of acquisitions in 2017. These have allowed us to strengthen our position in a coherent manner, and to lock in new revenue streams.”

As Chairman of the Board, Johan Beerlandt has supported and encouraged his successor in exploring new avenues of diversification - so much so that acquisitions came thick and fast during 2017.

Aware that shareholder stability is a key factor of long-term success, Johan Beerlandt is constantly concerned to preserve it in his new role. “Moreover,” he concludes, “the acquisitions of 2017, made largely in Belgium, reinforce what is very dear to me: the Group's Belgian identity. This too points to the successful transition between Rik and me at the head of the company.”

2017 KEY EVENTS

▼ Pilbara Marine Pty Ltd (Fortescue Group) awards the Design & Build contract for the new tug infrastructure at **Port Hedland** (AUS) to BESIX in partnership with Decmil.



|01



▲ After renovation works done by HYACINT (BESIX, Dura Vermeer, Spie en Croon Elektrotechniek), the **Velsertunnel** (NL) reopens.

02



▲ BESIX Group announces the acquisition of the Belgian activities of **Heijmans NV**. Van den Berg, BESIX Infra and Belemco join the Group.

04



▲ In Leiden (NL), following a construction period of 2,5 years, the country's deepest **underground car park Lammermarkt** opens.

▶ The BESIX Group-Luštica Development JV announces the development and construction of the **Chedi Hotel** and a number of residential blocks in Luštica Bay, Montenegro.

▼ The **Khalifa International Stadium** in Doha, Qatar, reopens after the renovations done by Six Construct/MIDMAC.



05

▼ BESIX completes the rehabilitation and widening works on the **3 viaducts of Herstal** (BE) on the E40/A3 highway.



06

► Socoetra acquires **Enrobage Stockem** (BE) and **Witraloc** (LUX), both operating in the road works sector.

► Vanhout acquires 60% of **Energieconcepten**, specializing in renewable energy systems.

► BESIX announces the reorganization of its Dubai Design Department (or DDD), renamed **Dubai Engineering Department** (DED). Engineering and methods planning are added to its design activities.

08



▲ BESIX Nederland signs the Engineer & Build-contract for the **Terraced Tower**, a 100 m-high residential tower in Rotterdam (NL).



▲ Franki Foundations acquires **Martello Group** (UK), which specializes in innovative foundations solutions for complex projects.

► BESIX wins the renovation contract for the 30-story **Manhattan building** in Brussels (BE) dating from the 1970s.



▲ Van den Berg acquires **Larabo**, which specializes in the laying of cables and pipelines for telecom operators and utility companies in Flanders (BE).

► As a member of the **United Nations Global Compact** since 2016, BESIX Group is granted 'Active Member' status after confirming its commitment to the 17 objectives set for 2030.



► The BESIX-Orascom teams finalize the works for the **Ain Sokhna Product Hub**, a 3 km long jetty shaped like an F in the Gulf of Suez.

▼ BESIX Group announces its 5-year **sponsorship** of the Royal Belgian Football Association.



► The **9th BESIX Global Safety Time Out** pays particular attention to the implementation of the Life Saving Rules 1, 3 and 5, concerning working at a height, lifting and moving of equipment.

▼ At the first **Benelux BIM Awards**, BESIX takes home no less than six awards, including the BIM Award of the year. BESIX Contracting, through its Engineering Department, is awarded **BIM Level 2 certification** by BSI Group, by meeting the criteria of the PAS 1192-2 standard (design and construction).



10



▲ BESIX Group launches **BESIX Fit**, a sports programme for all employees.

► The Executive Committee reformulates BESIX Group's mission: "Excel in creating sustainable solutions for a better world", with excellence, co-creation, respect, passion and unity as strategic drivers as part of **BESIX Forward**.

11



▲ **SAFI**, established in 2011 by the Municipality of Ajman, Veolia and BESIX, reopens the improved **water reuse station** in Ajman (UAE).

12



▲ BESIX Group, BWI and EWC present a **framework agreement on fair labour standards**, to promote and protect the well-being of all employees and workers employed by the Group.

► BESIX wins **several important contracts in Belgium**: ING's "Cours Saint-Michel" head office in Brussels (BESIX RED), the new Antwerp local police headquarters, the head office of De Persgroep in the same city, the Quatuor building in Brussels, and the WATT real estate project in Ghent.

▼ Change of guard at the head of two Belgian subsidiaries: the trio Ronny Eijckmans, Bert Lenaerts and Joeri Schellens take over the baton from Jef Lembrechts at **Vanhout**, and Etienne Lambilliotte that of Jean-Louis Henry at **Cobelba**. Cobelba's activities are reorganized.



▼ The launch of the first tunnel boring machine of the **Grand Paris Express**, the largest urban project in Europe. Since 2015, Atlas Foundations (Franki Foundations) has signed contracts for foundation works on the Grand Paris project.



▶ 2018

| 01



▲ The imposing 82 tonne statue of Ramses II makes its solemn entry into the main hall of the **Grand Egyptian Museum** in Cairo.

▶ The Circul2020 consortium (BESIX, Jan De Nul and Engie-Fabricom) wins the renovation + 25 year maintenance contract for **Leopold II-tunnel** in Brussels, the longest tunnel in Belgium (2.6 km long).

▶ The consortium formed by BESIX and Hitachi Zosen Inova (Switzerland) is awarded the BOT contract for **one of the world's largest thermal waste recovery plants** by the Municipality of Dubai (UAE).

03

A-STAY

▲ BESIX Group and A-Star Group sign a 50/50 co-investment in the new global company **A-Stay**. The revolutionary concept will develop 7,000 studios around the world within the next five years.

▶ The JV BESIX-Acciona Agua is awarded the contract for a **desalination plant in Jebel Ali** (Dubai, UAE), using Sea Water Reverse Osmosis technology.

CONSOLIDATED KEY FIGURES 2017

2016-2017
EVOLUTION OF REVENUES

-0.9%

NET RESULT
ON REVENUES

4.4%

NET CASH
POSITION

34.1

EUR million

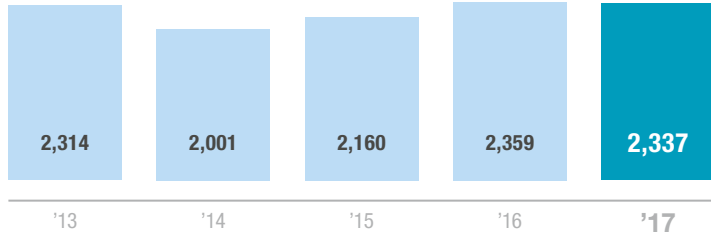
RETURN
ON EQUITY

15.7%

IN EUR MILLION	2013	2014	2015	2016	2017
INCOME STATEMENT					
Revenues	2,314.4	2,000.5	2,159.7	2,359.1	2,337.0
EBITDA	121.9	102.7	46.1	168.1	122.5
<i>EBITDA margin (%)</i>	5.3	5.1	2.1	7.1	5.2
EBIT	78.5	65.1	0.4	117.8	78.9
<i>EBIT margin (%)</i>	3.4	3.3	0.0	5.0	3.4
Earnings before taxes	95.6	79.3	15.4	135.0	115.5
Consolidated profit	83.4	62.9	3.8	120.8	102.6
<i>Net result on revenues (%)</i>	3.6	3.1	0.2	5.1	4.4
Cash flow	124.1	84.6	79.6	159.3	142.1
<i>Cash flow margin (%)</i>	5.4	4.2	3.7	6.8	6.1
BALANCE SHEET					
Equity	499.7	527.3	518.3	653.0	660.4
Net cash position	194.3	160.6	26.4	172.4	34.1
<i>Solvency ratio (%)</i>	27.5	26.4	24.4	27.3	28.1
<i>Liquidity ratio</i>	1.43	1.43	1.40	1.42	1.42
<i>Return on equity (%)</i>	18.5	12.6	0.7	20.6	15.7
ORDER BOOK (AT 31 DECEMBER)	2,716	2,962	3,229	2,930	3,031

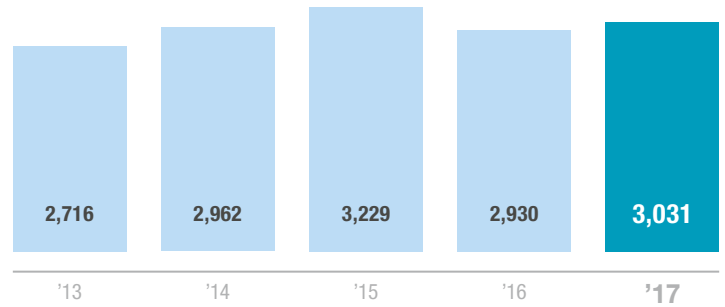
EVOLUTION OF REVENUES

[IN EUR MILLION]



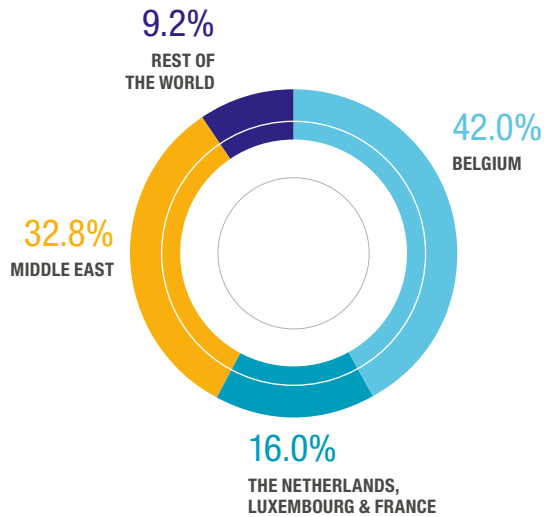
EVOLUTION OF ORDER BOOK

[AT YEAR-END - IN EUR MILLION]



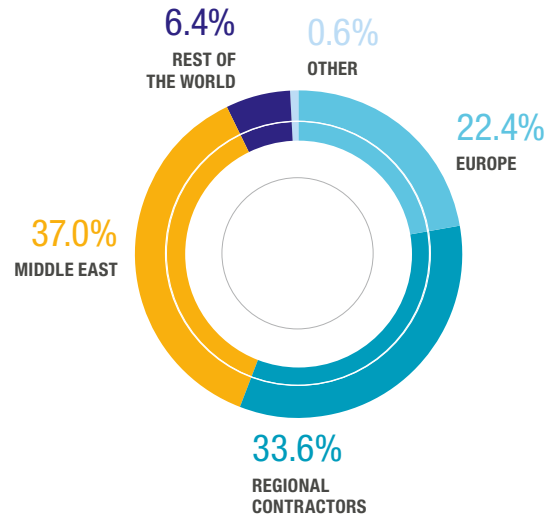
REVENUES BY REGION

[2017]



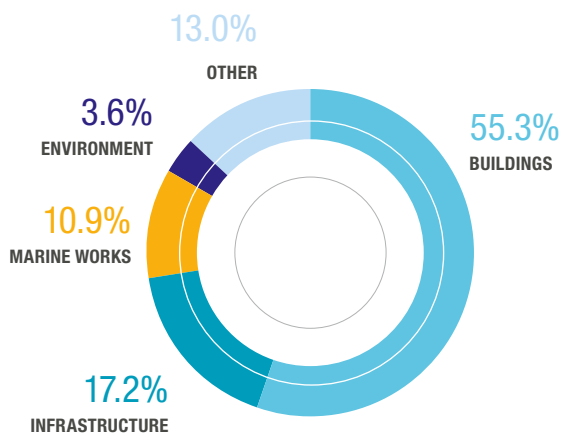
ORDER BOOK BY REGION

[AT 31/12/2017]



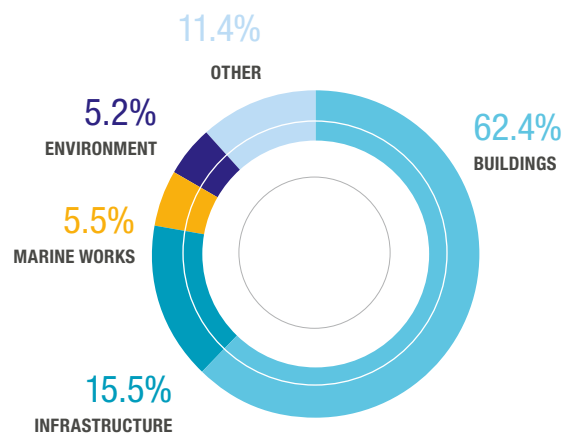
REVENUES BY AREA OF EXPERTISE

[2017]



ORDER BOOK BY AREA OF EXPERTISE

[AT 31/12/2017]





*Message from
the Chief Financial Officer
of BESIX Group*

SECOND CONSECUTIVE RECORD YEAR IN OUR HISTORY

JAN GESQUIÈRE
Chief Financial Officer of BESIX Group

“In Europe, BESIX had a positive year, marked by the good performance of the activities by BESIX and the regional entities in Belgium.”

I'm glad to report that 2017 has been the second record year in a row for BESIX Group, demonstrating the success of our sector and geography-based diversification strategy. The consolidated revenues have reached €2,337.0 million. The consolidated net result has reached €102.6 million.

BESIX Group's consolidated net cash position was €34.1 million. The solvency ratio stood at 27.8%, which is above the minimum standards for the sector.

The solid start to 2018 is attributable to an order book of €3.0 billion at the end of last year, as well as to several large-scale projects that were won in Q1 of this year (see page 15). Mid-February, BESIX initiated an offer on 50% of the shares not yet held by BESIX in Watpac, an Australian company noted on the Brisbane stock exchange. Finally, in March the Group announced a 50/50 co-investment in BESIX A-Stay.

Performance by Activity and Business Unit

Contracting

BESIX Group's Contracting business generated revenues of €2,218 million and a net result of €58.7 million. This performance reflects geographically contrasting developments.

- In **Europe**, BESIX had a positive year, marked by the good performance of the activities by BESIX and the regional entities in Belgium, which generated nearly €1.3 billion euros of revenues in 2017. The integration of the Belgian activities of the Heijmans Group, which was finalized at the end of April 2017, went very well. The other European entities (the Netherlands, Luxembourg, France) also had a very good year.
- In the **Middle East**, Six Construct had a very good year, with the realization of new and interesting projects in Oman and Bahrain and the continuation of large-scale projects in Dubai. Revenues from Qatar have logically been affected by the deterioration of the geopolitical context in the region since June 2017.
- The **International** cluster, meanwhile, had a less favorable year. This situation is mainly due to the significant costs incurred in the development and preparation for several projects, and also due to tenders for major projects for which the decision to invest by the client depends on the costs of raw materials (hydrocarbon or mineral) or the tenders for projects that depend on government decisions (mainly in Africa).

Real Estate Development

BESIX RED, the Group's real estate division, had a record year in 2017, with revenues of €144.4 million. The Belgian residential housing market was buoyant in 2017. Sales were strong despite a small rise in the average price (slightly above inflation), due to mortgage rates remaining at historically low interest levels. 2017 also saw the continued clean-up of the office market with a decrease in rental vacancies.

BESIX RED's net result was €17.0 million, up 23.9% year-on-year.

Concessions & Assets

Concessions & Assets have been once again very profitable, contributing to net result for €24.7 million. This reflects mainly a robust performance of the group's concessions in the Middle East.

Balance Sheet

The balance sheet total decreased with €45 million to €2.4 billion, partly explained by a decrease in the USD closing rate year-on-year with 12%. While non-current assets increased with €80.6 million mainly as a consequence of the acquisitions made in the course of 2017, current assets decreased as part of the Group's cash has been used for the financing of these acquisitions. Non-current liabilities increase as a consequence of the Schuldschein issue.

Progress continues to be made in securing the Group's necessary funding requirements for the coming years. Beyond the negotiation of a number of revolving credit facilities with 3-year and 5-year tenors and the implementation of a €50 million Commercial Paper program, a €100 million Schuldschein issue with 5-year and 7-year tenors was successfully completed during the second quarter of 2017.

Net cash evolution

BESIX Group's consolidated net cash position has reached €34.1 million at the end of the year, compared to the €172.4 million net cash position at the end of last year. This significant decrease is mainly attributable to the many acquisitions that were made during the year (former Belgian Heijmans subsidiaries, Martello Group, Enrobage Stockem), an increase in working capital due to lower net advances, a negative currency translation effect (due to the decrease of the USD), net capital expenditure and the payment of a €50 million dividend based on the record profitability posted last year. This was partially compensated by a significant operating cash flow, the net cash from the acquired entities and dividends from associated companies.





BESIX GROUP

CORPORATE GOVERNANCE

BESIX Group follows the Belgian recommendations on corporate governance for unlisted companies ('Code Buisse III').

BESIX Group has structures and rules in place to ensure effective corporate governance, risk management and control both in each Group company and within the organization as a whole.

The **Board of Directors**, assisted by advisory committees, plays a leading role in outlining, monitoring and controlling such structures and rules and in securing the day-to-day operational and financial management of the Group and its entities by the **Chief Executive Officer** and the **senior management**.

The Board includes **four external directors**, whereby a balanced configuration ensures authority, expertise and independence, and the positions of **Chairman** and **Chief Executive Officer** are separated. Decisions are also taken after ample deliberation and consultation and the functioning of the Board is regularly reviewed, also in the light of the prevailing shareholders' arrangements.

A number of **advisory committees** are organized within the Board of Directors to prepare its deliberations and optimize its decision-making process. These committees prepare the topics discussed during the Board meetings, assess the effectiveness of the internal controls in place and formulate opinions and recommendations:

- The **Audit Committee** supervises the setup of the statutory and consolidated financial statements, the interim financial reports and the relations with the **statutory auditor**. It works closely with representatives of the **senior management**, monitors the internal control and risk management systems and the main risks associated with the activities of the Group and its entities, and operates in accordance with its charter;
- The **Remuneration & Nominations Committee** evaluates the performance of the senior management, oversees the HR policies of the Group and its entities and pays specific attention to succession management;
- The **Executive & Strategic Committee** focuses on the vision, mission and strategic objectives of the Group and oversees the business activities and performance as well as the risk management and internal control and organization, as implemented by the Chief Executive Officer and the senior management.

BOARD OF DIRECTORS AND COMMITTEES



Johan Beerlandt



Rik Vandenberghe



Osama Bishai



Jérôme Guiraud



Mark Littel



Paddy Padmanathan



Philippe Quoilin



Baron Jean Stéphane



Ridder Luc Vandewalle



Baron Philippe Vlerick

Board of Directors

Name

Johan Beerlandt¹
Rik Vandenberghe²

Osama Bishai
Jérôme Guiraud
Mark Littel
Philippe Quoilin³
Baron Jean Stéphane⁴
Ridder Luc Vandewalle
Baron Philippe Vlerick
Paddy Padmanathan

Position

Chairman (as from 3 April 2017)
Managing Director, Chief Executive Officer
(as from 3 April 2017)
Director
Director
Director
Director
Independent Director
Independent Director
Independent Director
Independent Director

End of term

2019
2020
2019
2019
2019
2019
2019
2018
2019
2020

Audit Committee

Ridder Luc Vandewalle (Chairman)
Mark Littel
Baron Philippe Vlerick

Remuneration & Nominations Committee

Baron Jean Stéphane⁴ (Chairman)
Johan Beerlandt¹
Rik Vandenberghe²

¹ Permanent representative of Bevafin SPRL

² Permanent representative of Audymatt SPRL

³ Permanent representative of Philippe Quoilin SPRL

⁴ Permanent representative of Innosté SA

EXECUTIVE AND STRATEGIC COMMITTEE





From left to right:

Jan Gesquière
Chief Financial Officer
(as of 1 November 2017)

Jean Polet
General Manager
Business Unit Europe

Pierre Sironval
General Manager
Business Unit Middle East

Rik Vandenberghe¹
Chief Executive Officer

Geert Aelbrecht²
Chief Human Resources Officer

Johan Beerlandt³
Chairman of the Board of Directors

Frédéric de Schrevel⁴
Secretary General – General Counsel

Mathieu Dechamps
General Manager
Business Unit International

Philippe Dessoy
General Manager
Business Development

Carlo Schreurs
Chief Development Officer
(invited member)

¹ Permanent representative of Audymatt SPRL

² Permanent representative of Gacco SPRL

³ Permanent representative of Bevafin SPRL

⁴ Permanent representative of Artheпа SPRL

* Not on this picture: **Philippe Quoilin**
(permanent representative of Philippe Quoilin SPRL),
Special Advisor to the CEO.



STRATEGY

EXCEL

IN CREATING

SUSTAINABLE SOLUTIONS

FOR A BETTER WORLD



BESIX is all about building on solid foundations. This approach applies to both our projects and our people, underpinned by innovation growing from ideas, experience and technology. Our technical arsenal includes an impressive portfolio of diverse projects and businesses, with relevant expertise in many domains, all contributing real value to society and, at the same time, enhancing the Group's enviable global reputation. From a cultural perspective, BESIX is made up of a proud, dedicated team with a can-do attitude, solution-oriented mindset and client-focused approach. Passion, team spirit and a strong willingness to take on challenges are what make this company stand out from the crowd.

The proven track record and continuous quest for excellence provide BESIX with the platform it needs to lead the way and pioneer. This is vital, since yesterday's successes are no guarantee for those of tomorrow. Complacency is not an option. Like many industries, ours is constantly challenged. We are starting to see innovation disrupt areas of our sector, competition is ever-present and margins are not always what we want them to be. Talents are hard to find and retain, and diversification needs strategic planning. BESIX must therefore step up its efforts to meet these challenges.

If we want to go for gold, we need to ask ourselves: How can we make sure we always deliver quality? How can we continue to be a top employer? How can we grow beyond building? The foundations are there, it's now a case of evolving and adapting.

Purpose & vision

To move with the times and stay ahead of the competition, BESIX needed a clear purpose, backed by a sound strategy. This is critical, because in today's VUCA (Volatile, Uncertain, Complex and Ambiguous) world, it's a proven fact that successful businesses are those that combine the pursuit of profit with the pursuit of purpose. A purpose mobilizes people in a way that pursuing profits alone never will.

In autumn 2017, the Executive Committee set out to address this. The objective: to phrase the company purpose and to clarify its vision and values for the future. This was a process of rethinking who the company is, what it is here to do, and what it stands for? This process led us to define the following purpose: **Excel in creating sustainable solutions for a better world.**

For 2018 and beyond, this purpose is our source of inspiration and motivation. It describes not only what we want to be in the future, but also where we want to effect changes in society.



Strategic drivers

Every word in our purpose holds value:

Excel: always strive to improve. We want to make a difference, stand out and achieve excellence.

Creating: we are more than “builders” and “developers”. We need to develop creativity and co-create with our customers, so as to be innovative, evolve and stay in the driver’s seat.

Sustainable: both financially and environmentally. While we need to make profit and plan for regular income sources for the future, we also want to assume social responsibility in a world of sharing and circular economies.

Solutions: customers are not looking for products or services, what they really want are solutions. To make sure our solutions meet their needs, we need to listen even better to our customers.

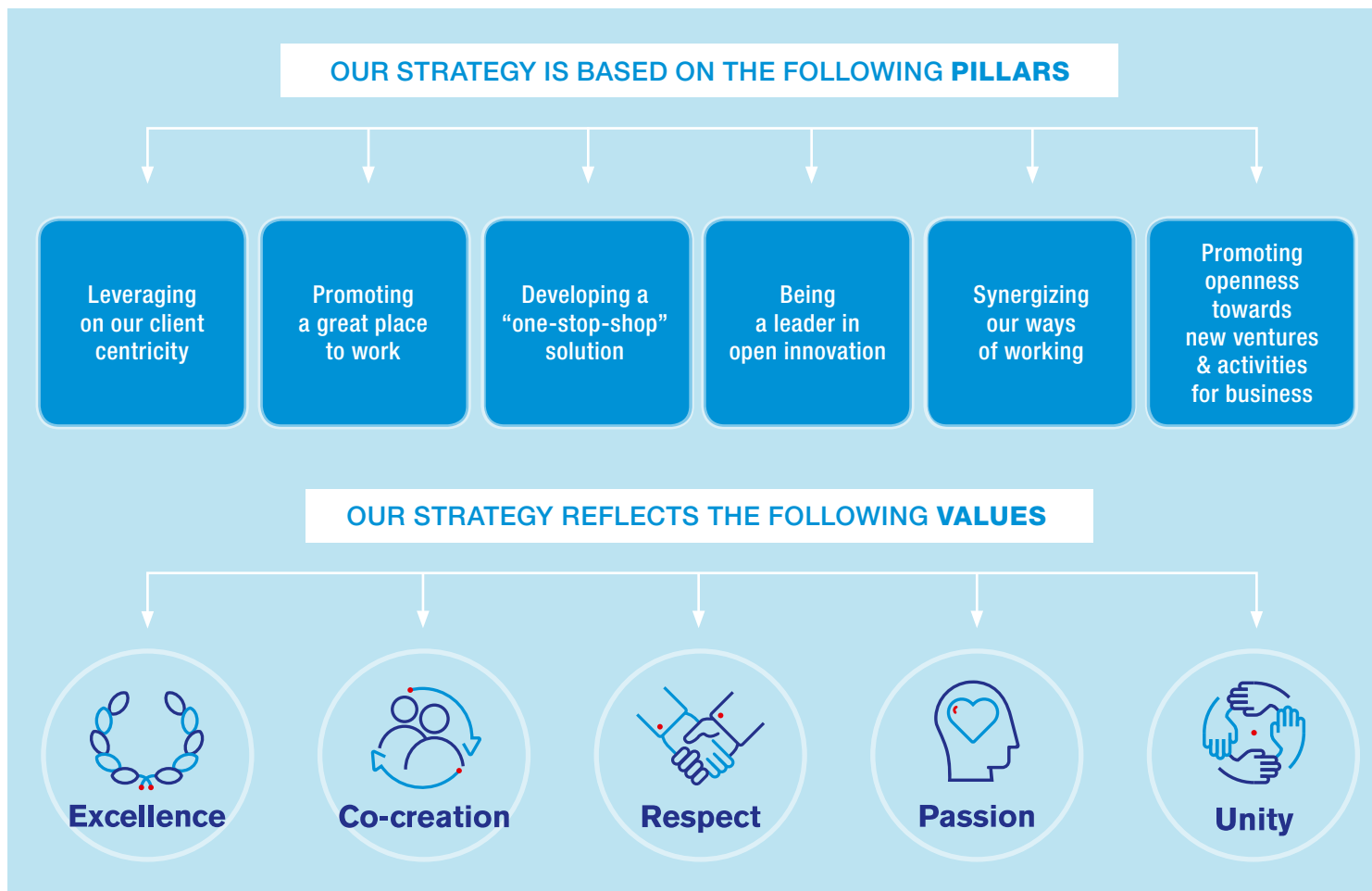
Better world: BESIX is keen to play a pivotal role in innovating to protect our planet’s shared resources. Given BESIX’s projects and its presence worldwide, our impact can be significant.

Our strategy is not a revolution, it’s an evolution. It’s about momentum, building on the great foundations we have in order to fulfill our newly-defined purpose and outperform the competition. To incorporate this purpose into our actual business, and to live this purpose in all we do, we have defined **6 strategic drivers**.

1. **Leveraging on our customer centricity:** it is key for our business to really know our clients, understand their needs and satisfy them to achieve the desired results. Doing this better than our competitors will be a major differentiating aspect.
2. **Promoting a great place to work:** our ability to provide a great employee experience in an open community of enthusiastic colleagues will be a defining factor in our successes of tomorrow.
3. **Developing “one-stop-shop” solutions:** the BESIX Group has unique capabilities and a multiservice offer, meaning we can provide solutions throughout the value chain, from “develop” to “operate and maintain”. Examples of this include

the projects Kons (Luxembourg), a collaboration involving BESIX, Lux TP (construction) and BESIX RED (real estate), and the SAFI water reuse station (Ajman, UAE), where Six Construct (construction), BESIX Sanotec (water expertise) and BESIX Concessions & Assets (management of the plant) joined forces.

4. **Being a leader in open innovation:** good innovation today is by definition open and in partnership. We are ready to experiment here and will be looking closely at the innovation dynamics of other sectors. We are already running our ‘Unleash’ internal innovation program, so moving towards open innovation is the logical next step for us. Further open innovation initiatives will be launched this year, one being the Clean Air project, a natural, intelligent solution that purifies the air in urban environments.
5. **Synergizing our ways of working:** this means ‘working light’ by simplifying and harmonizing our internal processes and communication. This can include common choices of tools, organizational formats and resource allocation across the Group.
6. **Promoting openness towards new ventures and business activities:** BESIX Group has been known for decades for its entrepreneurial spirit. We need to continuously explore and to react positively to new opportunities. A good illustration of this is our investment in A-Stay, announced in March 2018 and centered on a brand new concept in the city stay for expats, millennials, business travelers and tourists.



Values

To put these strategic drivers into practice, we will draw on the Group's **5 core values**:

Unity: as the proverb goes: “alone we are smart, together we are brilliant”. Despite the size of our company, there is an attitude where colleagues stand up for each other and are ready to lend an extra hand to help others succeed.

Passion: we are all passionate about our jobs, and this is where we stand out from the competition.

Respect: respect is treating others as you want to be treated. Respect is all about attitude. It is vital to create an atmosphere of comfort and trust for everyone.

Co-creation: we need to demonstrate this every day, by pooling our minds and skills, and advancing forward.

Excellence: this takes us straight back to our corporate purpose and trademark: to always excel in what we do.



Diversification

Diversification is key to sustaining growth. BESIX Group has therefore a clear focus on sector and geographical diversification.

Sector diversification

BESIX is reinforcing its footprint through acquisitions. These acquisitions help put us in a position of strength as we can offer more global services and add new activities and areas of expertise to our arsenal. In line with

our strategic ambition of offering our customers integrated solutions, 2017 saw a large number of acquisitions at both Group and subsidiary level.

In April 2017, BESIX finalized the acquisition of the Belgian activities of Dutch group Heijmans. This transaction further diversifies our product offering, particularly in road construction, complex infrastructure, networks and the infrastructure market.



In July 2017, BESIX Group acquired UK-based Martello Group. August then saw the acquisition of Enrobage Stockem and Witriloc, two companies operating in the road construction sector, notably asphalt mix, concrete supplies, and road metalling. The same month, Vanhout acquired a 60% stake in Belgian company Energieconcepten, which specializes in renewable energy installations alongside conventional technologies. Later in September, Van den Berg took over Larabo, specializing in high-quality cable and pipe-laying for telecommunication operators and utilities. More recently, in February 2018, Vanhout announced the acquisition of De Bie-Veba, based in Aartselaar, their specialization being technical installations in primarily residential projects.

Alongside various acquisitions, BESIX Group is focusing on water (supply, treatment, desalination) and waste management projects in the Middle East. Major projects in this area include the Sea Water Reverse Osmosis (SWRO) Plant in Jebel Ali Power Station, Dubai (UAE), the Hamriyah power and desalination plant (Sharjah, UAE) and the SAFI water reuse station (Ajman, UAE; see article p. 144).



Geographical diversification

This diversification strand has seen the Group active across the globe, including as far away as Australia where it intends* to acquire further capital in Watpac, a leading contracting business in the country. By fusing our solid reputation with Watpac's strong brand, we will generate compelling value for clients, employees and shareholders. By tapping into BESIX's enhanced technical capabilities, Watpac will be able to compete for larger and more complex projects, something that should substantially benefit both companies.

Closer to home, Scandinavia saw our first project launched in Denmark, with more new projects expected in the future. In 2018, BESIX also launched its first project in Canada for the Baffinland corporation. Back in Europe,

BESIX RED acquired land in Lisbon (Portugal) in 2017 to develop 42,000 m² of offices and residential spaces. RED has plans to continue growing in its current markets (Belgium, Luxembourg, the Netherlands, France and Portugal) but is also analyzing other dynamic urban markets in Germany and Scandinavia. The aforementioned A-Stay project will also allow BESIX to enter new markets, such as Turkey and Moldova.

Three motherships

Today, BESIX is much like a large fleet with one mothership and two smaller ships. The biggest is Contracting, followed by BESIX RED and Concessions & Assets. In the future, our ambition is to continue expanding. We want all of our activities to become motherships.

* Vote from shareholders not known yet at the time of going to press.

UNLEASH



Innovation at BESIX is part of the company DNA and philosophy

To keep up with the pace of expectations of our markets and customers, BESIX Group needs to change the way it develops and launches new products and services. We have a culture where our employees are encouraged to bring forward their ideas and put them into practice. Unleash does just that.

Unleash is an innovation program designed to gather ideas from across the Group and turn them into real projects. There have already been two ideation 'waves', with a third recently launched. The process is simple: participants submit ideas to a dedicated online portal and share it with colleagues so they can vote for and/or contribute to the idea. The ideas go through several reviews and assessments involving Innovation Ambassadors, Inventor Teams and the Innovation Board. Selected teams head off to boot camp where professional coaches, meetings and training courses are used to help the teams refine their projects. The top ideas are subsequent-

ly chosen by the Board. The teams then have several months to develop their concept.

The first wave resulted in a diverse range of ideas, from sick child care, turning waste into energy and water desalination, to a Lean Competence Center.

More recently, the second wave saw again some truly innovative ideas put into action. The Greenprint Division for example is focused on specializing in 3D printing of structural and non-structural concrete. Another, the Floating Desalination Plant, represents one of the main targeted sectors for BESIX Group's growth, as potable water availability looks set to become a serious issue in regions like the Middle East where we have a solid footprint. Finally we have the BESIX Floating City, a response to the continuous growth of urban areas and its related challenges. The team wants to develop 200 floating villas. Such a project will enable BESIX to create

strategic partnerships with key players in energy, urban development, architecture and solid waste management.

Clearly a proven success, Unleash recently launched the third wave. All Group employees had until mid-April 2018 to submit their innovative ideas. The boot camp will be held from 30 September to 5 October. The Innovation Board will then vote on the most promising ideas, and help make them a reality.



**OUR INTERNAL
ENGINEERING DEPARTMENT**

**A VISION FOR
THE FUTURE**

TO SERVE OUR CLIENTS



Quality and independence

For any project, BESIX's Engineering Department strives to strike the optimal balance between cost and the client's performance objectives. Undergirding this search for best value for money is the Group value of co-creation with and for clients. And while proud to be an integral part of the Group, the department is also committed to maintaining its independence. Its unique position within BESIX gives it a 360° view of all activities, with a combination of unrivalled expertise and best practices with which to provide tailored solutions.

Our added value

Having its own in-house Engineering Department is a major asset, matching perfectly the strategic lines the Group has defined to ensure its future development. The department represents an indispensable link in the construction chain, capable of undertaking all the design missions that enable BESIX to offer and carry out one-stop-shop solutions. This in-house expertise guarantees close collaboration with site teams, permanent attention to specific in situ requirements and optimal flexibility. With offices in both Brussels (Belgium) and Dubai (UAE), our Engineering teams are close to the action in our two main markets. This is particularly valuable when deadlines are very short. Indeed it is no accident that such projects have become a BESIX specialty!

In addition, the privileged position that several members of the Engineering Department enjoy in the academic world allows them to maintain a vast network of excellence within the industry and universities that benefits both the Group and its clients.



Feeding on the past to build the future

While resolutely turned towards the future, Engineering digs deep into its accumulated experience in order to constantly improve its current knowledge and expand its fields of activity. This applies as much for civil engineering as it does for geotechnical engineering, methods, planning, and productivity. This includes façade engineering, a strategic area in which BESIX reinforced its expertise in June 2017. The ten new colleagues we recently welcomed from our long-standing partner, Jungbluth Alu Partners (JAP), add their competences in façade design and execution to our internal expertise. The Engineering Department is also keen to embrace the future with a focus on digital technologies. This includes developing smart buildings or industrial installations that are more functional, safe, economical and sustainable.

OUR EXPERTISE TESTED IN THE FIELD



PORT OF DUQM

Oman

At Duqm, the Six Construct-Royal Boskalis Westminster consortium has been commissioned to build a quay wall and two jetties (see article on page 68). The Engineering Department intervened in this large-scale project to propose a bold solution. As Project Manager **Pierre Mengeot** explains: *“We have developed a ‘dry’ construction area, protected by large ‘dikes’ of sand dredged at sea. A system of pumps drains all the water from the work area. These pumps will run continuously, for about three years, until work at the site has finished.”* The result is impressive to say the least. Working on dry land, 20 meters below the surrounding sea, obviates the need for heavy marine equipment and significantly reduces both costs and risks. This is a perfect example of a spirit of initiative giving a vital competitive advantage: this solution developed in co-creation with Royal Boskalis Westminster was not part of the original client specifications.



TERRACED TOWER

Rotterdam, Netherlands

In Rotterdam, BESIX has won a Design & Build contract to erect a 100 m residential tower on the north bank of the River Maas. Here again, the Engineering Department’s flexibility and its close relationship with the worksite have proved their worth. *“One particularity of this project is its location, between a quay wall and a dike,”* says Project Manager **Frederic Stroobandt**. For this project, BESIX opted for parametric design. *“For producing the formwork plans for this project we had a computer perform very quickly repetitive manual operations, thereby saving time, eliminating the risks of human error and reducing costs,”* Frederic explains. Use of this technology has been made possible by the close collaboration between the BIM and Engineering teams.

BIG IN BIM, FIRST IN BIM

“BIM” is the acronym for “Building Information Modeling”. This is a set of methods and technologies that optimize the design, execution and management of a construction project. With BIM, the construction work is represented by means of a digital model, which collects all relevant information of the project. Much more than 3D, BIM makes it possible to share centralized and synthesized information. BIM has become a ‘must-have’ in today’s construction world, where the amount of information produced has never been so high.

For BESIX, BIM is the cornerstone for interfacing between the physical and digital aspects of the construction business. Since 2010, we have built a strong team of experts that has participated in a large number of tenders and projects around the world.

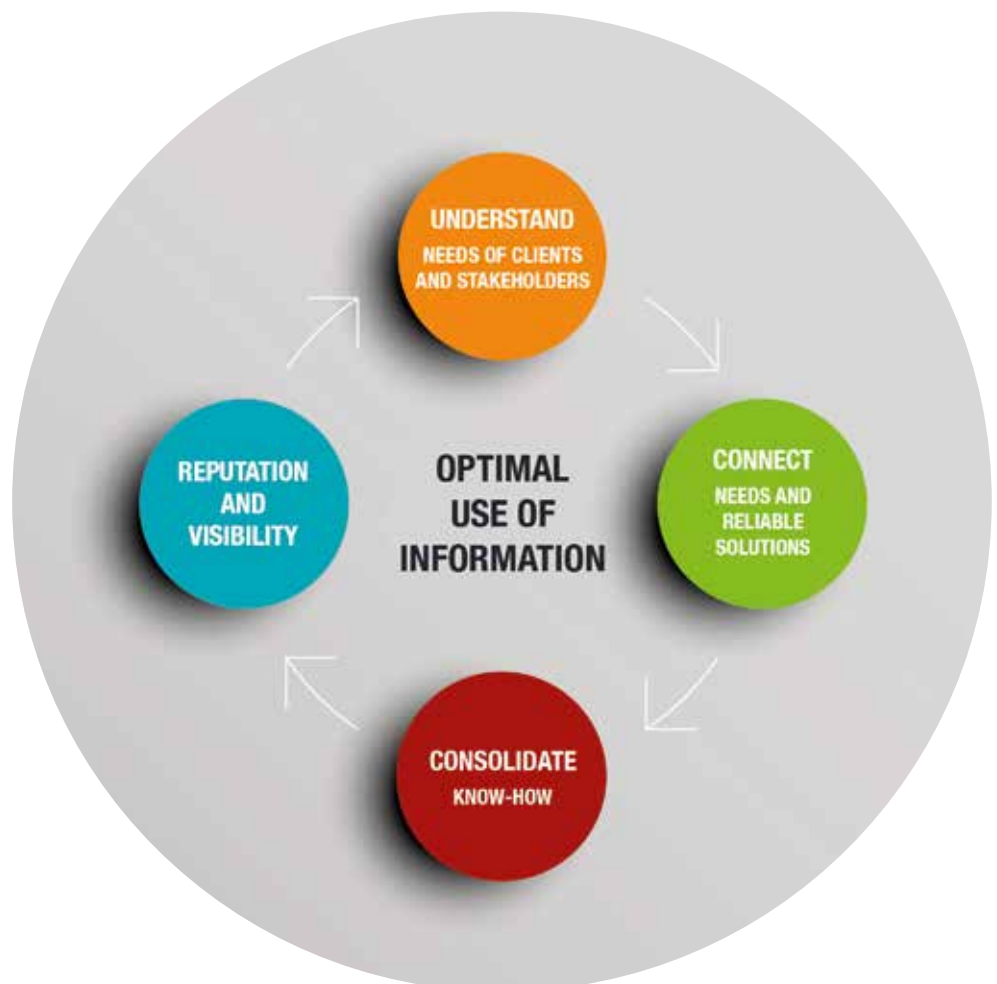
At the end of 2017, BESIX passed a major milestone by becoming the first Belgian construction company to obtain BIM Level 2 certification by meeting the standards of the PAS 1192-2 standard (information management during the design and construction phases of BIM projects). This certification sets BESIX apart from the competition and offers significant competitive advantages, including an acceleration of tendering processes and positive effects in terms of risk control, safety and productivity.

In its vision for the future of BIM, BESIX is looking to articulate its ambitions around four strategic axes:

- **understanding** the market, client needs and expectations (both internal and external) and industry trends;
- searching for reliable **solutions**, by enriching and sharing our knowledge, and using BIM as a catalyst for implementing new technologies;
- **consolidating** our experience by creating synergies between BIM managers across the Group and centralizing our knowledge in this field;
- **developing** the reputation and visibility in the field of BIM that BESIX has enjoyed for several years.



In early December 2017, the first edition of the BIM Awards for Benelux, held in Brussels, saw BESIX take no less than three first prizes (including the BIM Award of the Year for the Beatrix Lock and the broadening of Lekkanaal in the Netherlands), two Silver Awards and a Bronze Award. The panel examined 46 particularly well-executed projects displaying state-of-the-art techniques, professional management and an innovative approach.



MARINE EQUIPMENT
THE RIGHT TOOL
FOR THE RIGHT JOB





JUMEIRAH PRIVATE ISLAND
Jumeirah, UAE



AIN SOKHNA PRODUCT HUB
Gulf of Suez, Egypt

Since the acquisition of its first self-elevating platform in 1998, BESIX has continued to increase and modernise its marine construction equipment fleet in order to best suit the requirements of its coastal marine projects.

The overall fleet comprises two 1,100-ton capacity self-elevating platforms fitted with 250-ton cranes, two backhoe dredgers, tugs, multcats and workboats, as well as crane and transport barges.

The fleet is based in and deployed from the marine base in Ajman, UAE, that offers all the required facilities, including a slipway, to properly maintain, repair, prepare and mobilise the vessels.

Thanks to its know-how, its in-house Engineering Department and the variety of its fleet, BESIX is able to offer its clients tailor-made solutions for the construction of coastal marine facilities.



**QUALITY, HEALTH, SAFETY
AND ENVIRONMENT**

**GOAL
“ZERO INCIDENT”**

The Corporate QHSE department supports the BESIX Group’s purpose of to “excel in creating sustainable solutions for a better world”. Developing a strong, positive culture in the fields of Quality, Health, Safety and Environment, and excelling in these areas are the main objectives of the department. Out of respect for its customers, staff and partners, BESIX Group is committed to implement the following ambitions: zero incidents, compliance with the Life Saving Rules and continuous improvement.



Health and Safety Program

Accidents

Accident frequency rates in 2017 point to a slight deterioration in safety performance. The three Contracting business units - Benelux & France, Middle East and International - all improved, as did the majority of regional entities. Some of the latter, however, experienced dramatic incidents that impacted the Group’s overall safety record.

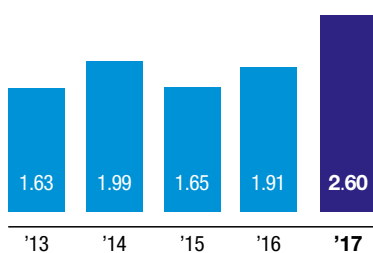
Thus, 2017 was unfortunately marked by four fatal incidents involving our sub-contractors and partners:

- In January, on the site of the Khalifa International Stadium (Qatar).
- In June, on the site of the Mall of Egypt (Cairo).
- In July, on the site of Limmel Lock (The Netherlands).
- In November, on a construction site in Haren (Belgium).

In each case, our teams conducted in-depth investigations to determine the cause of the incident and take the necessary action.

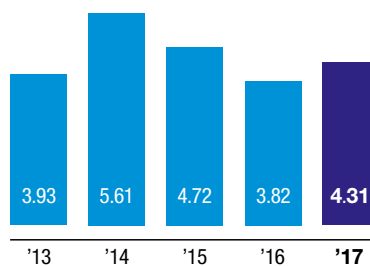
These fatal incidents only increase our determination to strengthen security measures at our sites around the world to prevent such tragic accidents from happening again. Hundreds of audits and inspections were carried out on our projects this year. These served to verify safety compliance which should help sites achieve better health and safety results. In addition to these controls and in general, we call on everyone to be vigilant: safety is the business of each and every one of us.

**BESIX SALARIED EMPLOYEES
LOST TIME FROM INJURIES
FREQUENCY RATES
(LTI FR)¹**



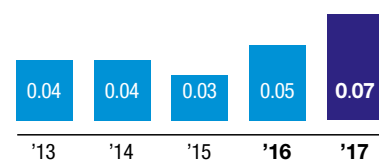
¹ Number of workplace deaths + injuries resulting in the loss of at least one day of work, day of accident not included * 1,000,000 / hours worked.

**BESIX SALARIED EMPLOYEES
TOTAL RECORDABLE
INJURY AND ILLNESS
FREQUENCY RATES
(TRII FR)²**



² Number of deaths at work + time lost due to injuries + cases involving restrictions on the performance of duties + cases of medical care * 1,000,000 / hours worked.

**BESIX SALARIED EMPLOYEES
SEVERITY
(SR)³**



³ Number of days lost (due to LTI) * 1,000 / hours worked.

BESIX Global Safety Time Out 2017

On 14 November 2017, all staff members and subcontractors worldwide took part in a safety brainstorming exercise. The goal of this 9th BESIX Global Safety Time Out was to reconsider our approach to complying with the “Life Saving Rules” (LSR). These 10 safety rules, which were introduced at BESIX in 2013, aim to reduce the main risks in our sector and promote a “zero incident” environment.

Safety Time Out 2017 was the starting point for a series of actions, initiatives and programs that will support our efforts and compliance goals. “Zero Incident” is our major challenge in 2018. To help us meet this, a global LSR compliance assurance plan has been developed and validated by the Group Executive Committee. Our mission is to adapt everyone’s behaviour so that no more LSR violations occur in the future, and thus prevent accidents in the workplace.

The theme of respecting the Life Saving Rules was again discussed during the Safety Time Out organized in April 2018 on the occasion of the World Day for Safety and Health at Work (SafeDay).

Behavioral program

The Behavioral Program is one of many actions we shall be developing as part of the overall LSR compliance assurance plan. This will aim to evolve everyone’s behaviour so as to create this “zero incident” environment. Every employee, regardless of his or her hierarchical level, as well as all external people working for the company - including subcontractors - will be involved. Emphasis will be on attention to others, to oneself, and on observation and communication. Behavioural change is a fundamental to enabling us to move up a gear in accident prevention.



Life Saving Rules



When working at height outside a protective environment, protect yourself against falling



Always obtain authorisation before starting excavation activities



Prevent objects from falling



Always obtain authorisation and conduct gas tests before entering a confined space



Do not walk under suspended loads. Do not swing loads over your colleagues



Always wear a personal floatation device when /where required



Always follow prescribed lift plans



Always obtain authorisation before diving



Always position yourself in safe zones, away from moving and energised equipment



While driving, do not use your phone and do not exceed speed limits



BESIX honoured for quality of its work

2017 ends very positively. BESIX successfully delivered more than thousand projects, and won many prizes on the way. These include:

- On May 3, Six Construct won 6 awards at the MEED Quality Awards for Projects 2017 for the following projects:
 - The Gabbro Terminal in Qatar, in the “Logistics Project of the year in the Gulf Region” category;
 - The Ruwais Water Treatment Plant, UAE, in the categories “Award for Best Sustainable Project in the United Arab Emirates” and “Award for the Best Water Treatment Project in the United Arab Emirates”;
 - The Green Planet, Dubai, UAE, in the “Tourism and Recreation Project of the Year in the United Arab Emirates” category;
- Sohar industrial port in Oman, in the “Best Water Treatment Project in Oman” category.
- On November 9, BESIX Infra was awarded second place in the “Minder Hinder (reducing nuisance to neighbours) Awards”.
- On November 15th, the Dutch Concrete Association (Beton-vereniging) awarded its “Betonprijis 2017” to BESIX Nederland.

These numerous prizes, which honour the work of many parties, attest to BESIX Group’s constant attention to the quality of projects it delivers to its customers.

Group Multi-sites Certification

One of the objectives of the year 2017 was the alignment and integration of the management systems in the Business Units Europe, International and Middle East. The Integrated Management system (IMs) has been updated in order to meet the requirements of the three Management System Standards (ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007) and VCA**. Today, the IMs covers BESIX Contracting, including the three aforementioned Business Units. To achieve

this “process standardization” objective and to satisfy our clients around the world, the Group has decided to be multi-site certified by mid-2018. For this purpose, we called upon the international third party certification body M/s SGS, one of the most recognized certification bodies in the Construction and Oil Industry, in order to demonstrate our conformance with the standards.

Environmental performance

In 2017, BESIX Group multiplied its initiatives to reduce its carbon footprint. Here are some striking examples:

- Recertification of the BESIX Nederland carbon management system to version 3.0 of the “Prestatieladder CO2” (CO2 performance scale);
- Affiliation to Green Deal GWWW 2.0 (for contractors in the soil, water and road works sector) with the aim of reducing the company’s carbon footprint;
- In January, BESIX Group was voted winner of the 2016 Mobility Week;
- BESIX is a member of the Steering Committee in charge of introducing a potential carbon management system in Belgium that complies with the Dutch system;
- Six Construct organized a recycling campaign;
- The circular economy and waste management are at the centre of the City Dox pilot project (Brussels, Belgium), being undertaken in collaboration with the BBRI (Belgian Building Research Institute);
- Good environmental practices are now introduced at all Six Construct sites;
- In its Middle East activities, BESIX Group has generalized practical energy saving methods: LED bulbs, water saving devices, and the like.

More information on our CSR initiatives can be found on pages 46 to 49 of this report.



PEOPLE @ BESIX

**PRIORITY
TO PEOPLE**

As an employer, BESIX is keen to support its employees at every stage of their careers, from recruitment through to retirement, with onboarding, training, coaching and personal development. This priority to people ensures that BESIX is viewed as a highly attractive company to work for, with the corollary that we can always be systematically sure of having the right people in the right place. Which does not prevent us from regularly questioning ourselves and keeping a close eye on all the latest trends, particularly in the area of digitalization. That's why in 2017 we introduced a number of tools and initiatives that allow us to remain an employer of choice in our industry.

Developing our talents

BESIX is fortunate to have exceptional teams of people who are passionate about their profession, loyal to the company and boast extensive experience in their particular area of expertise. For our teams to remain our number one asset in the long term, it is essential to maintain and develop our talents. BESIX therefore invests extensively in diverse and varied training programs that allow our employees to develop their technical and human skills, helping them to evolve in their careers and boosting their skills. At regular intervals BESIX also organizes its BESIX Potential Academy, enabling young talents selected by the Group's Executive Committee, to take courses adapted to the Group's activities.

We also want to be an innovative company, closely following trends in digitalization. This is why, for example, in 2017 we introduced tools like the onboarding application (see next page) or Metrillio, an HR software package for talent management.



Ensuring our employees' well-being

Our employees are our priority, and their well-being is at the heart of all our actions, from recruitment to the working conditions of our subcontractors. These are the foundation stones of how we want to run our business.

Proof that our commitment goes beyond mere words is the international framework agreement on fair labour standards that BESIX signed on 14 December 2017 with BWI (Building and Wood Workers' International). Drafted on the basis of a wide range of international labour standards and other human rights instruments, this agreement is intended to promote and protect the well-being of all employees and workers working for BESIX Group. The end result, however, goes beyond simply complying with prevailing legislation: we have also taken additional steps to make our actions more effective. BESIX believes that it can be a force for change and have a positive impact on the lives of its employees, on its communities and on society as a whole.

The company also makes several concrete tools available to its employees. Two new initiatives became reality last year: the introduction of teleworking to meet employees' flexibility needs, and a sick child care service, which provides a very responsive service to help parents cope with unforeseen situations.





Key figures

On December 31, 2017

14,661
employees



40 years
average age

13.2%*



86.8%*



* Employees only.

A guaranteed welcome even before the first day of work!

At BESIX, we want to welcome new employees in optimal conditions. Several initiatives have been introduced to enable them to find their feet as quickly as possible. Three times a year, Welcome Days are organized for new employees in all Benelux and French subsidiaries. These join a site visit, followed by a presentation on the Group by a member of the Executive Committee. At the end of the day, a walking dinner allows them to interact informally with management.

But the big news in 2017 was the introduction of an onboarding application, which allows new hires to get to know the company even before their first day of work! "This welcome is assured even at a very early stage," says **Anaïs Glibert, Manager of the BESIX Potential Academy**. "When a job interview is positive, certain candidates already receive access to our Attract App, which is an abbreviated version of our onboarding application." This application gives access to a range of practical information: administrative questionnaire, onboarding timeline, historical and practical information, contact details, video messages, etc., making BESIX a forerunner in 'pre-boarding' in its sector. The new employee can also submit a personal description to future colleagues, all in a practical and fun way. 137 new hires used the application in

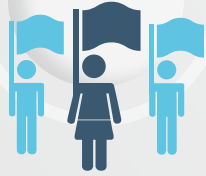
2017. Finally, "the application is also a valuable tool once the candidate has started work. We use it to do three 'pulse checks' at different stages after their arrival, to make sure everything is going smoothly, by means of a simple vote on several issues. In case of negative results, Human Resources contact the person in question to analyse the situation," Anaïs adds. At the end of 2017, the overall average score after a week at work was 4 out of 5. Currently, the application is available only to new colleagues in Belgium, but BESIX is keen to implement it throughout the Group.

Finally, during the first quarter of 2018, BESIX also introduced a Welcome Pack, a customized box, packaged by a sheltered workshop, which is handed to new employees on their first day of work. The pack contains a USB key with lots of useful documents and information, as well as several goodies.

BESIX promotes flexibility at work

In early October 2017, teleworking was introduced at BESIX, making the company a pioneer in the Belgian construction sector. This decision was made in order to better respond to a series of developments and findings: the density of car traffic in large cities and the attendant stress, private-professional life balance, and the fact that some functions do not require daily presence at the office.

71
nationalities



7 years
average
seniority



“In a changing world, where the employer is forced to demand for more and more flexibility from its employees, it seemed logical to us to be able to offer them this flexibility in return,” explains **Johan Melort, Group Head of Reward and HR Operations**.

The initial thinking was based on a survey of 80 employees, which served to define the terms of teleworking policy at BESIX. The results were indeed very telling. At the end of the process, 81% of participants said they were interested in working from home, the main reasons given being the time savings and productivity as well as improved work-life balance. “Everyone wins with teleworking: it helps us to meet better the expectations of our employees, it increases their productivity, and as a company we do our share in helping reduce traffic congestion in Belgium,” Johan adds.

Since October 2017, employees of BESIX Group, BESIX, BESIX RED and West Construct have been able to telework one day (or two half days) per week. By the end of the year, 15% had already taken advantage of this new opportunity. This year, employees will be asked for their feedback on teleworking, with plans to introduce it progressively in our other entities.

BESIX Fit, a motivating sports programme for employees

For BESIX, employee well-being cannot be limited solely to working hours. For this reason we decided, in 2017, to join forces with Dutch company Energy Lab to offer our employees around the world a fitness program that promotes a healthy, balanced lifestyle. BESIX Fit was born! The principle is simple: if our employees feel better individually, their teams will also benefit, which will help create a positive work environment.

The BESIX Fit online platform offers tools and opportunities for improving well-being. Employees are encouraged to do sports and record the kilometers they walk on the platform. Specific challenges such as “Do 10,000 steps in a day” are also offered at regular intervals. The target is to reach a cumulative total of 320,000 km (8 times around the Earth!) by 1 October 2018. At the same time, BESIX Fit has launched its “Run like a Devil/Flame” program (the reference is to the Red Devils/Flames of which BESIX Group has become one of the main sponsors): since November 2017, Energy Lab has been helping 25 volunteers prepare to represent BESIX at the Brussels 20 km road race, to be held on 27 May 2018. A great goal, as highlighted by two of our Devils/Flames testimonials (see opposite)!

MELISSA PATEET

Finance Controller, BESIX International (Switzerland)

“I’ve never seen myself as great athlete or a fitness freak, so this challenge seemed a priori out of reach. But I said to myself: where did you get that idea from? Maybe I have in me, without realizing it, all the skills needed to make it through to the finish!”

PATRICK WARNOTTE

Purchasing Department, Wust

“The ‘Run Like a Devil’ challenge gives me a goal that will push me to surpass myself, and will force me to look after my diet. This is a personal challenge, but I hope it will be an example to my children as well.”



**CORPORATE SOCIAL
RESPONSIBILITY**

**ALL ABOUT
GIVING BACK**



Proven commitment to further develop CSR initiatives

Pierre Sironval, General Manager Business Unit Middle East, signing the international framework agreement on fair labour standards.

In 2017, BESIX Group maintained its dedication to CSR. We also published our third CSR report, covering the years 2015-2016. In addition to showcasing our many CSR achievements, this report is a good opportunity to describe what we have achieved with respect to the Global Reporting Initiative (GRI) which many players, including in our field, have adopted. The GRI provides an excellent blueprint for informing our stakeholders as fully as possible on our goals and the actions we are taking to achieve them.

In all regions where we operate, and despite the huge differences in culture and the difficulties and risks of our business, we have made progress. We have done so both through specific activities, in part via BESIX Foundation (see next page), and through our processes, which are inspired, to a greater or lesser degree, by the Triple Bottom Line (People-Planet-Profit) in each Group entity.

High-visibility CSR activities include the partnership, in the United Arab Emirates, between the World Wildlife Fund (WWF), the EWS (the Emirates-Wildlife Society) and our subsidiary Six Construct, proving the Group's dedication to upholding the diversity of wildlife in the world, and to limiting the impact of our activity on this diversity to as great an extent as possible.

2017 also saw BESIX Group winning the contract to build one of the world's largest thermal waste recycling plants in Dubai (UAE). This is a great leap forward for the region in terms of waste management.

This past year, BESIX Group signed an international framework agreement on fair labour standards with BWI (Building and Wood Workers' International). This agreement, stronger than other international framework agreements, and extending to all BESIX Group entities worldwide, demonstrates BESIX Group's firm commitment to human rights and well-being, as part of its wider corporate purpose of excelling in creating sustainable solutions for a better world. At the same time, with our Codes of Conduct, increasingly adhered to by our subcontractors and their suppliers, we are keen to drive CSR awareness and change beyond our own structures.

Finally, in 2017, BESIX Fit was launched worldwide within BESIX Group. Intended to encourage employees to remain physically active, it demonstrates the Group's dedication to the well-being of its employees.



**9 YEARS
OF SOLIDARITY,
231 PROJECTS
SUPPORTED,
THOUSANDS OF
BENEFICIARIES**

BESIX FOUNDATION

BESIX Foundation supports charitable projects in three sectors: education, construction and environment, helping the communities we work in with the active support of our employees.

In 2017, 32 new projects obtained support from the Foundation. The total amount donated to projects was around €400,000. Our support did not stop at financial aid, however. Like when the “École Anne Misonne” special needs school in Brussel came to us for financial aid to do up their playground. Here one of our Selection Committee Members found a contractor ready to do the job for a price which made our financial aid unnecessary.

In 2017, through the Foundation, 524 BESIX Group staff volunteered their time to make a difference to the community around them, in Belgium and elsewhere. BESIX Foundation’s attempts to get colleagues involved with the local community proved to be a resounding success.

Over the past few years, we have been involved in Belgium with the association “Operation Thermos”, which during the winter

prepares and hands out meals to poor or homeless people in Brussels and Liège (Belgium). These initiatives are very popular and most evenings this year are fully booked! In 2017 we were involved again in blood donation initiatives for the Red Cross. We also repeated our cooperation with the KiddyBuild project (see next page) for the fourth year running.

We also hold clean-up days, where a group of colleagues goes to a park or similar location and picks up litter. This is a popular initiative, which we will be extending in the coming year.

One evening a whole team of BESIX employees helped set up the Special Olympics site in Flanders, lending a practical hand to erect stands and mark out playing fields, and ending the evening by watching the opening ceremony. It was a truly marvellous show, and a fitting testimony to what solidarity can help achieve!

BESIX Foundation’s involvement does not stop in Belgium. In 2017, the Foundation was very much involved in supporting the Manzil School in Dubai (UAE), which provides disabled children with an education. During the year workshops were organized with colleagues and the children to create works of art from waste products found on our local building sites. In November 2017, these were auctioned in an art gallery in Dubai to benefit the Manzil School. This project helped foster these children’s creativity, get rid of some waste products, create awareness about waste treatment, reuse and circular economy, and raise money to give these children an education and, hopefully, promote their better integration into the community at large.

And for our own workers, our volunteer Right 2 Learn program (see next page) continues to provide valuable computer literacy training.





Right 2 Learn and KiddyBuild: growing aspirations, growing projects



Launched in 2011, this project aims to provide basic computer knowledge to unskilled workers in the United Arab Emirates. Learning to use internet enables them to communicate better and more cheaply with their families back home.

In 2017 we ran two classes, in Abu Dhabi and Dubai, and hope that four will be running soon, on site or in workers' accommodation. With more employees involved, the project should gain momentum and benefit an increasing number of workers. This includes access to functions for which IT skills are a necessity. 172 workers have completed the training program thus far.



Working with Toekomst Atelier de l'Avenir, our KiddyBuild days have, since 2014, welcomed 5th and 6th grade children from primary schools in less privileged parts of Belgium to visit our depots and building sites and take part in workshops that let them discover the wide variety of jobs in the construction sector. It is our hope that many of them leave the day feeling inspired, perhaps with a clearer view of where they would like to be and what they would like to do when they grow up, not only in building construction but also other sectors. In 2017, we expanded the initiative to five events, in Brussels, Ghent and Antwerp. The Construction Confederation and the Fondation pour l'Enseignement are supporting the project enthusiastically.

In the United Arab Emirates, our Ajman concession hosts up to 300 students a year, explaining the water cycle and how wastewater can be reused, as well as raising awareness on preserving the environment.

OLIVIER REMELS

Secretary General and Managing Director
of the Fondation pour l'Enseignement

“The Fondation pour l'Enseignement welcomes this initiative on many accounts. KiddyBuild is aimed primarily at children from less privileged backgrounds, where negative attitudes, failure and dropping out of education are strongly correlated with young people's socio-economic and migratory origins. This type of initiative helps break this vicious circle by promoting integration through positive attitudes in the most fragile parts of the population.”

More generally, initiatives to enable people of all ages to discover different trades are an essential basis for positive attitudes to life, based on a desire and taste for learning and initiative-taking.”



ACTIVITIES

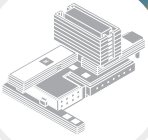


OUR ACTIVITIES AND AREAS OF EXPERTISE

Thanks to its expertise and in-house engineering know-how, BESIX Group is always ready to come up with high-quality and cost-efficient solutions across its many activities.



Buildings



From world-famous skyscrapers to low-impact housing developments, our impressive track record stands testament to our professionalism and mastery. Today, we continue to design, develop and deliver fully integrated buildings and properties with a unique architecture, cutting-edge technology and performance, complex logistical and environmental requirements and extreme construction deadlines. We are especially known for our sound experience in realizing sophisticated large-scale projects, such as shopping malls, hotels and hospitals.



Marine Works



The market for modern port infrastructure is one of the most dynamic in which BESIX Group operates. After WWI we rebuilt the Belgian ports and waterways and ever since our expertise and experience have continued to grow. Benefiting from our in-house engineers' know-how, we carry out projects mostly on a Design & Build basis. We own and operate our specialized marine construction equipment. This comprehensive design and equipment approach yields considerable cost savings.

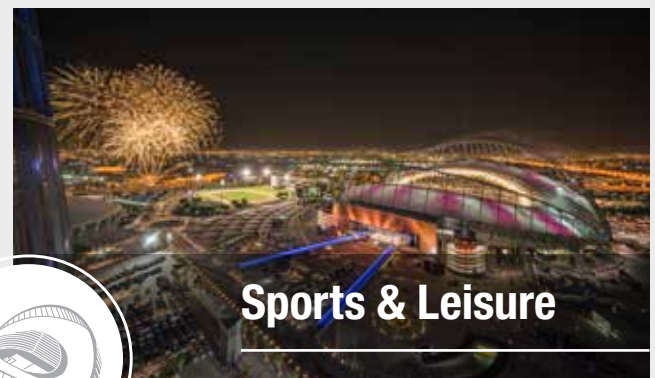
We carry out coastal marine works all around the world: breakwaters, jetties, quay walls, ship locks, shore protection, waterways and intake & outfall.



Infrastructure



We take on the most challenging and large-scale civil construction plans for both public and private clients. Tunnels, bridges, transport and systems engineering, geotechnical improvements, landscaping... Time and again, our engineers devise and deliver optimum results in the (re)design, construction and maintenance of diverse infrastructure projects, actively collaborating with other teams and experts.



Sports & Leisure



BESIX Group builds places that turn people into participants. The Khalifa International Stadium (one of the official stadiums of the 2022 FIFA World Cup in Qatar), Ferrari World theme park, the Aspire Tower celebrating the 2006 Asian Games or the King Abdullah Sports City football stadium are some of the iconic examples of world-class infrastructure for entertainment and sporting events we have built.

Contracting



Environment

At BESIX Group, we assist clients in meeting stringent environmental requirements by obtaining esteemed certifications, such as BREEAM and LEED, which assess and award sustainable constructions. We also actively share our specialized know-how related to onshore wind farms across Europe, from study over planning to completion. Over the past 40 years we have been providing integrated solutions for wastewater treatment in Europe, the Middle East, Asia and Africa. The planet is facing great challenges, but we are determined to support local communities worldwide in creating better places to live.



Industry

In the niche market of industrial structures BESIX Group designs and builds logistic and handling centers, oil and gas terminals, halls and warehouses... We are particularly well-versed in contracting for the energy and water processing industries and have the resources to supply our own raw and aggregate materials for the projects we are dedicated to.

Real Estate Development



BESIX RED is the entity of BESIX Group responsible for property development. It covers three lines of activities: Offices, Residential and Retail & Services. In addition to its 30 years of experience, BESIX RED relies on a team which gathers great talents, whether it be architects, engineers or entrepreneurs. They serve the specific interests of clients with high-performance developments: maximizing convenience of occupancy and optimization of the environmental, economic and technical factors.

Concessions & Assets



BESIX Concessions & Assets devises tailor-made solutions covering the complete infrastructure lifecycle. With our broad experience in European and Middle-Eastern Public Private Partnerships, we recognize that each project, customer and community has a unique set of challenges and we pride ourselves on being able to form collaborative partnerships to deliver on their aspirations. Together with our Client-Partners and applying BESIX's range of financing options, we devise a pragmatic approach to achieve a shared interest over the complete infrastructure lifecycle.

BESIX AROUND THE WORLD

WE OPERATE IN 22 COUNTRIES ON 5 CONTINENTS





PROJECTS HIGHLIGHTED IN THIS REPORT

CONTRACTING

01 | Herstal Viaducts

Herstal, Belgium
See page 62

02 | Mechelen Railway Bypass

Mechelen, Belgium
See page 65

03 | Duqm Liquid Bulk Berths

Duqm, Oman
See page 68

04 | Ain Sokhna Product Hub

Ain Sokhna, Egypt
See page 74

05 | Post X

Antwerp, Belgium
See page 80

06 | Groupe Hospitalier Sud Île-de-France

Melun, France
See page 83

07 | 'The Tower' Pile Cap

Dubai, United Arab Emirates
See page 86

08 | Roskilde Fjordforbindelsen

Roskilde, Denmark
See page 92

WATER ACTIVITIES (SANOTEC)

09 | Tiel Sewage Treatment Plant

Tiel, the Netherlands
See page 126

REAL ESTATE DEVELOPMENT

10 | Les Promenades d'Uccle

Brussels (Uccle), Belgium
See page 134

11 | Soho

Luxembourg
See page 137

CONCESSIONS & ASSETS

12 | SAFI Water Reuse Station

Ajman, United Arab Emirates
See page 144

13 | Beatrix Lock

Nieuwegein, the Netherlands
See page 147

LUŠTICA BAY MARINE VILLAGE
Luštica, Montenegro



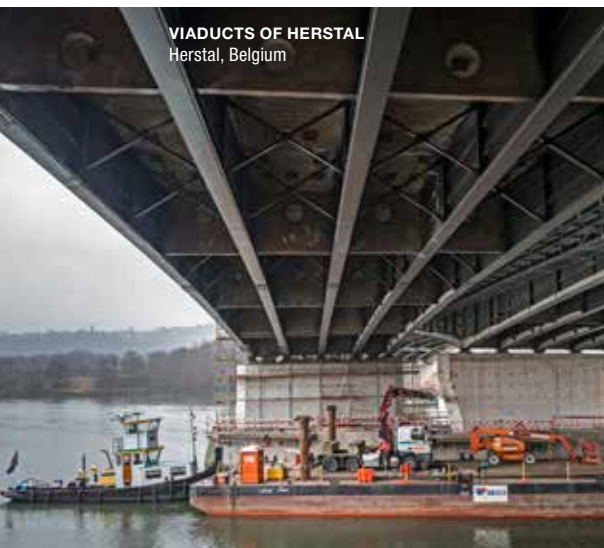
An aerial photograph of a large concrete dam with a curved spillway, situated in a valley. The reservoir behind the dam is a deep blue color. In the background, there are rugged mountains with patches of snow under a clear blue sky. A semi-transparent grey banner with a white arrow pointing right is overlaid on the upper part of the image, containing the word 'Contracting' in white text.

Contracting

CONTRACTING

BUSINESS REVIEW

Ask any BESIX client around the world how he perceives our company and you will get the same answer: we are not just a supplier, we are a first-in-class partner who proposes sustainable and value-added solutions. It is the driving force of our growth, in Europe, the Middle East and all international markets and in our different areas of expertise: buildings, marine works, environment, ...



VIADUCTS OF HERSTAL
Herstal, Belgium

2017, a challenging year

In markets with a positive conjuncture, we have consolidated our leading position, whereas we have dealt with less favourable economic and political situations in other markets.

Europe

In 2017, BESIX Europe has continued to develop its activities in Belgium, the Netherlands, Luxembourg and France. All countries mark once again positive growth: Belgium and the Netherlands particularly in the buildings sector, and France with a number of large infrastructure works in the pipeline.

In Flanders we have delivered the railway bypass, including two bridges, a tunnel under the canal and two bridges under the train lines in Mechelen, the ICO quay wall in Zeebrugge, as well as an important first phase in the Antwerp Post X project. In Wallonia, we have completed the renovation of three viaducts at Herstal, on the E40 motorway. In Luxembourg, we have delivered the Kons project, the new ING Bank headquarters. The entire site was rebuilt in a mere 28 months. In the Netherlands, we have delivered the Velsertunnel, the Lammermarkt underground parking as well as the Limmel lock, to the full satisfaction of our clients.

Many projects are still ongoing: the Wilfried Martens Building, the MIVB maintenance complex, the new headquarters of BNP Paribas Fortis, the Ekla and Manhattan towers in Brussels, the renovation of three locks on the canal between Brussels and Charleroi, and the dock walls in the 5th port dock of Antwerp.

In France, the two projects for the hospital and the clinic in Melun have been delivered to the client in April this year.

As for the Netherlands, we are working on the Kinderdijk-Schoonhoven dike reinforcements, the Beatrix lock, the Garenmarkt parking in Leiden and the A6 in Almere, for which BESIX is responsible for the design, construction, financing and maintenance, as well as on the water treatment plant of Den Bosch.



GROUPE HOSPITALIER SUD ÎLE-DE-FRANCE
Melun, France



RAILWAY BYPASS
Mechelen, Belgium

Middle East

In 2017, the market has been very slow, difficult and competitive overall, with clients willing to share more financial risks with contractors and organizing very competitive tenders.

Projects tracker MEED Projects show that the fall in the total value of contract awards began in 2015, accelerated in 2016, and continued in 2017. The total value of construction deals fell from close to \$80 billion in 2014 to \$52 billion in 2016. The main cause of decline is being the fall in value of awards in Saudi Arabia, Six Construct has been less active in this country; however there has been no real impact on our performance.

In Dubai, one of the key drivers of the successful performance in 2017 was the Expo 2020 construction. Understandably, the activity in Qatar has reduced after the diplomatic crisis of June 2017.

We successfully delivered a number of prestigious projects. The Bluewaters Pedestrian Bridge in Dubai is a 350 m long pedestrian footbridge, connecting Bluewaters Island with Jumeirah Beach. The full revamp and upgrade of the existing Safi facility in Ajman was also successfully completed. Safi is the first branded water station in the world supplying recycled water for industrial and commercial applications. We also successfully completed the construction of a private island in Jumeirah, comprised of three marinas.

2017 started well with the award of the marine project in Duqm (see page 68). This contract involves a 1 km quay wall and two jetties at 20 m below sea level.

In March 2017, Dubai developer Emaar Properties awarded Six Construct the contract to build the raft foundations for the world's tallest building, The Tower, at Dubai Creek Harbour. As the height of The Tower should exceed more than one kilometer, it will break the record of the world's tallest building, currently held by the Burj Khalifa in Dubai, United Arab Emirates, that was built by Six Construct as well.



BLUEWATERS PEDESTRIAN BRIDGE
Dubai, UAE

DUQM LIQUID BULK BERTHS
Duqm, Oman

Key Figures 2017

Revenues: €2.2 billion	Net result: €58.7 million
Order book at 31/12: €3.0 billion	1,000+* projects
21 countries	14,013 employees

* Including Regional Contractors



SAFI WATER REUSE STATION
Ajman, UAE



DUBAI CREEK HARBOR DEVELOPMENT - 'THE TOWER' PILE CAP
Dubai, UAE



PORT HEDLAND TUG FACILITIES
Port Hedland, Australia

In June 2017, BESIX Façade was awarded the Al Wakrah Stadium roof and façade package as a specialized subcontractor for the joint venture Midmac-Porr-Six Construct. This unique contractual set-up is a major milestone for the development of the BESIX Façade in-house expertise.

At the end of 2017, Six Construct, in a joint venture with Porr, won its first ever Tunnel Boring Machine (TBM) project in Dubai. This prestigious project was awarded by the Dubai Municipality, and the objective of the project is to collect and convey groundwater and storm water runoff from the Dubai World Central (DWC) area and adjacent communities, along with the emergency Treated Sewerage Effluent (TSE) from the Jebel Ali Sewerage Treatment Plant, which will be discharged into the Gulf.

International

The International Business Unit had a less favourable year. This situation is mainly due to the significant costs incurred in the development and preparation for several projects, and also due to tenders for major projects for which the decision to invest by the client depends on the costs of raw materials (hydrocarbon or mineral) or the tenders for projects that depend on government decisions (mainly in Africa).

A number of important projects have been delivered in 2017. First, there is the Mall of Egypt, a gigantic shopping and leisure center in Cairo, including the first real indoor ski slope in Africa. Again in Egypt, we have successfully completed the Ain Sokhna Product Hub, a first-class energy hub in the Gulf of Suez, and a major engineering feat.

Favorable outlook

The future looks bright, in all markets. We have secured multiple projects in Benelux-France,

such as the Antwerp local police headquarters and the new buildings for media company De Persgroep in Antwerp. In Brussels, we will be visible above and underground: we have been awarded the contract to build 60,000 m² of offices at Boulevards Baudouin and Albert II, and we participate in the renovation and maintenance of the Leopold II tunnel. In Ghent, we have been awarded the contract for the construction of the apartment complex Watt. Excellent news from the Netherlands as well, where we are still increasing our building activities after a couple of difficult years. We have started working on the Terraced Tower in Rotterdam, where we have also secured the contract for the Theemswegtracé, and hope to start soon at the Sluishuis in Amsterdam. BESIX France has received a first order for the Grand Paris Express, the new subway network in Paris. On a more general note, BESIX's home markets will focus on a more intensive collaboration with its specialized and regional subsidiaries in order to maximize synergies and to increase the services we offer our clients.



The outlook in the Middle East will depend greatly on the fortunes of the two largest markets, the UAE and Saudi Arabia. After two years of economic restructuring and a review of capital expenditure commitments, there are some indications the Saudi construction market could finally be moving into a new cycle and changing for the better. These include a string of major project announcements in the second half of 2018 and positive reports from consultancies. There will be a definite change in the Saudi construction sector over the next five years and we are working on a tailor-made approach in the market. In the UAE, the emphasis is on Waste-to-Energy. Six Construct has recently been awarded a Build, Operate and Transfer contract for one of the world's largest thermal waste recycling plants in Dubai, as well as an Engineering, Procurement and Construction (EPC) contract for a Sea Water Reverse Osmosis (SWRO) plant in Jebel Ali, Dubai.

In 2018, the International Business Unit will focus on its hydropower activities and its presence in Scandinavia – on top of the ongoing

Roskilde bridge in Denmark – and the Eastern European countries. We are about to sign our first project in Canada and will develop our activities in Australia, where we initiated an offer on 50% of the shares not yet held by BESIX in Watpac, an Australian company listed on the Brisbane stock exchange, and in Western Africa. In Sri Lanka, the Group is planning to build a new water treatment plant.

A number of important projects will be completed: the Andermatt 4B Radisson Blu hotel,

the Chedi Luštica Bay Montenegro hotel and the Marine Infrastructure for Tug Facilities at Port Hedland, Western Australia. And last but not most certainly not least, we are happy to say that part of the Grand Egyptian Museum in Cairo will open its doors this year. The museum, a highly complex and challenging building will house 100,000 antiquities, among which the colossus of Ramses II, who made his solemn entry into the great hall in the beginning of 2018.



Herstal road viaducts
Belgium

100,000

vehicles/day
to be kept moving

650 m

in length

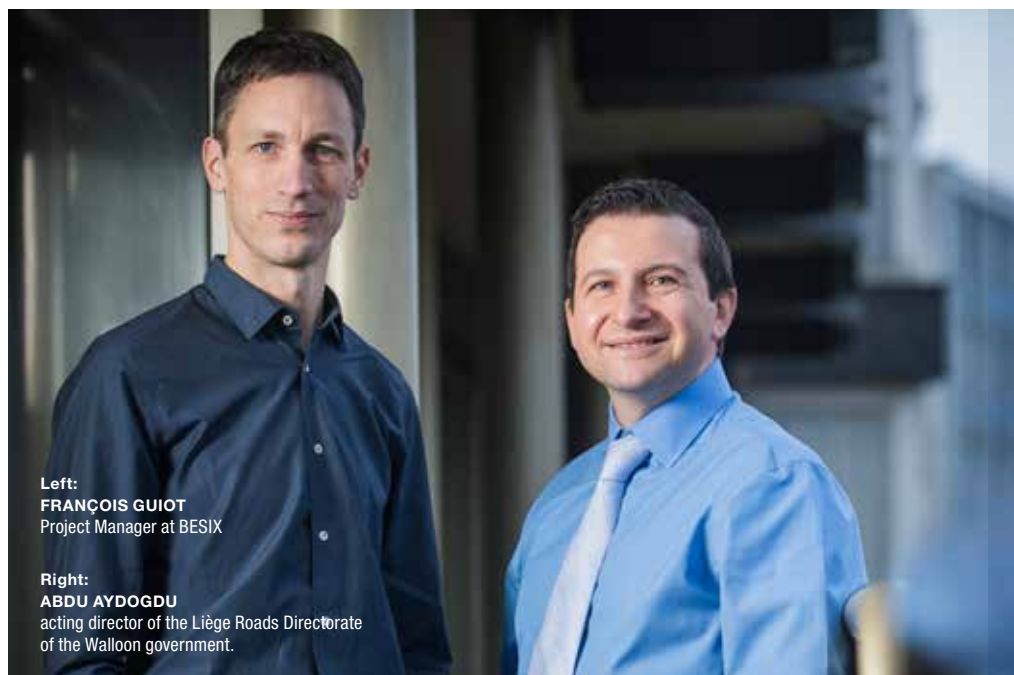
21,000 m²

of deck to rehabilitate

Interview

THREE DAUNTING ENGINEERING STRUCTURES





Left:
FRANÇOIS GUIOT
Project Manager at BESIX

Right:
ABDU AYDOGDU
acting director of the Liège Roads Directorate
of the Walloon government.

ABDU AYDOGDU

Acting director of the
Liège Roads Directorate
of the Walloon government.

*“The entire BESIX team
was quickly motivated
to take on this
complicated project.”*

One of the largest work sites of recent years on the Walloon motorway network (Belgium) was completed just before summer 2017. This involved rehabilitating and widening the Herstal viaducts on the E40 motorway. BESIX played a vital role in this project.

We are talking here, not of one, but of three successive viaducts, with a deck surface 650 m long and 30 m wide, which were exhibiting serious signs of fatigue after more than 50 years of good and loyal service. These structures were built in the 1960s above the Albert Canal and the River Meuse, close to the Cheratte interchange between the E40 and E25. These concrete and steel mastodons constitute a strategic section of the Liège bypass connecting Wallonia to the Netherlands and to Germany. As such they see a lot of traffic: more than 100,000 vehicles a day, on average, in both directions, making it the busiest road passage in Wallonia.

A much needed facelift

Following major inspections in 2012 by the Roads Department of the Walloon government, a rehabilitation program was launched in 2014. BESIX was chosen to undertake it, in temporary partnership with AB Tech. “Three objectives were pursued,” says **Abdu Aydogdu, acting director of the Liège Roads Directorate of the Walloon government**. “Improving the durability of the structures by rehabilitating them, improving traffic fluidity by creating an emergency stopping lane to limit the impact of any accident on traffic flow, and increasing user safety with the same stopping

lane.” Rehabilitation meant here the complete replacement of the technical equipment (waterproofing, cladding, expansion joints, guardrails, etc.), reinforcing the existing beams and piles, thickening the concrete deck slab, treating the supporting structures etc. Widening meant building new aprons coupled to the existing ones, adapting the access and exit ramps of the exchangers concerned, creating emergency stop lanes in both directions and building an acceleration/deceleration lane towards Aachen, making it possible to open the access ramp starting at Herstal. Just that!

“A rehabilitation job is technically more difficult than a new build,” says **François Guiot, Project Manager at BESIX**. “In this particular case, the viaducts were not all structurally similar and a new traffic lane had to be built independently of and connecting to the existing motorway. To manage these complex aspects, we used our internal design office, bringing in specialist subcontractors for jacking, support and moving the structures.”

Reducing the impact on mobility

Work lasted three years. Given the strategic importance of this road axis, it was broken down into six successive phases in order to maintain traffic flow throughout. In all, more than 21,000 m² were

rehabilitated, more than 5,000 m² of new deck were built, more than 1,000 tonnes of structural steel and several thousand m³ of concrete were used. On average, 50 men worked daily, day and night, seven days a week. Which goes to illustrate the exceptional challenge that this site presented. Not only in terms of its physical size, but also given its impact on regional mobility, which had to be minimized.

“The fact that this was renovation work on a structure with a limited number of accesses and which had to remain open at all times produced many logistical constraints,” **François** confirms. “We had to plan the timing of the work and the physical location of the various intervening parties, ensuring that the phasing was technically coherent and that the interactions of the various partners did not cause loss of profitability or place lives at risk.” Everything possible was done to absorb the usual traffic flow and minimize the impact on mobility. In this way, three traffic lanes were kept open in each direction for almost the entire duration of the project. Depending on the construction phase, these were shifted from one side to the other of the viaduct and their width narrowed. The River Meuse below remained open to river traffic all the time.



FRANÇOIS GUIOT
Project Manager at BESIX

“The fact that this was renovation work on a structure with a limited number of accesses and which had to remain open at all times produced many logistical constraints.”

Priority to safety

“Special attention was given to the risks linked to working at heights, which are specific to this type of project,” says **François**. “To effectively identify the risks or shortcomings and to take the appropriate measures quickly, walk-arounds were regularly organized, in collaboration with the customer, the subcontractors and the internal or external safety services.” User safety was not forgotten: vehicles on the motorway and under the work site, barges and boats on the river and canal, bicycles and pedestrians using the path and cycle track under the viaducts ... “Regular inspections and evaluations took place, internally with the customer and with the different local authorities.”

A complete success, apart from a delay of a few months imposed by the need to reinforce the structure. “The entire BESIX team was quickly fired up to make a good job of this complicated project,” says **Abdu Aydogdu**. “A team whose excellent technical skills must be emphasized. I would be happy to work again with BESIX on a project of this magnitude. “Our added value undoubtedly lay in our responsiveness to the many unforeseen that we encountered and which are inevitable in this type of project,” **François** adds. “The customer appreciated the fact that we came not only with questions, but also with proposals for solutions, despite the fact that we were in charge only of the construction as such.”



Our people

FRANÇOIS GUIOT
BELGIAN // AGE 41

François joined BESIX in 2001. Although of Belgian nationality, Herstal was his first mission in the Plat Pays! Various missions had already taken him far afield, especially to Africa and the Middle East: a water supply project, the Edéa dam and Quay 51 in Cameroon, a desalination plant in Algeria, the Riaba bridges in Equatorial Guinea, the Tanger Med II maritime works project in Morocco, and the rehabilitation of a berth at the port of Ras Laffan and the Salwa Resort, both in Qatar.

Project details

HERSTAL ROAD VIADUCTS
HERSTAL, BELGIUM

Activity and area of expertise
Infrastructure / Bridges

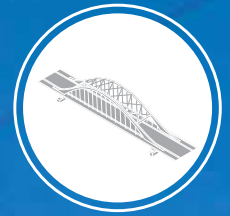
Client
Sofico (Walloon supplementary infrastructure financing company) and the Roads Directorate of SPW

Stakeholders
BESIX-AB Tech non-integrated temporary partnership

Type of contract
Build

Contract value
€36 million

Construction period
May 2014 to June 2017



Mechelen railway bypass Belgium

Interview

BESIX REBUILDS MECHELEN FOR HIGH SPEED TRAIN TRAVEL

2,882

foundation piles

20,400 m³

diaphragm walling

106,000 m³

concrete

YVES FERMEUSE
Project Manager, BESIX

"As an engineer, I always dreamed of undertaking a project in my own city. Every time the project team successfully completed one of the 23 weekends, we felt a rush of pride and job satisfaction."



SAÏD EL-BARBAR
Project leader, BESIX

"Every weekend was a big challenge and could be successfully completed only with the full commitment of every member in the project team. BESIX, together with its partners, met every deadline, adding another great reference to our list of achievements."

In Mechelen work has started on the final phases of one of the largest infrastructure projects in Belgium. It's not without pride that the local Mechelen population calls this enormous site the "worksite of the century". And one in which BESIX has played a significant role..

Everything started with the need for 2.5 km railway bypass between the municipal border with Zemst and Mechelen-Nekkerspoel train station. The new rail bypass is intended to provide the station of Mechelen-Central, lying midway between the two, with two new tracks. By upping the speed limit to 160 km/h in place of the current 100 km/h, this will enable international high-speed trains to pass through Mechelen faster.

Railway bypass and tangent

At the same time, people in Mechelen were playing with the idea of creating a brand-new four-lane road (partly underground), the so-called tangent, passing along the back of the station. This will separate the local from through traffic, making Mechelen station much more accessible. The new railway bypass and tangent interconnect perfectly. Last of all, the station building itself is being completely renovated, turning the station area into one of the city's flagships.

A planning and engineering feat

With the construction of no fewer than fifteen new civil engineering works - including major railway-related ones like signalling, overhead power lines and tracks - BESIX is playing a crucial role in the project. The fact that the civil engineering works need to be executed alongside existing busy railway lines makes this site a considerable challenge, says **Project Manager Saïd El-Barbar**: "Interruption of railway traffic was permitted only when there was no other solution. No-train periods were always reduced to the absolute minimum, and always during weekends. Four railway bridges and a railway viaduct were built at temporary locations and then moved to their final location in a single weekend: four under existing railway lines and one above an existing motorway." The bridges in particular were a real feat. No less than 58 m long and 13 m wide, BESIX built these on a pre-fabrication site alongside the existing track. They were then driven into exactly the right place in one go (during the weekend) with the help of modular platform cars, so that on Monday, after the weekend in question, the trains could immediately travel over them.

"Added to this, the customer handed over the entire project to us in the form of a 3D model," **Project Manager Yves Fermeuse** remembers. "The first job was to reduce this to 2D drawings, which we could work with outdoors. During the translation process, however, we stumbled across a number of impossible-to-execute details."

"A detailed study by our project team showed that thirteen of the fifteen civil engineering works were not doable according to the model on which we had submitted our tender," **Saïd** adds. "The BESIX Engineering team reworked four civil engineering works to make them feasible. In this way we played a crucial role in the design process during the implementation stage in collaboration with the project team."

A race against the clock

Time, according to **Yves**, was the biggest challenge in this project: "The biggest challenges were the out-of-service weekends where the work had to be completed within the planned time. These moments became highlights in the total planning and the design coordination, with critical purchases and work preparation necessarily coordinated into an integrated whole."

“INFRABEL closed the tracks to rail traffic for a total 23 weekends to enable us to carry out our work,” **Saïd** adds. “Every weekend was brim-full of meticulously coordinated activities, with hefty fines for every additional hour the tracks had to remain out of service because we had not met our schedule. Every weekend was in this way a big challenge and could be successfully completed only with the full commitment of every member in the project team.” And not without pride he adds: “BESIX, together with its partners, met every deadline, adding another great reference to our list of achievements.”

Yves too is proud of what has been achieved, especially given the technical and innovative demands. “The project was typified by many different foundation technologies, for which we had to find a suitable subcontractor each time. Thus, for the diaphragm walling we opted for Franki Foundations, working with them to optimize the technology for this project. I also think of the impressive drive-in operations with the SPMTs (Self Propelled Modular Transport), which picked up the bridges as if they were as light as a feather.”

A dream becomes reality

Both Yves and Saïd will not quickly forget the “site of the century”. **Yves** : “As an engineer, I always dreamed of undertaking a project in my own city (of Mechelen). My highlights? Without a doubt the 23 successful weekends. Every time the project team successfully completed such a weekend, we felt a rush of pride and job satisfaction.” **Saïd** fully agrees: “The planning phase of such operations is really the ultimate in work preparation.”



Project information

RAILWAY BYPASS MECHELEN MECHELEN, BELGIUM	Stakeholders STAMechelen temporary consortium: BESIX, Jan De Nul, BAM Contractors and Franki Construct
Activity and expertise Infrastructure / Railway infrastructure	Contract Type Build
Client TUC RAIL - Infrabel	Contract value €86 million
	Construction period 2013 to 2017



Our people

SAÏD EL-BARBAR
BELGIAN // AGE 40

Saïd started at BESIX in 2002. After just a few months he left for Libya where he helped construct an LNG jetty. From Libya he moved to the Middle East, where he was active on various maritime works and infrastructure projects. Back in Belgium since 2013, he is now day-to-day manager of the Hansadok project in Antwerp and the Massenhoven bridge project.



Our people

YVES FERMEUSE
BELGIAN // AGE 40

Yves started his career at BESIX in the Netherlands in November 2001, working on the Amsterdam Bijlmer ArenA Station. He gained a taste for this kind of work, which was quickly followed by other large projects in the Netherlands, like the DODO road overcapping in Utrecht, the second Coen Tunnel in Amsterdam and the Buitenring Parkstad Limburg. In 2013, Yves crossed the border to Belgium, in order, as Business Office Head, to keep the Mechelen railway bypass project on track. Right now he is assisting with various projects for BESIX Vlaanderen (Flanders).



Duqm Liquid Bulk Berths Oman

Interview

**TRANSFORMING
REMOTE
DUQM PORT INTO
AN INTERNATIONAL
FUEL HUB**





From left to right:
BENOÎT VALLÉE, Project Manager at Six Construct | **JAMAL AL NAAMANI**, Head of Project Management on the Duqm Refinery Terminal | **JEAN-BAPTISTE DE GHELLINCK**, Resident Manager at Six Construct | **AHMED AL AMRY**, General Manager in charge of the project management of the Duqm Refinery Terminal

Six Construct has been selected as the main civil works subcontractor for the construction of two dual berth jetties and a 1 km quay wall at the remote port of Duqm, Oman. The \$515-million project is part of a massive development of the port and will enable it to receive and handle giant container vessels. It will allow Duqm Port to export liquid refined products, enhancing its prominence and value in the national economy.

The Six Construct-Royal Boskalis Westminster (RBW) joint venture was awarded the Engineering, Procurement & Construction (EPC) contract by the Special Economic Zone Authority in Duqm (SEZAD). Under the agreement, RBW is to carry out the detailed engineering design, construction of marine infrastructure, and dredging and reclamation works. A substantial part of the existing lee breakwater will be developed and reclaimed. Six Construct is responsible for the construction of a 1-kilometer quay wall and two dual berth jetties with accessories and navigation equipment.

SEZAD's representative for the project, **Ahmed Al-Amry, General Manager in charge of the project management of the Duqm Refinery Terminal**, outlined the key steps in the process. "The agreement calls for the construction of 2.4 km of a 4.6-km long secondary wave breakwater which will be reclaimed for the development of the liquid quay," he explains. "The project also

involves the dredging of around 26 million m³ of material from the sea floor. The purpose is to deepen the basin and approach channel leading to the bulk liquid berth: it needs to reach a depth of 18 m. Around 5 million m³ of the dredged material will also be used to reclaim an area that will serve as the terminal. Additionally, a 1 km long quay wall will be built and fitted with buoys and navigational aids."

"Once the marine infrastructure is completed and ready," **Mr. Al-Amry** continues, "Duqm Refinery will proceed with the construction of storage tanks and other facilities for the handling of bulk liquids on the reclaimed land. These bulk liquids originating from the Duqm Refinery and Petrochemical Industries zone are destined for export. Some examples of refined products that will be handled at the liquid berth include naphtha, jet fuel, diesel, high sulfur fuel oil (HSFO), liquid petroleum gas (LPG), coke and sulfur."

192,884 m³

of concrete

3,717 t

rebar

3,828 t

tubular steel piles



AHMED AL-AMRY

General Manager in charge of the project management of the Duqm Refinery Terminal

“The relationship between Six Construct and Royal Boskalis Westminster in executing the work on site, and on management level, is seamless. You can hardly see that they are two separate entities. From a client perspective, this type of strong relationship between the two parties is reassuring; it builds trust.”

Challenges of remote working

Six Construct’s Project Manager, **Benoit Vallée**, outlined the main challenges in the project. “Location, location, location!” Benoit exclaims. “It’s a very remote part of the country. Until just a few years ago, Duqm was a small fishing settlement. Today it’s a rapidly growing industrial oil town with a notable port. The government is also working to attract tourism to the area. But it’s 500 km from the nearest urban area, Oman’s capital Muscat.”

“The remoteness of the location influences everything. Right from the start, it was a challenge in terms of recruitment and finding subcontractors and suppliers. Procurement is a constant test of our ingenuity! Our daily challenge is to secure

the required tools and materials to execute our works. It takes up to three weeks to procure material in Muscat and transport it to Duqm”, **Benoit** continues.

“The location of the port also has its benefits, however,” **Benoit** notes. “Duqm Port has a unique geographical location, open to the Arabian Sea and the Indian Ocean; it’s close to international shipping lines and to the African and Asian markets. So it’s well placed to play a strategic role in the region’s economy, once its development is completed.”

Duqm Port is currently witnessing the implementation of a number of infrastructure projects, including the establishment of a terminal at the commercial quay. The development includes the construction of roads, a commercial gate, a customs inspection area, a trucks registration building, a port single-window building, a customs building and other facilities related to the clearing of goods from the commercial terminal. Also under construction is the commercial terminal for the handling of containers, buildings and workshops for port operations, service roads on the dock, and rails for cranes.

“The port will be an international hub due to its unique location and to the facilities that will allow the growth of the petrochemical industries,” says **Benoit**. “For the team, it’s very exciting to be part of that development.”

Preparation is key

“The location, however, is by no means an insurmountable challenge,” says **Benoit**. “But it has demanded rigorous and careful planning, right from the start. The teams were put in place at an early stage of the works to allow a strong start to our activities. Engineering started from the first day of the project, continuing on the good foundations that were established during the tender stage.”

He acknowledges that the investments and efforts put in at the beginning have proven their value. “Every day, we see that the time spent on details early on has resulted in clear time savings and smooth operations. Within the first months, most of critical supplies were secured and our main works facilities were defined. For example, Six Construct managed to get access to the quarries and provide full supervision, along with the required tools and equipment, so that it was possible to secure on-time delivery of the required engineering fill quantities and qualities required for the project. In addition, we were able to establish a dedicated concrete batching plant within the pre-cast yard area as well as having access to the local concrete supply companies.

The client, SEZAD, has been appreciative of this efficient approach. “Six Construct tends to take calculated risks in executing the work to ensure that they meet target dates,” comments **Ahmed Al-Amry**. “For example, by carefully aligning concurrent engineering and construction activities.”





“Each and every activity is prepared well in advance to ensure that we do not miss anything,” **Benoit** adds. “Every detail has to be carefully studied. And we need to expect every team member to take ownership of the issue and do their part effectively.”

Communication is part of the solution

“Communication is both part of the problem and part of the solution,” **Benoit** continues. “It’s a key challenge, because all the project teams are working under a regime of short rotations. That means that key stakeholders may be absent at any particular time.”

Under these circumstances, the teams need to be empowered to take instant decisions at working level. This is necessary to avoid delaying or impacting the progress of the project. For this to succeed, and to ensure that activities remain uninterrupted, it’s essential that information is well shared and distributed.

Different expertise, a common purpose

“Information exchange is also key to good collaboration,” says **Benoit**. “Take the different roles of Six Construct and RBW, for example. We each have our separate roles and tasks. But we have a mutual objective: a shared priority to ensure that our client’s expectations are met.”

It took some time and effort for both teams to know each other but the relationship is a very constructive one. The teams have a common understanding and their respective scopes of work are complementary. Challenges they are facing are tackled together, and solutions are developed addressing each one of them. For example, they just succeeded in delivering the first 350 m of quay wall to the client, on time, by virtue of effective coordination of the respective activities.

“We keep a proactive approach,” **Benoit** further explains. “We pay careful attention to ensuring a smooth collaboration with our client, consultants and partners. We strongly believe that we can

always reach solutions satisfying all parties. It is sometimes a complicated exercise, but we have so far demonstrated that a practical attitude brings advantageous results to the whole project.”

“We already knew that Six Construct has a wealth of experience worldwide and a proven track record in Oman and in the region,” says **Ahmed Al-Amry**. “In this project we also see how they work. Six Construct complements RBW’s marine capabilities by covering all civil works. Clearly, the relationship with RBW is good and Six Construct is working and executing the assigned scope independently.”



Our people

BENOIT VALLÉE

BELGIAN // 35 YEARS OLD

Benoit joined BESIX in 2007, right after completing his studies. He started within the Methods Department at Six Construct's Dubai head office, then moved to various projects in the UAE and Qatar: paving works in Al Dhafra, the Ferrari Experience, Yas Mall and Das Island in Abu Dhabi, the Ajman Sewage Treatment Plant, and the Ruwais Jetties (Qatar). He also supervised the Quay 51 project in Cameroon during two years, before joining the Duqm project team in April 2017. Through his career he had the rare opportunity to alternate roles within execution and technical teams.



“Until just a few years ago, Duqm was a small fishing settlement. Today it’s a rapidly growing industrial oil town with a notable port.”

BENOIT VALLÉE

Project Manager at Six Construct

Project details

DUQM LIQUID BULK BERTHS

DUQM, OMAN

Activity & area of expertise

Marine Works / Jetties & Quay Walls

Client

Special Economic Zone Authority Duqm (SEZAD)

Stakeholders

Six Construct-Royal Boskalis Westminster joint venture

Type of contract

EPC (Engineering, Procurement & Construction)

Contract value

\$515 million

Period

February 2017 to October 2019



Collaboration builds trust

“We also see an excellent collaborative spirit from Six Construct,” **Mr. Al-Amry** continues. “The team is very interactive, addressing all issues in a constructive way. We see them maintaining a continuous communication channel with RBW and SEZAD’s representatives, in all matters related to the project. The relationship between Six Construct and RBW in executing the work on site, and on management level, is seamless. You can hardly see that they are two separate entities. From a client perspective, this type of strong relationship between the two parties is reassuring; it builds trust.”

“It’s thanks to a strong team spirit,” **Benoit** reacts. “The team members have developed a strong bond. Perhaps that’s a hidden benefit of the remote location we’re working at! We’ve developed good understanding and even friendship between team members. This helps us during difficult moments. Our focus is to complete the works, but it is important to have fun while doing it!”

Innovative techniques

Benoit outlines some of the interesting technical aspects of the project. “The method of execution is quite unusual,” he notes. “We are building the marine facilities ‘in the dry’. In a nutshell, the construction area was isolated from the sea by creating a sand bund wall – that’s a retaining wall, made from reclaimed sand – and pumping out the water. It was dredged using RBW’s brand new cutter suction dredger. It’s an impressively powerful dredger, developed to work in extremely hard ground.”

This means our equipment circulates on a platform located twenty meters below sea level; this will constitute the permanent sea bottom after the water is allowed to flood back in. The quay wall and jetties are being erected using specially engineered temporary structures. This method allows us to reduce the construction time while it increases the quality of the permanent constructions. All for the benefit of our client.

2018 milestones

The project runs from February 2017 to October 2019. “The next milestones will be the completion of remaining structures and re-flooding of the area by the end of this year,” says **Benoit**. “There are still challenges ahead but I’m convinced that our hands-on attitude and team spirit will allow the project to be completed within due time.”



Ain Sokhna Product Hub Egypt

Interview

**BESIX DELIVERS
COMPLEX OFFSHORE
FUEL FACILITY IN
UNDER ONE YEAR**



3 km

long jetty, the longest
BESIX has ever built

534 piles

driven in 9 months

FSRU berth
ready for operation

5 and a half months

after first pile driving

2017 saw the delivery of a very challenging project: the construction of a complete marine energy facility in less than one year, in the Gulf of Suez. The 3 km F-shaped jetty, for the storage and delivery of petroleum and natural gas products, contributes to securing Egypt's strategic position as a regional energy hub. The project was executed in just 11 months – three weeks ahead of schedule – despite tight deadlines.

The Ain Sokhna Product Hub consists of three berths including all berthing furniture and related works such as fire water pipes, firefighting systems, CCTV cameras and a fully functioning control building.

The \$125-million project was an exceptional feat, both in terms of execution and collaboration. The jetty was constructed by the BESIX-Orascom Construction joint venture for the Arab Petroleum Pipeline Company, SUMED. It was designed by BESIX's in-house Engineering department in Brussels (Belgium). The dedication and close cooperation between the various BESIX and Orascom departments, situated in Dubai (UAE), Brussels, Lisbon (Portugal) and Cairo (Egypt), as well as the perseverance of the site team and other stakeholders, were drivers in the successful and timely completion of the entire project.

The team's challenges: short deadlines, variation orders and working in a live environment offshore

The original contract comprised two berths, one for liquefied natural gas (LNG) through a Floating Storage and Regasification Unit (FSRU) and a second for liquid petroleum gas (LPG) and fuel oil. Mid-project, our client SUMED awarded a variation order for a third berth, adding \$25 million to the original value of \$100 million.

"The schedule was a challenge from day one, requiring tremendous flexibility, collaboration, willingness to work under pressure and above all, a positive mindset. It started with BESIX's Engineering department in Brussels. With little available geotechnical information, they needed to confirm pile lengths within 6 weeks from project award. To optimize the design while the soil was being investigated, in-house geotechnical experts and design engineers from Dubai and Brussels were mobilized to site for real-time interpretation and pile length confirmation," explains **Laurens Schokking, Project Manager at BESIX.**



Left:
LAURENS SCHOKKING
Project Manager at BESIX

Right:
AHMED HASSOUNA
Engineering Director at SUMED

SUMED and BESIX worked closely during the design phase by having frequent meetings. “BESIX’s Engineering team headed by Loïc Van Durmen proved their competence many times during this phase, by proposing and appropriate design with minimal cycles of re-issuance in such a fast track project, in addition to the proficiency observed in closing-out all raised comments issued. Moreover, they were able to overcome changes requested on site by accommodating their impact to the design, all within the project’s time frame,” points out **Ahmed Hassouna, Engineering Director for client SUMED.**

BESIX’s Engineering team determined that the first stage of the works would require more than 200 piles measuring up to 75 m long and 1.4 m in diameter. And they were needed quickly.

Countdown to delivery - All hands on deck!

The team had just 5.5 months to deliver the first berth in operating condition, counting from the first pile being driven until completion, including all mechanical and electrical (M&E) works and commissioning.

Laurens comments: “To accomplish this in such a short time, three jack-up barges (self-elevating platforms) were mobilized: BESIX’s “Rima” and “Pauline”, as well as “Ignatios V”, hired externally from Greece. In addition, three crane barges, seven supply barges and seven tugboats were on site to carry out all the support and ancillary tasks.”

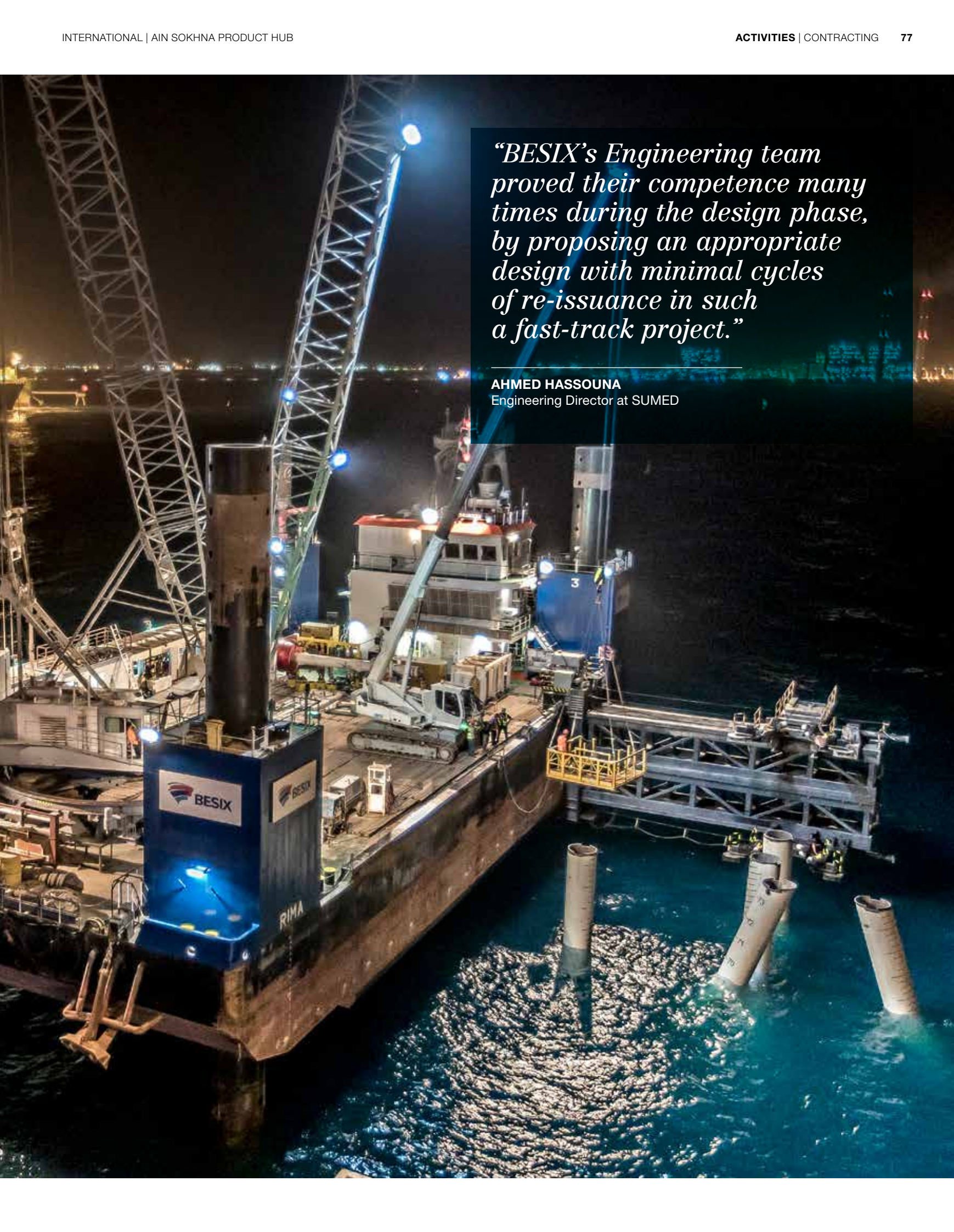
Mr. Hassouna confirms: “BESIX adequately provided the required resources, especially a marine fleet that nearly reached 18 units including two piling jack-up barges. A third piling jack-up barge was added to be able to complete the project within the committed date.”

Having found stock coils for the piles, Arcelor in Turkey was able to start pile fabrication within one day of signing the purchase order and to deliver in batches of 50 pieces, transshipped in Sokhna from vessel to barge in the open sea. 221 piles were driven in 126 days.

The first 500 m of the jetty were originally designed as a rock dumped causeway. Due to liquefaction issues encountered during the soil investigation, this was changed last minute to a piled jetty. A bored piled option was chosen using 1.5 m diameter piles. The works were carried out by Orascom Foundations, an in-house department of Orascom Construction.

A successful collaboration with the client was key to meet the challenges in such short time. “The people from SUMED, BESIX and Orascom Construction worked shoulder to shoulder during the whole project duration,” explains **Mr. Hassouna.** “Brief wrap-up meetings were held on a daily basis presented by the Project Manager and Site Construction Manager Dominik Wroblewski to comment on the ongoing daily site activities and to highlight any problems or potential concerns. Proficient planning and reporting tools were used as well, to visualize the project’s status and future plans on a weekly and monthly basis.”



A large industrial vessel, likely a jack-up rig, is shown at night. The vessel is illuminated by bright lights, and several cranes are visible on its deck. A prominent blue container with the 'BESIX' logo is in the foreground. The vessel is positioned over a body of water, and several large cylindrical structures are visible in the water. The overall scene is a busy industrial operation at night.

“BESIX’s Engineering team proved their competence many times during the design phase, by proposing an appropriate design with minimal cycles of re-issuance in such a fast-track project.”

AHMED HASSOUNA
Engineering Director at SUMED



Our people

LAURENS SCHOKKING

DUTCH // 40 YEARS OLD

Laurens started at BESIX in 2001 as Technical Office Engineer. The projects he worked on include the LNG Terminal Wafa in Libya, various projects in Dubai and Abu Dhabi (UAE), the Marathon Oil jetty on the Bioko island in Equatorial Guinea, the South Hook LNG terminal in the UK and Tangiers MED II in Morocco. After completion of the Ain Sokhna Product Hub project, Laurens currently works as a Project Director on the Grand Egyptian Museum in Cairo.

“The schedule was a challenge from day one, requiring tremendous flexibility, collaboration, willingness to work under pressure and, above all, a positive mindset.”

LAURENS SCHOKKING
Project Manager at BESIX





Project details

AIN SOKHNA PRODUCT HUB
SOKHNA, GULF OF SUEZ, EGYPT

Activity & area of expertise
Marine Works / Jetties

Client
Sumed (Arab Petroleum Pipelines Company)

Stakeholders
BESIX-Orascom

Type of contract
EPC (Engineering, Procurement & Construction)

Contract value
\$125 million

Period
June 2016 to October 2017



Two minutes to midnight

The first berth, for LNG, was handed over on April 30, 2017. “It was a proud moment for the team, sending a letter to SUMED at 11:58 pm on the 30th of April to confirm the firefighting system had just been successfully tested, so the berth was safe to use, just two minutes before our milestone deadline,” disclosed **Laurens**, recounting one of his best memories working on this ambitious project.

The FSRU arrived soon after, enabling the pumping of gas via pipeline into the Egyptian grid from end May. This meant that the remainder of the works had to be completed in a ‘live’ environment, adding more complexity to the mix. All works were officially completed in October, nearly three weeks ahead of schedule.

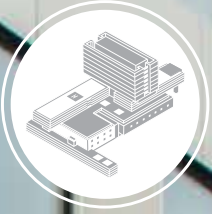
The Ain Sokhna Product Hub project represented one of the highlights of 2017 for BESIX, demonstrating what can be achieved thanks to its considerable expertise in projects of this scope. “BESIX was able to count on its own equipment, suited for such works, and its in-house design department familiar with the equipment and capabilities. All of this, along with experienced people with a collaborative and positive mindset, brought added value in this demanding project,” says **Laurens**.

Setting the standard for future tenders

SUMED recognized the challenges faced by BESIX-Orascom JV and their project partners. After the handover of the first berth, the team received a formal letter of gratitude in which the client recognized that the ‘target seemed unachievable’. “BESIX positively faced the complications met during the initiation phase by assigning highly qualified personnel to this project, especially considering its fast-track nature,” adds **Ahmed Hassouna**.

SUMED also praised BESIX-Orascom JV for the quality of their collaboration with the client and the other stakeholders, noting their ‘can do’ mentality to make sure the client got what they needed. The project team appreciated SUMED’s contribution too. “We were grateful to have a proactive client working closely with the site,” said **Laurens**. “I have no doubt this project will set the standard for future tenders,” he added, “keeping BESIX competitive in an increasingly demanding market.”

“BESIX’s outstanding performance showing a remarkable degree of commitment in fulfilling project deliverables is the main reason behind SUMED’s confidence in extending its business relation between both companies,” concludes **Mr. Hassouna**.



Post X
Belgium

Interview

BESIX BUILDS FIRST PASSIVE AND 'FUTURE-PROOF' OFFICE COMPLEX IN ANTWERP

5

office buildings

50,000 m²

landscaped office space

-50%

energy consumption



If you take the Antwerp (Belgium) ring road daily, you can't miss it. Between the Kennedy Tunnel and the Sportpaleis stands an impressive, brand new office complex: Post X. A prestigious project, a real eye-catcher, with a wide range of facilities and many pluses in terms of mobility.

Where once mail used to be sorted, five brand new buildings are grouped around a single central courtyard. Together, the complex accounts for some 50,000 m² above ground open plan office space and another 25,000 m² of parking space for 800 cars. A sixth building will be added by the end of the year.

The tender for the project was submitted on 19 February 2015, with work starting two months later on 21 April 2015. From the start the idea was to work in phases, with a starting order given for each successive phase.

Numerous challenges

The whole project brought many challenges. A first specific customer requirement was that this had to be a passive office building with excellent acoustic qualities. Understandable, given the building's proximity to the Antwerp ring road, the railway line and Deurne airport. And with the site right in the approach path to Antwerp airport came restrictions on the height of the tower cranes used in the project. Post X wanted an office environment where it is pleasantly cool in the summer and warm in the winter without additional energy costs, and therefore consciously opted for concrete core activation. In this way the buildings are cooled and

heated by having the concrete store cold or heat and later release it. "You can best compare it to what happens in old castles or church buildings," explains **Project Manager Koen Peeters**. "In summer it's always cool because the thick walls keep out the sun, and in winter it's never as cold as outside because of the same insulating power of the stones." Put simply, there are pipes built into the concrete mass that are later filled with water. When the water is warmer than the indoor temperature, the building is heated. And when it is colder, the building cools down inside. "The advantage is that this is much cheaper than conventional heating systems and air conditioning, that it requires little maintenance, is not visible and audible, nor does it create a draft, because there is simply no air circulating," says Koen.

50% lower energy consumption

The Post X site aims for an energy consumption that is half that of a standard office complex, i.e. an energy level of E50. This predefined score is also achieved effectively, thanks to the airtightness of the building shell, the sound thickness of floors, roof and walls, the glazing ratio, the orientation of the building and the existing technical installations.

KOEN PEETERS
Project Manager at BESIX

"You can best compare it to what happens in old castles. In summer it's always cool because the thick walls keep out the sun, and in winter it's never as cold as outside because of the same insulating power of the stones."

But Post X had to be more than just an office environment. Creative thought was also given to providing the most diverse facilities so that everyone who works or passes there can enjoy the necessary services without any worries. There is a restaurant, bar, lounge and even a hotel. Also a business centre with meeting rooms, seminar rooms and various corporate services, along with a beauty centre, childcare facility, car wash and an ironing service. With all the new mobility evolutions, there are of course also charging points for electric vehicles and a bike repair facility.



Unique mobility benefits

Mobility is one of the bottlenecks of our time, for which Post X offers many solutions. "Because the project is located at a ring road where some 280,000 vehicles pass daily, close to an airport and next to a train station, we had to play these trump cards optimally", says Koen. "Post X is easily accessible with all possible means of transport, or a combination of these."

In this sense Post X is a unique location and therefore ideal for companies that are already working on 'future-proof mobility'. A great reassurance for companies that settle here is that their employees have total freedom of choice of mobility. And they will be at work on time!

The added value of BESIX for the entire project? Our experience with large, complex sites", Koen concludes. "Because there were a number of specific difficulties involved." For example, the available storage space was very limited precisely due to the - partial - simultaneous execution of the works on the various buildings. "There was therefore no other option than to work to the 'just-in-time' principle."

Together we are strong

An additional degree of difficulty was the absence of any prior knowledge as to when a subsequent starting order for a particular building would be given. "The order of the construction works was not known either, that freedom simply lays with the client," says Koen. "But that is precisely why the contact moments with our client were so important. We had daily consultations and planned site meetings twice a week. We agreed things on site and followed intensely all developments, together with client, architects and engineering offices." When we ask him for his best memory of this project, Koen does not have to think twice. "There was an excellent rapport and a smooth interaction between all parties involved. Customer, architects, engineering firms and BESIX ... We worked together as a real team, with respect for each other and with a single shared goal: delivering the buildings within the agreed period and to the planned quality standards."



Our people

KOEN PEETERS

BELGIAN // AGE 52

Koen joined BESIX in 2008. Since then he has already taken part in a number of projects, especially in Flanders and Brussels (Belgium): Helix (Anderlecht, Brussels), a transit center in Steenokkerzeel, Alsberghe & Van Oost phases 1 and 2 in Ghent, and Residentie Cadiz in Antwerp. Today he is hard at work as Project Manager on two important projects in Antwerp: Post X (delivery of the sixth building is scheduled for July this year) and the new Antwerp Local Police master building on the same site.

Project information

POST X
ANTWERP, BELGIUM

Activity and expertise
Buildings / Offices

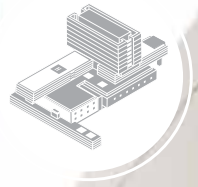
Customer
IRET Development

Stakeholders
BESIX

Contract type
Build

Contract value
€49 million

Contract period
April 2015 to July 2018



Groupe Hospitalier Sud Île-de-France
France

Interview

**BESIX BRINGS
"LEAN" TO
HOSPITAL
BUILDINGS**

56,000 m²

surface area

510

beds

36

months' construction time



Two buildings simultaneously on the same site, particularly tight deadlines, multiple technologies: there was no shortage of challenges on this hospital site close to Paris. BESIX responded by using Lean methods that brought together all stakeholders around a common goal. A first for BESIX on such a large and complex project.

The challenge was a major one, but BESIX met it: the titanic and innovative construction site of the new Melun Hospital Centre was delivered on time. A remarkable feat, raising out of the ground 56,000 m² of ultra-modern care space, with 510 beds, in just thirty-six months. The first patients are expected on 15 May 2018, with the effective move of the time-marked predecessor hospital to the new modern and efficient premises taking place in June.

A triple challenge

To achieve this result, BESIX had to be flexible and rigorous to face three major challenges.

First, the deadline, obviously: 36 months to build a large hospital might seem an unrealistic deadline, given the sheer quantity of work. To this main challenge were added two others. First, an unforeseen geotechnical problem that became apparent only once construction had started, inevitably causing

delays. This required the originally planned strip slab foundations to be replaced by a system of piles driven to a depth of 15 m, which avoided serious structural problems. "Fortunately, BESIX's Engineering Department once again demonstrated its responsiveness by designing this new solution in less than two months," explains **Vincent Legros, Project Manager at BESIX France**. And the reaction on the ground was just as fast: 680 piles driven in under three months!

Then, in December 2015, with the hospital construction site already under way for more than a year, BESIX was awarded a second contract to build the shell (structure, roof and façade) and partitions of the Clinique Saint-Jean L'Hermitage, on the same site, and with an identical delivery date. The clinic was completed in just 6 months! "While as a general contractor, we were in charge of the design and construction of the hospital (except for the furniture and specific medical equipment), in the clinic project, as part of a public-private partnership (PPP) with the client, we had only a

secondary role ... while committed alongside the same subcontractors as those working for us on the hospital," **Vincent** explains. "This diversity of roles and projects obviously made planning and coordination particularly difficult."

In these circumstances, to stick to the very tight deadlines, we had no choice: we had to have fool-proof coordination.

LEAN to the rescue

Vincent Legros had the solution: using Lean management on the project. What are we talking about? "Lean" is a philosophy that aims to eliminate waste and lost time in order to achieve maximum efficiency. Whether unnecessary travel, e-mails that do not answer the customer's requests, duplicated tasks, excess production, etc., put together, all these "little" malfunctions end up costing the client as much as they do the construction company and its staff.

Luckily, Lean Management is **Vincent's** dada. "It was even the subject of my graduation dissertation!" he recalls. "BESIX management gave me carte blanche to introduce Lean on the construction site, which is a great mark of confidence. In July 2015, Vincent therefore brought in a Lean consultant, Delta Partner, which was commissioned to analyse the malfunctions and make a diagnosis.

"The result was very clear," **Vincent** explains. "If we wanted to deliver the site on time, we needed optimal planning and collaboration at all times. Lean involves everyone from top management to the people on the ground. The goal is really to work hand in hand, not everyone in his corner as it is too often the case."

VINCENT LEGROS

Project Manager, BESIX France

“Lean involves everyone from top management to the people on the ground. The goal is really to work hand in hand, not everyone in his corner as it is too often the case.”

For the benefit of all

The introduction of Lean was a challenge in itself, bearing in mind that BESIX was working with about fifteen different subcontractors. The site was divided into 46 zones and it took almost four months to define the planning of just six zones, which gives an idea of the titanic job of work that had to be done. “I had never been able to do this on a site of this magnitude,” recalls **Vincent**. “We encountered a lot of resistance at the start because we shook the habits of most of our partners who had never collaborated as closely with the contractor and other subcontractors. But in the end they all grasped the added value of the Lean approach for the benefit of all.”

Thanks to Lean and the close collaboration it entails, the deadlines have been met. The Departmental Advisory Committee for Safety and Accessibility, a French body bringing together representatives of the public authorities, which decides on the opening of the buildings to the public, delivered its authorization within the prescribed time. “As one can imagine, in the case of a medical infrastructure, this authorization is subject to the respecting of extremely strict criteria. This is further proof of the quality of the work produced despite the difficult conditions,” Vincent concludes.



Our people

VINCENT LEGROS

BELGIAN // AGE 44

An architect by training, Vincent quickly moved towards construction. Joining BESIX in 2015, he was immediately entrusted with a full-size challenge: the Melun hospital site. After three years in France, Vincent now plans to return to Belgium to spend more time with his two children, even if he is still passionate about working abroad. Whatever his next mission, his ambition is clear: integrating the Lean approach from day one!

Project details

GROUPE HOSPITALIER SUD ÎLE-DE-FRANCE
MELUN, FRANCE

Activity and area of expertise

Buildings / Hospitals

Customer

Groupe Hospitalier Sud Île-de-France

Stakeholders

BESIX France

Contract type

Design & Build

Contract value

€127 million

Construction period

October 2014 to April 2018



'The Tower' Pile Cap United Arab Emirates

Interview

**REACHING
FOR THE SKY:
WORLD'S TALLEST
BUILDING WILL STAND
ON SIX CONSTRUCT
FOUNDATIONS**





17,839 t

of rebar

49,026 m³

concrete

6,036 m³

concrete
in a continuous pour
(Layer 1 Zone 1)

Soaring to over a kilometer high, with 210 floors, The Tower at Dubai Creek Harbor will be the world's tallest tower, breaking the record currently held by the Burj Khalifa tower (828 m), also located in Dubai. . . and built by Six Construct. The Tower will stand on 20-meter thick raft foundations. The pile cap, an impressive construction feat in itself, will incorporate nearly 18,000 t of steel and 50,000 m³ of concrete, of which 6,000 m³ were poured in one continuous 30-hour pour.

The central column of The Tower is in the form of a minaret-inspired slender stem. A filigree of steel cable stays, the longest ever used on a structure, will anchor the reinforced concrete column to the ground and provide structural stability.

The Tower is an ambitious and highly prestigious project, due to be completed in 2020. The contract to build the pile cap was awarded to Six Construct in 2017 by Dubai property developer Emaar Properties. Construction of The Tower will begin after completion of the foundations in June 2018.

Reaching new heights

The Tower will serve as the central piece of the 6 km Dubai Creek Harbour master plan developed by Emaar Properties. It is intended to be a monumental centerpiece in the EXPO 2020 Dubai, the 35th universal world expo and the first one to be held in the MEASA-region (Middle East, Africa and South-Asia). The Dubai Creek Harbour development, promoted as 'The Future of Living', is a visionary project. It is situated on the edge of the Ras Al Khor Wildlife Sanctuary, and includes a waterside promenade, natural landscaping and

a retail district, as well as several upscale office, residential and leisure projects.

"The Tower will rival the Burj Khalifa tower, which has held the record as the world's tallest building since 2010," notes **Six Construct Project Manager Ruben Fidalgo Dias**. "Interestingly, the Burj Khalifa tower was also commissioned by Emaar Properties and it was built by Six Construct. So, we're proud to be once again contributing to building the world's tallest building and keeping it in the BESIX Group family!"

The Tower was designed by Spanish architect Santiago Calatrava Valls. It is intended as a viewing or observation tower, not as an office building or residential tower. "People will be able to quickly reach viewing platforms up to 700 or 800 meters high," exclaims Ruben. "The views across Dubai and beyond will surely be quite spectacular."

At night, The Tower will emit a beacon of light from its peak. The top of the tower will be an oval-shaped bud, housing ten observation decks, including The Pinnacle Room, which will offer 360-degree views of the city.

RUBEN FIDALGO DIAS
Project Manager at Six Construct



One team, united towards one goal

"It is a 'simple' foundations project, yet on an unprecedented scale," says **Ruben**. Due to its immense height, The Tower requires vast foundations. "Once completed," Ruben explains, "the pile cap will have around 17,800 t of reinforcement steel. To give you a rough idea of what that means, that represents about 2.5 times the amount of structural steel of the Eiffel Tower. In total, around 125,000 t of concrete will be poured."

"So many people have come together on this project; we are working side by side with the client, engineer and consultants. But despite the number of people involved and the different points of focus, it feels like one, united team: the Dubai Creek Raft (DCR) team. It is a multidisciplinary team, with everything from planning to cost control, Health, Safety and Environment (HSE) and Quality Control/Quality Assurance (QA/QC). Then there are the workshops, stores, administration and documentation control, and so on." In total there are 450 highly committed workers, of which approximately 350 direct tradesmen are building the pile cap, equally split in day and night shifts. About two-thirds of the direct workforce is working on rebar installation.

"The team spirit is excellent," **Ruben** continues. "Each of us is aware of making a decisive and interconnected contribution to our common greater goal: executing and delivering the DCR project to our client's satisfaction. Everyone has a valuable role to play."

The cooperation and sense of common commitment has been strong right from the start, when the team had its traditional Pooja celebration to break a coconut for good luck. And it has continued throughout the whole project.

Planning the pile cap in layers and zones

The first project milestone was reached on schedule in December 2017. "Casting the central top part of the pile cap was a remarkable achievement by the DCR team," says **Ruben**. "It was cast on December 21, as per baseline program, despite being granted access to the site one month later than agreed."

During the tender stage, our client requested to prioritize the construction of the central part of the pile cap up to its top level of +5.8 m. The full height of the pile cap is 19.8 m. "DCR proposed a general method statement for the full pile cap, dividing it into layers and zones, developing on the initial concept envisioned by the Dubai Engineering Department. Six Construct produced new construction drawings and the project plan was established", comments **Ruben**.

30-hour continuous concrete pour

"To achieve the goal," **Ruben** continues, "we faced the challenge that our first major pour, Layer 1 Zone 1, would also be the largest. This would be a 'box', 36 m by 36 m, and 5 m high. It would re-

quire 3,200 t of reinforcement bar, with a 30-hour continuous pour of over 6 thousand m³ – 12,100 t – of C70 concrete! It had to be planned meticulously, anticipating a range of scenarios so we would be ready to take action in any event."

The pour of Layer 1 Zone 1 started on 7 September 2017 at 9 p.m. It was successfully completed on 9 September at 3 a.m.

"It was a remarkable pour and a tremendous job," says **Ruben**. "It took 840 truck deliveries, with 35 trucks arriving on site every hour during the pour. I don't think any of us had ever seen anything like it. For many of us, that's when we could really understand and get a full sense of the magnitude of the foundations that we are building to support The Tower."

The pour was executed to the full satisfaction of client Emaar Properties. On 10 September the site team was proud to receive an appreciative letter from the client's representative, acknowledging its 'proactive approach to planning and executing this pour'.

This first concrete pour represented about a third of the whole job. The central part of the raft, to allow The Tower to start rising, was completed in January 2018 and the full raft is scheduled for completion in July 2018.



“Once completed, the pile cap will have around 17,800 t of reinforcement steel. To give you a rough idea of what that means, that represents about 2.5 times the amount of structural steel of the Eiffel Tower.”

RUBEN FIDALGO DIAS
Project Manager at Six Construct



Our people

RUBEN FIDALGO DIAS
PORTUGUESE // 39 YEARS OLD

Ruben's previous experience includes a two-year stint in Algeria and several projects in his home country, Portugal. He started working for BESIX Group in 2014, on the Four Seasons Hotel in Bahrain.

He subsequently moved to the UAE, where he worked on the Legoland® Dubai and The Oberoi Resort (Ajman). He joined the team responsible for the Dubai Creek Tower pile cap in February 2017.

"We have an opportunity to actively contribute to what will be one of the world's icons in engineering and construction. The entire Dubai Creek Raft team shares a deep sense of responsibility and pride for this."

RUBEN FIDALGO DIAS
Project Manager at Six Construct





Project details

**DUBAI CREEK HARBOR DEVELOPMENT
THE TOWER PILE CAP**
DUBAI, UNITED ARAB EMIRATES

Activity & area of expertise
Foundations / High rise

Client
Emaar Properties

Stakeholders
Six Construct

Type of contract
Build

Contract value
\$36 million

Period
March 2017 to June 2018

A serious responsibility

“The Layer 1 Zone 1 pour was important to the team,” **Ruben** reflects. “While The Tower itself will be a superb and impressive structure, we were reminded of the song lyrics: ‘It is not the beauty of a building you should look at; it’s the construction of the foundation that will stand the test of time.’” (David Allan Coe)

“We know the foundations are quite literally the base on which everything stands,” **Ruben** continues. “We have an opportunity to actively contribute to what will be one of the world’s icons in engineering and construction. The entire DCR team shares a deep sense of responsibility and pride for this.”

A ‘simplicity’ mindset drives innovative thinking

Ruben reveals the team’s guiding principle in approaching the work. “Keep it simple. The fewer steps we have in any process, the lower the risk of failure, either in execution or meeting deadlines.”

One practical example of applying this principle was the formwork bracing system adopted for Layer 1 Zone 1. With a traditional solution for building a specific foundation, the formwork needs to be fixed to prevent uplift. To do this, you would start by cutting the recently cast blinding. Then you would excavate and remove the cut cast. Only then can you start building the foundation. If we had used this method, we would have had to repeat the process all along the total 144-m perimeter of Layer 1 Zone 1.

Ruben goes on to explain the new solution conceived and developed by Didier Fillon, then Head of Six Construct Methods department. “Didier’s solution took advantage of the 3,200 t of permanent reinforcement bar that would be installed. This entailed partially using the rebar as tie rods to brace and secure the formwork. That meant that the formwork was fixed in place. As a result, no uplift would occur when the concrete was poured in.”

This clever solution meant that three major activities on the critical path were no longer required. Additionally, potential damage was avoided during excavating to the cathodic protection works below the blinding.

Final milestone

The second contractual milestone is the project completion by 22 June 2018. “We’re working hard every day to get there on time,” **Ruben** concluded. “Always keeping in mind our three priorities: 1st – Safety, 2nd – Quality and 3rd – Time! We continue to work hard every day to challenge ourselves and further improve on past performances!”



Roskilde Fjordforbindelsen Denmark

Interview

FIRST BESIX PROJECT IN SCANDINAVIA SETS ENVIRONMENTAL CHALLENGES



Left:
STEEN PEDERSEN
Coordination and Stakeholder Manager
at RBAI

Right:
XAVIER DEBRUCHE
Design and Technical Manager
at BESIX

8.2 km
long expressway

1.4 km
high bridge

492
deck segments
precast in Poland

BESIX's first Scandinavian project is the design and construction of an 8.2 km, 4-lane dual carriage expressway and a 1.4 km cantilever high bridge crossing the beautiful Roskilde Fjord in Denmark. With a site that includes an EU Natura 2000 zone as well as residential areas, the construction needs to meet stringent environmental and social requirements. Safeguarding the habitats of protected flora and fauna and minimizing impact on the local community are key success factors.

In all, the project includes a dual carriageway, a tolled high bridge over the fjord and 11 smaller civil structures (bridges, fauna passages and cycle lane passages), 1 km of retaining wall and a 3 km noise barrier. The new bridge will connect the town of Frederikssund to the Skibbyvej highway in the Hornsherred peninsula. It will complete an existing bascule bridge, built in 1935, which has seen increasingly severe traffic congestion in the past years.

The €133 million project was awarded in 2017 by Vejdirektoratet (the Danish Road Directorate, DRD), to RBAI, a joint venture between BESIX, Rizzani De Eccher (Italy) and Acciona Infraestructuras (Spain). The main local subcontractor is MJ Erikson, who is executing all roadworks and minor structures.

An elegant design to respect the beauty of the environment

"The star of the show is the bridge," declares **Design and Technical Manager Xavier Debruche**. "It will be highly visible across the fjord and has been designed to do full justice to the setting."

The high bridge design is a segmental balanced cantilever structure consisting of 54 foundation bored piles up to 50 m long and 2 m in diameter, and 16 pier columns set 80 m apart. It will

be constructed in 492 deck segments of 20 m x 3.5 m x 3 m, precast in Poland. Both on- and off-shore, heterogeneous and fractured limestone make piling works more complex. "The soil presents geotechnical challenges. And we've had to work in temporary cofferdam below sea level. The dual carriage expressway will require 500,000 m³ of cut and fill earthworks," **Xavier** adds.

First BESIX project in Scandinavia

The Roskilde project introduces a number of "firsts" for the BESIX team. "It's a new country, new client and new partners," says **Xavier**. "We're also using some innovative methods and technologies, such as diving drones, systematic concrete temperature modelling and monitoring, and electrical heating cables to improve curing conditions during the winter."

Cooperation with the main stakeholders has been excellent, **Xavier** reports. "Rizzani de Eccher's expertise for the deck construction, from prefabrication until erection, has been extremely valuable. Communication with our client, DRD, and with the Engineer, is positive and transparent. Our weekly site meetings are lean and open with no taboo topics. I feel lucky and proud to be working with them and leading the BESIX team towards the successful completion of our first Scandinavian project!"



A protected area presenting unique challenges

“This project requires special care,” explains **RBAI’s Coordination and Stakeholder Manager, Steen Pedersen**. “The environmental and social aspects are a primary concern for all the stakeholders.” The route for the expressway and bridge passes areas of different protection classes, including a EU Natura 2000 zone. These zones are a network of protected areas offering a haven to Europe’s most valuable and threatened species. It is imperative to safeguard the natural landscape and habitats and to preserve the beauty of the fjord and the countryside the expressway will run through. The fjord area is rich in wildlife. It is home to a protected aquatic plant, eelgrass, and it’s an important refuge for waterfowl.

“There are also residential areas close by,” **Steen** continues. “While longer-term effects on the protected nature area are of paramount concern, we also need to ensure that bridge- and road construction activities don’t have undesirable impacts on the local community.”

RBAI is required to have a high standard for daily monitoring of the environment. “The location of the project puts heavy demands on the design,” says **Steen**. “In addition, it makes access for marine

and land pose more complicated, and presents a range of challenges related to logistics, dust, noise and traffic management.”

Many environmental inspections are conducted on a daily basis, where both the natural environment and the construction activities are monitored and inspected, to ensure that precautionary measures are being taken to best safeguard the protected plants and animals that make this Natura 2000 area so special. “For example, we routinely monitor construction activities to ensure that we avoid any direct or indirect impacts from construction, such as the possibility of erosion from earthworks spilling into waterways,” explains **Steen**. “Controlling pollution from the heavy construction vehicles is another big responsibility. Monitoring and controlling discharged water and preventing oil spills are also crucial activities.”

“We also monitor noise and vibration and other factors that could have secondary impacts on life in the Natura 2000 zone,” notes **Steen**. “As an example, we have several protected bird species in the area. We must make sure that nesting birds and construction activities don’t accidentally and unexpectedly affect each other. Noise from driving sheet-piles and pile casings, and other potentially noise-critical activities, could disrupt the birds’ nesting and impact the bird population.”

Xavier Debruche notes some of the measures taken. “For example, works have been scheduled to keep noise within certain limits during nesting seasons. The noisiest activities are scheduled for periods when migratory birds are not present in the fjord.”

“We also need to preserve the aquatic environment,” **Steen** explains. “It’s essential to maintain good water quality, and to protect the fjord and areas that de-water into the fjord from any potential impacts that building activities might have. We closely monitor sediment spill. Likewise, process-waters from piling and casting activities to build the bridge foundations down to and into bedrock under the fjord, are always monitored and treated, to ensure that all discharge water meets quality standards, so that we don’t pollute the fjord and endanger the plants and animals that live in and around it.” “To protect the eelgrass, we’ve scheduled works so that sediment is not disturbed during the eelgrass growth period,” **Xavier** adds. “No sediment screens are being used, but the execution methods (for piling works, for embankments construction,...) have been selected to minimize the risk of sedimentation.”

Creation of some of the minor structures like underpasses, overpasses and animal passageways, also entails ground-water lowering and associated de-watering. These discharged waters are also all monitored to ensure compliance with the local municipalities’ regulations regarding waters discharged into the Natura 2000 zone. Regular inspections are carried out to monitor plants and animals, such as snorkeling surveys to check the eelgrass and checking the water levels of ponds and lakes within the construction areas to ensure the safety of protected amphibians.

Excellent collaboration between the stakeholders is paramount. “Not all challenges are strictly related to the natural environment here! Communication can also be tricky!” **Steen** explains. “The Environmental Team is continually in close dialog with construction crews, as well as with the Municipality and DRD, who are both monitoring our construction works. It’s a multi-lingual



“Fortunately, we all share a common goal to safeguard the sensitive Natura 2000 area. Our daily inspections will continue until the bridge stands ready, tall and proud among the thriving nature of this beautiful corner of Denmark.”

STEEN PEDERSEN

Coordination and Stakeholder Manager at RBAI

interaction with a lot of stakeholders and many external parties. Fortunately, we all share a common goal to safeguard the sensitive Natura 2000 area. Our daily inspections will continue until the bridge stands ready, tall and proud among the thriving nature of this beautiful corner of Denmark.”

Local consultation and dialogue

Xavier outlines the activities to consult with local residents and authorities, answers questions and provides information about the project. “From the very beginning, DRD has implemented a very open

and informative approach towards the people living in the area. There have been public meetings and presentations with attendance of 300 to 600 participants. There have been some 15 to 20 meetings for the 4 home-owner associations (2 on either side of the fjord) that represent the nearby neighbors.

Both DRD and RBAI have been proactive in their communication, promoting the project in a positive way to residents, authorities and the public. Flyers are distributed to inform residents nearby of construction activities coming up, outlining what nuisance can be expected. A project website pro-

vides detailed information. In addition, DRD has created two visitor centers, one on each side of the fjord, to be used for information and for educational purposes.

“We have had a wide range of events with the public,” **Steen** explains. “Everything from a career fair for recruitment at the start of the project, to presentations about the project, site visits for students and professors from local universities, and guided tours for municipal authorities. We even had an open water swimming event, when 27 swimmers swam across the fjord in the place where the bridge will be built!”



Our people

XAVIER DEBRUCHE

BELGIAN // 43 YEARS OLD

Xavier joined BESIX in 2005, as Project Manager for the bridges projects in Equatorial Guinea. Since 2009, he has been working as Project Manager in the UAE (Dubai Tram), Belgium (Engineering Department and Lanaye Lock), Poland (DCT Terminal T2) and now Denmark. A testimony of his globe-trotting nature, his four children were born in four different cities: Brussels, Dubai, Gdansk and Xavier's home town Liège!



“The star of the show is the bridge. It will be highly visible across the fjord and has been designed to do full justice to the setting.”

XAVIER DEBRUCHE

Design and Technical Manager at BESIX

Project details

ROSKILDE FJORDFORBINDELSEN
ROSKILDE, DENMARK

Activity & area of expertise
Infrastructure / Bridges

Client
Vejdirektoratet (Danish Road Directorate)

Stakeholders
RBAI joint venture (BESIX, Rizzani de Eccher and Acciona Infraestructuras)

Type of contract
Design & Build

Contract value
€133 million

Period
October 2016 to October 2019



© The Danish Road Directorate

Social events foster understanding

On the one hand, people are delighted to know that a remarkable, beautifully designed bridge will soon cross their beloved fjord. And they look forward to having a solution to the traffic congestion the old bridge has been causing. But, of course, there are concerns too. The meetings and social events all help to build mutual understanding, providing opportunities to listen to each other's concerns and get reassurance.

“We recently had a very successful Open-Site Day with around 2,000 people participating,” adds **Steen**. “An Open-Site Day is a common way in Denmark to show the site to employees and their families, subcontractors, suppliers, neighbors, authorities and anyone else. It’s a family day, not an ‘official’ event. The purpose is to tell the story behind the project, let people explore the fascinating machinery and equipment being used and mingle with all the different nationalities who come together on a project like this. The aim is to learn and have fun.”

It was on a bitterly cold day in March 2018, with the temperature around -3°C and a very strong wind. There were plenty of attractions, including a guided tour around the site, an overview of the harbor area and all the floating equipment and finally the bridge element storage with the straddle carrier and low-bed transport truck. There were group tours originally intended with half-hour intervals between them, but there was so much demand that the team had to run them continuously.

For the children, there were competitions and gifts. But the big hit for them was the machinery. The subcontractor MJ Eriksson had placed 8 of their biggest machines near the entrance gate. The operators explained what they were for, and the kids could sit in the machines and get their photo taken.”

Completion ahead of schedule

Most of the expressway including the high bridge will be built in 2018. “The project was scheduled to run from October 2016 to October 2019,” **Xavier** concludes. “But our target now is to complete all works before the contractual milestone. Finishing works and equipment installation (mechanical and electrical (M&E), drainage, waterproofing, pavement and safety barriers) should be completed in July 2019, three months ahead of schedule.”





Regional and Specialist Companies

In the Benelux and France, the Group's regional affiliates Belemco, Vanhout, Wust, Cobelba, Jacques Delens and Lux TP ensure a strong presence and a local approach. With Franki Foundations, BESIX Infra, West Construct, Socogetra and Van den Berg, the Group offers specialist niche solutions for the building market like deep foundations, geo-engineering, road construction and cable and pipeline construction.



 | www.jacquesdelens.be

Founded in Brussels in 1967, Entreprises Jacques Delens (EJD) is a general construction and property development company. It operates essentially in the Brussels-Capital region and in Walloon and Flemish Brabant, but is also present in Wallonia and in Flanders. It joined BESIX Group in 1982.

Specialized in the construction, renovation and restoration of buildings of all kinds and sizes, EJD operates in public and private markets. The company's achievements include office buildings, housing and amenities like nurseries, schools, sports and leisure centers, hospitals, hotels, nursing homes, audi-

torias, cinemas and industrial complexes. Thanks to their subsidiary Sud Construct, EJDs is also present in the market of renovation and modernization of care units, the construction of offices, and the construction of small buildings (from 4 to 8 housing units) and luxury housing.

In 2017, the company consolidated its presence in the Brussels and Walloon markets by launching a record 21 new projects, among them Val Mosan in Liège, Epsilon in Uccle, Watson & Crick Hill at Mont-Saint-Guibert and the Hamoir 14, Oxygen and Greenhill Park real estate projects in Brussels...

Always at the forefront of sustainable design and construction, EJD is now an effective member of the Ecobuild.brussels cluster. EJD also won the call for projects to restore the former Brussels Shot Tower, one of the last industrial remains of the capital, the site of which will become a school.

Nevertheless, we cannot close this brief overview of the highlights of 2017 without paying tribute to Jacques Delens, founder and honorary president of the company, which bears his name, who died on December 6, 2017.



LES JARDINS DE L'ORNE
Mont-Saint-Guibert, Belgium

In the Spotlight

LES JARDINS DE L'ORNE

In the center of the municipality of Mont-Saint-Guibert in Walloon Brabant, the Jardins de l'Orne residential complex consists of apartments, studios, single-family homes, shops and premises for SMEs, all energy and environmentally efficient. The project will total nearly 250 luxury-housing units.

Enterprises Jacques Delens has completed the first phase of this ambitious complex in record time, with a quality of finish up to the high ambitions of the promoter, Belgian-Swiss investment group Ginkgo Advisor. The first apartments were ready in June 2017, even though work did not start until August 2016! It took less than a year to produce 62 apartments spread over four blocks including a basement, the ground floor and three floors.

This remarkable project is the first project completed by EJD using innovative electronic access management technology and LEAN Management, while the management of on-site inventory and of traffic spaces was comparable to that of a production line. Buoyed by this first experience, the company has decided to accelerate the introduction of innovative methods in managing its sites.



GREENHILL PARK | Brussels (Woluwé-Saint-Pierre), Belgium



OXYGEN | Brussels (Auderghem), Belgium

NEW CONTRACTS IN 2017

Maison Delune | Brussels (Ixelles), Belgium

Restoration, for the Embassy of the United Arab Emirates, of the Maison Delune, a heritage listed building in Brussels.

Cinema Le Palacel | Brussels, Belgium

Complete renovation, for the French speaking Community, of the famous Le Palace cinema by subsidiary Sud Construct.

Greenhill Park | Brussels (Woluwé-Saint-Pierre), Belgium

Construction of 31 luxury apartments for developer Immobel.

Oxygen | Brussels (Auderghem), Belgium

Construction of a high quality, highly energy efficient real estate complex.

Hamoir 14 | Brussels (Uccle), Belgium

Construction of upscale apartments for promoter Eaglestone.

TRILOGIPOINT
 Hermalle-sous-Argenteau, Belgium
 Architect: Biemar & Biemar



Wust is a leading construction company in the Walloon Region. It has pursued its policy of excellence in Belgium and the Grand Duchy of Luxembourg for more than 85 years. Wust operates in traditional buildings, industrial hangars, retail outlets, renovation and restoration, civil engineering and environment, residential development and promotions, and industrial works. Wust's growth is based on the knowledge and

expertise of 400 enthusiastic and passionate employees.

In 2017, Wust's business posted attractive growth, both in Belgium and in the Grand Duchy of Luxembourg. Sustained by an increasingly tangible economic recovery, the number of orders from the private sector has risen sharply to record levels. 2018 looks set to be equally fruitful. The company continues



to focus on important markets, in both the public and private sector.

Finally, in early 2018, Cobelba became a subsidiary of Wust within BESIX Group. The purpose of this reorganization is to take fuller advantage of synergies between the two companies. (See page 108)



In the Spotlight

TRILOGIPOINT

Wust erected a logistics hall for Société DLT on the Liège Autonomous Port site, in Hermalle-sous-Argenteau, in a temporary consortium. This impressive hall was delivered on a turnkey basis, with the consortium acting as general contractor, including all the special technologies.

The result is a 360-meter long, 43,000-m² logistics platform, with a free under beam height of 10.90 meters, including two storage units with offices and 60 dock levelers. The project also included the surrounds (10,000 m² of roads and plantations).

Wust carried out this project based on performance specifications. The company has therefore integrated the results of a number of engineering studies, in particular concerning stability.

The deadline was very tight but the teams succeeded in delivering the project on time. The file was finalized on March 31, 2017, the contract signed on April 25... and the building delivered on November 30!



CENTRE ILS GALILEO | Transinne, Belgium
Architect: Trema Architecture



IMPULSE | Luxembourg
Architect: Steinmetzdemeyer Architectes Urbanistes

NEW CONTRACTS IN 2017

Espace Rogier Grand Manège | Namur, Belgium

Design, renovation, conversion, extension and construction of auditoria, offices, a music academy and a catering area, and habilitation of the surrounds.

Val d'Orbais | Perwez, Belgium

Construction of a 99-bed nursing home and a 20-apartment serviced residence.

Eco-district (SMDI) | Arlon, Belgium

Grouped construction of 93 dwellings in two phases and habilitation of the surrounds in a "bouwteam" collaboration.

Impulse | Luxembourg

Renovation of an office building.

Galileo | Transinne, Belgium

Construction of the new logistics and maintenance center of the European Galileo program building (geolocation services), including offices and a technical section.



Vanhout NV turns 90 years old in 2018. In this period, it has grown into a reputable construction group, made up of a number of companies including HBS (finishing), Vanhout Facilities (facility management), Vanhout Projects (project development), Vadutec (sustainability engineering and technology), Isofoam / Isochape (insulation) and Energieconcepten (technical installations). For many years, CEO Jef Lembrechts, who retired at the end of 2017 after 12 years as managing director and transferred the management to his executive committee, led the company.

Vanhout operates in both the private and public sectors. The company strives for

quality, sustainability and added value. This strategy translates into good financial figures, giving a solid basis for growth, stability and new investments.

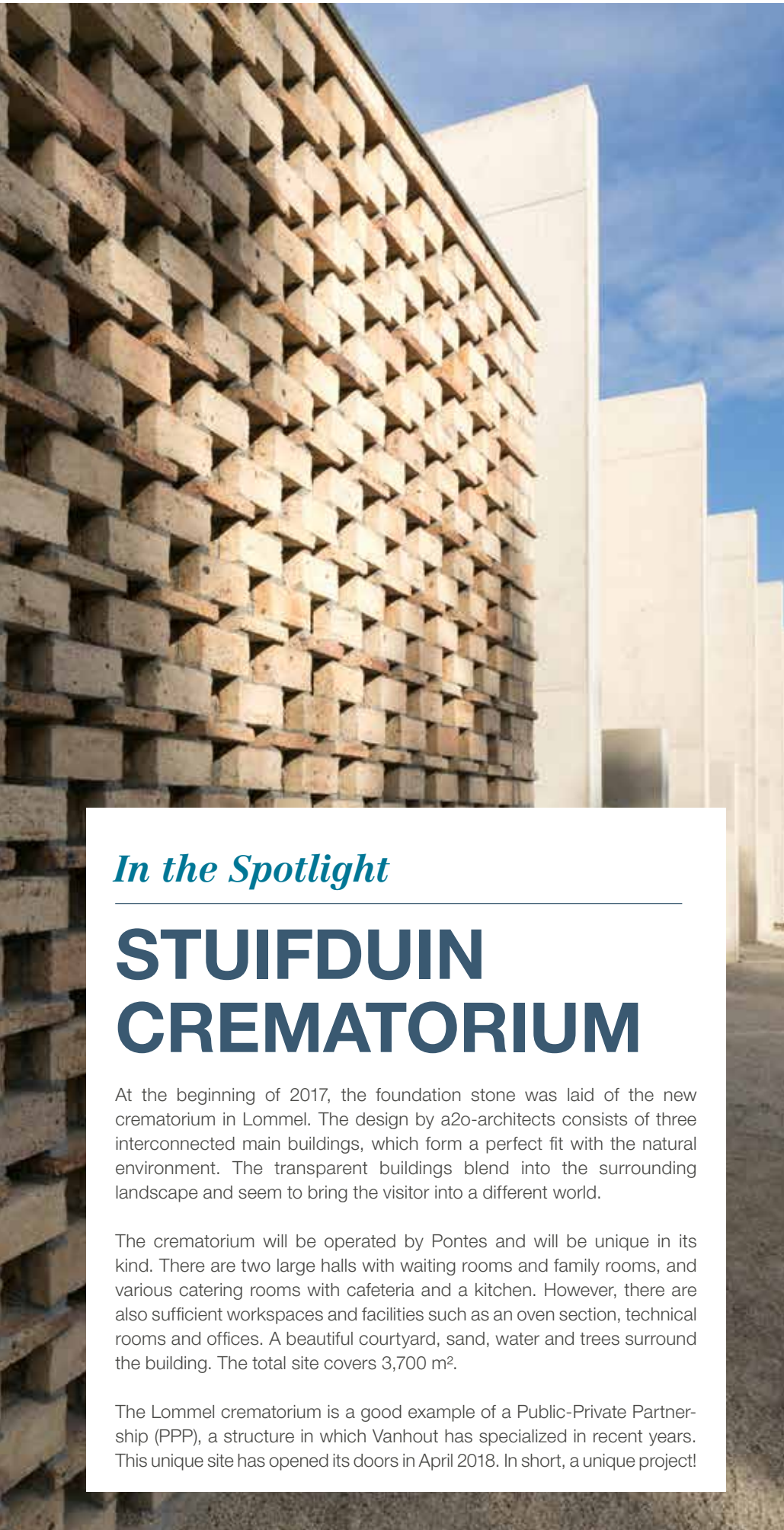
In 2017, Vanhout acquired a 60% stake in Energieconcepten NV in Arendonk. This company specializes in renewable energy generation facilities, supplemented with classical technologies. For 2018, Energieconcepten is keen to continue to grow, together with Vanhout, in the private and professional markets.

In 2017, Isofoam founded the Isochape NV. In the future, not only PUR insulation, but also insulation mortar will be used in buildings.

 | www.vanhout.be

2017 was also a successful year for Vanhout Facilities. New clients include the city and the province of Antwerp, the Flemish Land Agency and Basic-Fit. From 2018, Vanhout Facilities will also be in charge of maintenance for all Belgian Decathlon stores. HBS celebrated its 25th anniversary in 2017, and in the same year achieved a record turnover, delivering a number of fine reference projects such as H&M's only Belgian flagship store on Antwerp's Meir.

In 2018, Vanhout will focus even more on expanding the group by attracting niche companies.



In the Spotlight

STUIFDUIN CREMATORIUM

At the beginning of 2017, the foundation stone was laid of the new crematorium in Lommel. The design by a2o-architects consists of three interconnected main buildings, which form a perfect fit with the natural environment. The transparent buildings blend into the surrounding landscape and seem to bring the visitor into a different world.

The crematorium will be operated by Pontes and will be unique in its kind. There are two large halls with waiting rooms and family rooms, and various catering rooms with cafeteria and a kitchen. However, there are also sufficient workspaces and facilities such as an oven section, technical rooms and offices. A beautiful courtyard, sand, water and trees surround the building. The total site covers 3,700 m².

The Lommel crematorium is a good example of a Public-Private Partnership (PPP), a structure in which Vanhout has specialized in recent years. This unique site has opened its doors in April 2018. In short, a unique project!



GALLAIT SITE | Brussels (Schaerbeek), Belgium



FIRE STATION | Zaventem, Belgium

NEW CONTRACTS IN 2017

PXL University College (Hogeschool PXL) | Hasselt, Belgium

The Vanhout-Kumpen temporary consortium is building a new campus building for the PXL art department. Vanhout Projects is also developing a 6,000-m² tower (ground floor and 11 floors) with a student hostel and accompanying parking lots.

Yust | Berchem, Belgium

On the De Koninck brewery site in Berchem, an old warehouse will be converted into a hundred housing units.

OCMW (Public Social Services Department) | Merelbeke, Belgium

Construction and maintenance of a local service center and a residential care center with 142 rooms and 5 flats spread over various zones of the existing care campus.

Gallait site | Brussels (Schaerbeek), Belgium

Development of a new school campus for Dutch-speaking education. On this campus, a new secondary school, teenage school, primary school and a youth center will find their place.

Fire station | Zaventem, Belgium

The joint venture Antwerpse Bouwwerken-Vanhout is building two new fire stations at Zaventem airport.



Lux TP operates in building construction and in civil and railway engineering. It specializes in renovations, reconstructions and conversions. Apart from a few tiny sites in Belgium, it works exclusively in the Grand Duchy of Luxembourg.

After exceeding a €50 million turnover for the first time in its history in 2016, Lux TP succeeded in maintaining this level in 2017. This evolution is explained by the exemplary commitment of a loyal team of employees, which excels in looking after its customers. “A satisfied customer” is the leitmotiv of Lux TP: many customers return with further

 | www.luxtp.lu

projects and recommend the company to their entourage.

The right choice of projects as well as of partners and subcontractors is also a key element in the company’s success. Staying flexible with a modern approach, having a positive attitude and respect are key Lux TP values.



FUNICULAR PFAFFENTHAL-KIRCHBERG
Luxembourg City

In the Spotlight

FUNICULAR Pfaffenthal-Kirchberg

Lux TP has completed the construction of a funicular with a new railway station in the heart of Luxembourg City. In 63 seconds, travelers travel from the Pfaffenthal Valley (Old Town) to the new “Kirchberg” business district. The connection is intended to reduce traffic in the city center by linking the rail line to the new tram, making it possible to access different neighborhoods without having to take a bus from the main station.

The challenge of this project was as much working on an incline (19.7%) as the existence of an in-service railway line at the foot of the site. This project is somewhat exceptional for having involved our three departments. The expertise of our CFL rail team was essential for preparing the route of the funicular, because getting material to the site was made more complicated by the incline. Our Building department headed construction of the new station and the funicular arrival station. Finally, our Roads team was brought in to find the best solution for evacuating the masses of water that run down the valley and could potentially flood the neighborhoods at the foot of the project. Deadlines were tight and the work received considerable media attention as a prestigious project in the Grand Duchy of Luxembourg.



“SOHO” RESIDENTIAL PARK | Luxembourg City



IMPULSE | Luxembourg City

NEW CONTRACTS IN 2017

“Soho” Residential Park | Luxembourg City

Real estate complex consisting of three residences around a semi-enclosed courtyard surrounded by pathways and landscaped gardens. This unique green space in the city center offers a surface area of +/- 15,000 m² of AAA passive housing and +/- 2,300 m² of shops.

Impulse | Luxembourg City

BREEAM-certified real estate project. Seven floors with approximately 6,000 m² of offices and a retail outlet on the ground floor.

NSPA | Capellen, Luxembourg

Development of a new main entrance to the NATO Support and Procurement Agency (NSPA) headquarters. Civil engineering, infrastructure, exterior and structural work will be done for the main guard post, along with the metal structures for an awning.

Liaison Micheville | Belvaux, Luxembourg

Construction of structure 03 on the RN31, including 2 abutments and 8 piles. The deck is mixed steel/concrete and has a curved sound barrier in steel and PMMA.

MEUSE OFFICE
Jambes, Belgium





 | www.cobelba.be

Namur-based Cobelba has operated as a general construction company in Wallonia (Belgium) since 1994. Building on its long experience, it produces, among other things, industrial buildings, shops, public buildings, apartment buildings and offices. It also positions itself as a real estate developer for major projects like the “Les Jardins de Baseilles” eco-neighborhood or the “Les Tilleuls” revitalization project in downtown Andenne.

The company operates out of two sites, Naninne and Virton, which allows it to cover the geographical area surrounding the E411 motorway.

2017 was not an easy year in the Namur region, with repercussions on Cobelba’s order book. A new management team, which has taken over the reins following the retirement of Chief Executive Jean-Louis Henry at the end of 2017, will inject new momentum in 2018.

In addition, for strategic reasons, BESIX Group has decided to attach Cobelba’s construction activities to its subsidiary Wust, in order to develop new synergies and strengthen the Group’s positioning in Wallonia (see page 102). It is in a temporary joint venture with Wust that Cobelba won the important Espace Rogier revitalization project (“Grand Manège” site) in Namur in 2017. Cobelba’s real estate development activity, in turn, has been transferred to BESIX RED to stimulate a new development thrust in Wallonia.

In the Spotlight

MEUSE OFFICE

After three years of design works according to a system of ‘early contractor involvement’ and 17 months of construction, Cobelba delivered a remarkable office building for Brussels promoter Eaglestone in February 2017. This building, in the Namur suburb of Jambes, is intended to accommodate Atradius (formerly Assurances de Crédit), one of the largest private employers in the Namur region. This construction is part of an Eaglestone mixed project that will eventually include offices and housing, with at its center a green area, a semi-public park and a pedestrian plaza as the cornerstone of the project. The office building covers +/- 5,600 m² (ground floor and four floors) and includes a basement parking lot with 137 spaces (4,300 m²).

The building is certified BREEAM ‘Very Good’ and reflects the new trends in sustainable development.



L'IMPÉRIALE | Jambes, Belgium



ESPACE ROGIER (JV Wust-Cobelba) | Namur, Belgium

NEW CONTRACTS IN 2017

L'Impériale | Jambes, Belgium

Real estate development project to convert the former Bister mustard works into 28 dwellings pleasantly oriented off a particularly green central isle. The old vinegar factory will be converted into a multi-purpose room for the project’s inhabitants and local residents.

Espace Rogier | Namur, Belgium

Renovation of the “Grand Manège” with the creation of a new Music Conservatory, and a concert hall with acoustics unparalleled in Wallonia.


 | www.socogetra.com

Founded in 1948, Socogetra is an essential Belgian player in road construction and civil engineering. The company is also active in water treatment and environmental project management. Through its subsidiaries, Socogetra owns and operates various plants and entities that produce construction and coating materials (asphalt, bituminous road binders, concrete), which add real value. It also operates two quarries: the Carrière des Limites in Rochefort and CGR at La Roche-en-Ardennes.

Its Bagetra subsidiary rounds off these activities in the fields of civil engineering and industrial building.

On a strategic level, the year 2017 saw the acquisition of Enrobage Stockem and Witraloc, which specialize in the manu-

facture and supply of asphalt and concrete, and have two quarries. This acquisition reinforces the industrial position of Socogetra, which is already well established in southern Belgium. In parallel with this strategic strengthening, Socogetra renewed its order book with numerous renovation and rehabilitation works on the motorway and secondary road network. 2017 was also a record production year for Socogetra's various subsidiaries: GNB for the concrete, Famenne for asphalt and E3F for asphalt production, Emubel for road binders, Vialines for road marking or our quarries. The past year saw Socogetra win major projects in water purification and civil engineering. Socogetra and its subsidiaries have once again demonstrated the richness and diversity of their skills and expertise.

In the Spotlight

BYPASS Marche-en-Famenne

In 2017, Socogetra carried out major roadworks on the Marche-en-Famenne bypass for the SPW (Public Service of Wallonia). A brand new stretch of road linking the N4 to the N836 will relieve the center of Marche-en-Famenne. This involved major earthworks, with 66,500 m³ of material displaced, including 14,000 m³ of rock and 38,000 m³ of very compact schistous soil. All these operations were carried out entirely with company-owned equipment. With a fleet of over 170 machines, including nearly 40 specifically for earthmoving (crawler excavators, dumpers, rollers ...), the excavation/backfilling work was completed in less than 4 months. This project also brings together all the road-building trades: drain laying, laying of sub-foundation and foundation materials, and asphaltting (road surface), etc.



N4: trunk road Renewal of asphalt layer | Bastogne, Belgium



WASMUEL WASTEWATER TREATMENT PLANT | Belgium

NEW CONTRACTS IN 2017

E25 | Between Bastogne and Massul, Belgium

25 km of resurfacing for the Walloon Region.
Placing of 100,000 t of asphalt.

SHAPE | Mons, Belgium

Grand Headquarters of NATO forces. Replacement of the drainage system, installation of 3,500 m of new pipelines and repair of 350 m of existing pipelines using polymerized liners in situ.

Infrabel: Line 162 | Between Arlon and Hatrival, Belgium

Civil engineering works, half of which are carried out at night.

Wasmuel wastewater treatment plant | Belgium

Construction of a sludge discharge dock and the construction of weighbridges.

Marche-en-Famenne bypass (phase 7) | Belgium

Construction of an 800 m road, with drainage and installation of 400 m of soundproofing panels.



Franki Foundations

 | www.ffgb.be

Franksi Foundations is one of the top ten European contractors, specializing in the design and implementation of deep foundation technologies. The company has subsidiaries in France (Atlas Fondations), the Netherlands (Franki Grondtechnieken) and the UK (Franki Foundations UK and Martello Piling).

Its deep foundation technologies are used in various sectors, including office buildings, residential housing, distribution centers, infrastructure works, nuclear sites and the petrochemicals sector. A fleet of more than 110 machines, several of which are designed in-house, and a specialized engineering department, enable Franki Foundations to offer tailored solutions for deep foundation projects.

The primary focus today is on total projects. In these Franki Foundations acts as general contractor, offering a “turnkey” solution including the execution and coordination of other parts of the project (site preparation, earthworks, drainage, etc.).

In 2017, the Franki Foundations group grew strongly, thanks to its French subsidiary Atlas Fondations' contribution to the infrastructure works for the Paris metro extension (lines 4, 11 and 15 of the Grand Paris Express project).

A key event in 2017 was the acquisition of UK-based Martello Piling, a niche player specialized in the execution of large diameter piles in restricted access and low headroom environments. With Martello Piling on board, Franki Foundations can now offer a total range of foundation technologies on the British and European markets.

In the Netherlands, attractive large-scale projects included the Noordboulevard in Scheveningen and the RIVM (Netherlands etc ...) in Utrecht, where Franki Grondtechnieken acted as general coordinator, installing various special deep foundations techniques.

In Belgium, Franki Foundations is strengthening its leading position on the market, with a number of projects where it has made the difference in terms of quality, safety and innovation.



In the Spotlight

GRAND PARIS EXPRESS

The Grand Paris Express project consists of a major extension of the Paris metro network with 200 km of new tracks and 68 new stations around the French capital. In what is Europe's largest urban project today, Franki Foundations and Atlas Fondations have realized, among other works, lots OA 802 and OA 813 on the T2C section of metro line 15 Sud. For the construction of the Noisy-Champs / Bry-Villiers-Champigny tunnel, diaphragm walls and the barrettes were installed allowing for the realisation of launch shafts for two tunnel boring machines (TBM), ventilation rooms and shafts, and emergency entrances.

Lot OA 802 in Noisy-le-Grand is located at the eastern end of T2C and is used as a launch shaft for a tunnel boring machine. The rectangular diaphragm wall consists of 43 panels, 36 m deep. The excavations were made using grab cutters and trench cutters.

Lot OA 813 is the launch shaft for a tunnel boring machine that will drive to the maintenance site of Champigny-sur-Marne, at the western end of T2C. The retaining structure is a diaphragm wall consisting of 21 panels, each 1.22 m thick, 20 m deep and made using a grab and a trench cutter.

GRAND PARIS EXPRESS
Paris, France



NIKE 'THE COURT' | Ham, Belgium

NEW CONTRACTS IN 2017

New laboratories, offices and parking lots for the National Institute for Health & Environment (RIVM) and the Medicine Evaluation Board (CBG)

| Utrecht, the Netherlands

Franki Grondtechnieken acting as a multi-service contractor offering an important, all-inclusive global package project covering the execution of a wide range of different deep foundation techniques. In designing the foundations of the buildings engineers had to find the adequate solutions guaranteeing the strict requirements related the use of sophisticated, low-vibration laboratory equipment.

Nike 'The Court': new expansion of Nike's European Logistics Campus Ham | Ham, Belgium

Installation of more than 4000 fully automated Atlas displacement screw piles within a sharp implementation framework in glauconite-containing sandy layers. Piling rigs are GPS equipped.

Carpark Garenmarkt | Leiden, the Netherlands

A 5.044 m² circular diaphragm wall and 1.290 m² barrette foundations were realised for the construction of an oval-shaped 22-meter deep underground parking, one of the deepest of the Netherlands with a capacity for 525 cars.

Möbius Tower One | Brussels, Belgium

Franki Foundations acting as a general contractor for the execution of ground water lowering, demolition & ground works, excavation works, concrete works and deep foundations.

Bridge upgrade in Splott road for Network Rail | Cardiff, UK

To allow for a bridge upgrade over the rail, low headroom Martello rigs enabled the installation of 35 high capacity large diameter bored piles (height restriction of 4 m) beneath an existing bridge, in advance of its demolition. This method allowed for reducing the time the bridge being out of use and a minimal disruption to live road traffic and adjacent live railway traffic.



 | www.westconstruct.be

West Construct specializes in civil, hydraulic and industrial engineering works for both public and private sector customers in Flanders and Brussels. The company has also built a solid reputation in coastal infrastructure and canal maintenance under framework contracts. This includes emergency interventions, calling for extreme flexibility and professionalism.

West Construct's activities generally involve specialized engineering requiring a high degree of technical expertise and risk management. In our core activities, we place our skills and knowledge at the client's service, going beyond the limits of traditional contracting to create real benefit.

Under the BEWIND label West Construct, together with Franki Foundations, has in recent years built a solid reputation as a builder of foundation plinths for windmills.

2017 was a busy year for West Construct, in which several attractive projects were successfully concluded. These include the widening of the Albert Canal at the Merksem bend (see opposite), completed to the customer's satisfaction. With its experience and expertise, and in spite of the strong competition, West Construct succeeded in maintaining its place in the hydraulic engineering market.

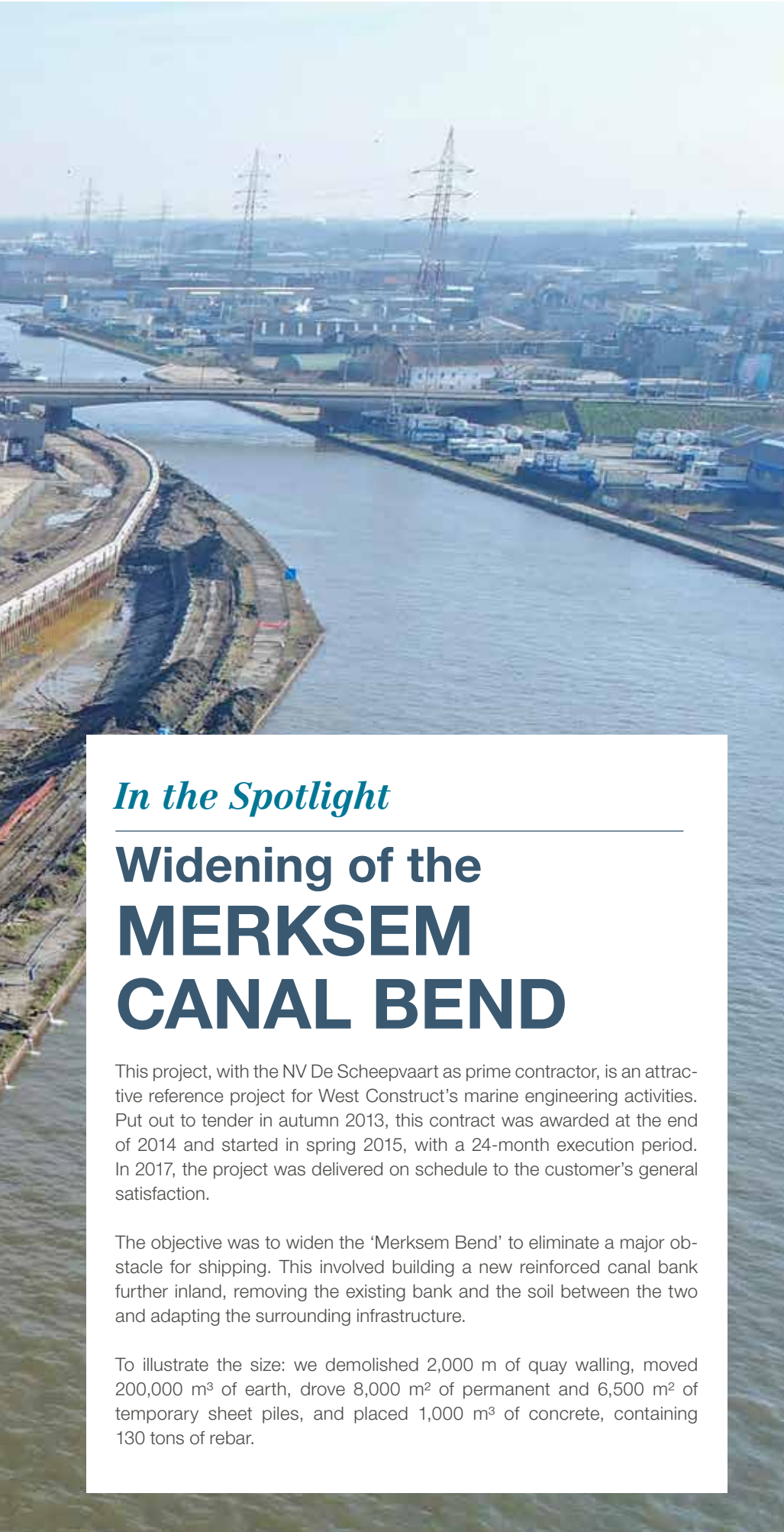
In the past year, West Construct was also very busy in the civil engineering market. For

TUC RAIL, for example, we built a passageway in Lokeren, a bridge in Bruges, a footbridge in Haren and parallel railway tracks in Zwankendamme.

The construction of the Parkbos bridges over the E40, the R4 and the Ringvaart (ring canal) in Ghent, have received repeated press attention with spectacular lifting operations. In the industrial engineering market, we would mention the building of a drinking water production center in Eeklo for the Watergroep. The contract from Chevron to design and build a jetty in Ghent is a fine example of how West Construct can offer benefit to the customer by being involved right from the design stage.



WIDENING OF THE MERKSEM CANAL BEND
Merksem, Belgium



In the Spotlight

Widening of the MERKSEM CANAL BEND

This project, with the NV De Scheepvaart as prime contractor, is an attractive reference project for West Construct's marine engineering activities. Put out to tender in autumn 2013, this contract was awarded at the end of 2014 and started in spring 2015, with a 24-month execution period. In 2017, the project was delivered on schedule to the customer's general satisfaction.

The objective was to widen the 'Merksem Bend' to eliminate a major obstacle for shipping. This involved building a new reinforced canal bank further inland, removing the existing bank and the soil between the two and adapting the surrounding infrastructure.

To illustrate the size: we demolished 2,000 m of quay walling, moved 200,000 m³ of earth, drove 8,000 m² of permanent and 6,500 m² of temporary sheet piles, and placed 1,000 m³ of concrete, containing 130 tons of rebar.



PARKBOSBRUGGEN | Ghent, Belgium



NEW UNDERPASS | Vichte, Belgium

NEW CONTRACTS IN 2017

Adapting the south bank of the Moervaart | Ghent, Belgium

Renovation of the existing sheet piling with a capping beam and ground anchors over a length of $\pm 1,050$ m along the south bank of the Moervaart (Rodenhuizekaai) between the Ghent-Terneuzen canal and the Arcelor Mittal blast furnace gas pipeline in Ghent.

New tunnel under railway line L59 | Lokeren, Belgium

Construction of the tunnel, with a separate cycle tunnel, road and ancillary works for the new road tunnel, integrating the tunnel in the surrounding area, and rail track work.

Noise barriers on the A12 | Ekeren, Belgium

Soundproof screens in plastic along the A12 north.

Leie bridge | Deinze, Belgium

Replacement of a steel service walkway by a plastic cycle path with accompanying reinforcement works.

Haren footbridge (Line 26 Schaarbeek-Halle) | Haren, Belgium

Demolition of the existing footbridge over the L26 and construction of a new pedestrian and cycle footbridge.


 | www.belemco.be

Belemco is a general contracting company, operating mainly in Flanders and Brussels, with an office in Bilzen. The office in Kortrijk has been integrated within BESIX Flanders since January 2018. Belemco is the new name for the former Heijmans Bouw, which has been part of BESIX Group since April 25, 2017.

Belemco undertakes high-quality residential and utility projects, in both the public and private sectors. Satisfied customers include local and federal government agencies, educational institutions, healthcare institutions,

project developers and private companies. Among the varied range of completed projects are apartment buildings, residential and care centers, assisted living residences, hospital buildings, school and university buildings, government buildings, community centers, concert halls and theatres, offices, hotels, football stadiums, and parking lots.

The acquisition by BESIX Group offers Belemco new opportunities to consolidate and expand its market position, thanks in part to the synergy with the other companies in the Group.

After an exceptional 2016, Belemco's turnover fell back in 2017. On the one hand, the starting date for a number of projects was postponed, or permits arrived late. On the other hand, stiff competition and heavy financial pressure on the market for procurement contracts, meant that fewer new projects were brought in. The opening of the therapy tower in Pellenberg and the new ALO building on the Gasthuisberg campus in Leuven add two attractive additions to Belemco's portfolio.



ALO LEUVEN
Leuven, Belgium



In the Spotlight

ALO LEUVEN

On 22 November 2017, the new ALO building on the Gasthuisberg campus in Leuven was officially opened. The complex combines three functions: an Alma student restaurant, a Learning Center and an Educational Tower.

The ground floor is taken up by the new Alma student restaurant with seating for 1,000 diners and an extensive kitchen. Particularly striking is the 1,000 m² concrete acoustic ceiling, 27 m wide and hanging like a chain above the dining room. The ceiling consists of a, merely 10 cm thick, post-tensioned curved concrete slab, in which 47,166 recesses have been left for the acoustics. The result is a stunning piece of craftsmanship.

The learning center is located above the Alma and can accommodate 450 students. It contains a large quiet study room with a view of the campus garden and connecting to the roof terrace. There are also ten closed group workrooms with wireless-operated screens. Students can book these rooms to work together on assignments.



RESIDENTIAL CARE CENTER WITTE MEREN | Mol, Belgium



BREDASTRAAT | Antwerpen, Belgium

NEW CONTRACTS IN 2017

Witte Meren Residential Care Center | Mol, Belgium

The existing building is being converted in 4 phases into a completely new 121-bed residential care center.

Bredastraat: new Delta building and conversion Koffienatie | Antwerp, Belgium

56 apartments in two new blocks, with an underground car park, and conversion of an old warehouse into 35 lofts.

Infinity | Bilzen, Belgium

New office building for energy engineering company Encon. With both BREEAM and LEED certification, the company's building will be one of the most sustainable buildings in Europe.

Museumgebouw Z33 | Hasselt, Belgium

Renovation of the existing building, located in the former beguinage, combined with a new building by Italian architect Francesca Torzo.

Extension of building O&N1 - KU Leuven | Leuven, Belgium

Extension of the Education and Research building on the Gasthuisberg campus: 10,800 m² of additional classrooms, practice rooms and laboratories for the Faculty of Medicine.


 | www.besixinfra.com

BESIX Infra builds roads, sewers and public spaces. They are among the top three players on the Belgian infrastructure market, for both public and private clients. The company premises in Bilzen and Burcht each have their own concrete production and recycling sites. In addition, the 100% subsidiary Belasco in Bilzen, Ghent and Puurs has its own asphalt production facilities. All this enables BESIX Infra to operate efficiently in Flanders and Brussels. BESIX Infra is also profiling itself increasingly

as a fully-fledged partner in communication, neighborhood consultation and nuisance limitation. Finally, BESIX Infra also undertakes long-term infrastructure maintenance under existing DB(F)M contracts. In 2017, BESIX Group acquired the Belgian companies of the Dutch Heijmans Group. This is how Heijmans Infra became BESIX Infra. All activities were continued seamlessly under the new flag, in an improving market in which BESIX Infra was able to boost its order book to a record of over €120 million. The new orders come

from a wide customer portfolio in which water purification company Aquafin is still by far the largest name. The company now operates in a strongly reviving market with considerably lower pressure on pricing. In all, BESIX Infra brought in 23 new assignments, while subsidiary Belasco generated 155 new asphaltting assignments. Our commitment to safety, nuisance reduction and communication was awarded second place in the annual 'Aquafin Minder Hinder (= Less Nuisance) Awards'.

REHABILITATION N19
Aarschot, Belgium





In the Spotlight

N19 RE-DEVELOPMENT

BESIX Infra has been commissioned by the Flemish Government to redevelop the N19 (Herseltsesteenweg) in Aarschot over a distance of one and a half kilometers. This involves replacing the 3-layer asphalt surfacing over an area of more than 10,000 m². Our plant in Bilzen will deliver the 4,700 t of asphalt for this. The new design includes building safe, raised cycle paths in concrete. Together with the linear elements, we will place almost 1,000 m³ of concrete for these paths with our own slipform paver. In addition to the complete structure, the sewers also need to be renewed. Where the sewer crosses a railway line, we chose to use underground drilling. Because it is important that the groundwater level does not fall along a railway line, we produced the inspection and reception wells with secant piles filled with underwater concrete. At the start of work at the site, we were faced with unforeseen soil and groundwater contamination from a nearby petrol station. Thanks to BESIX Infra's customary flexibility and to the full satisfaction of the client, the work did not have to be suspended. To control the contamination, a solution consisting of sheet piling and the installation of a groundwater purification plant was installed within a week. Flexibility is no luxury on this site!



KNESSELAERSTRAAT | Aalter, Belgium



BASILIEKSTRAAT | Halle, Belgium

NEW CONTRACTS IN 2017

Aquafin, Strombeek disconnection phase 1 | Strombeek-Bever, Belgium

Full façade-to-façade renovation of various streets and squares in Strombeek-Bever. At the same time the sewers are deduplicated and large underground concrete buffer basins are being built.

Farys, redevelopment of Groenstaak- and Botestraat | Mariakerke and Wondelgem, Belgium

Renovation of sewers and roads over a distance of 2.5 km.

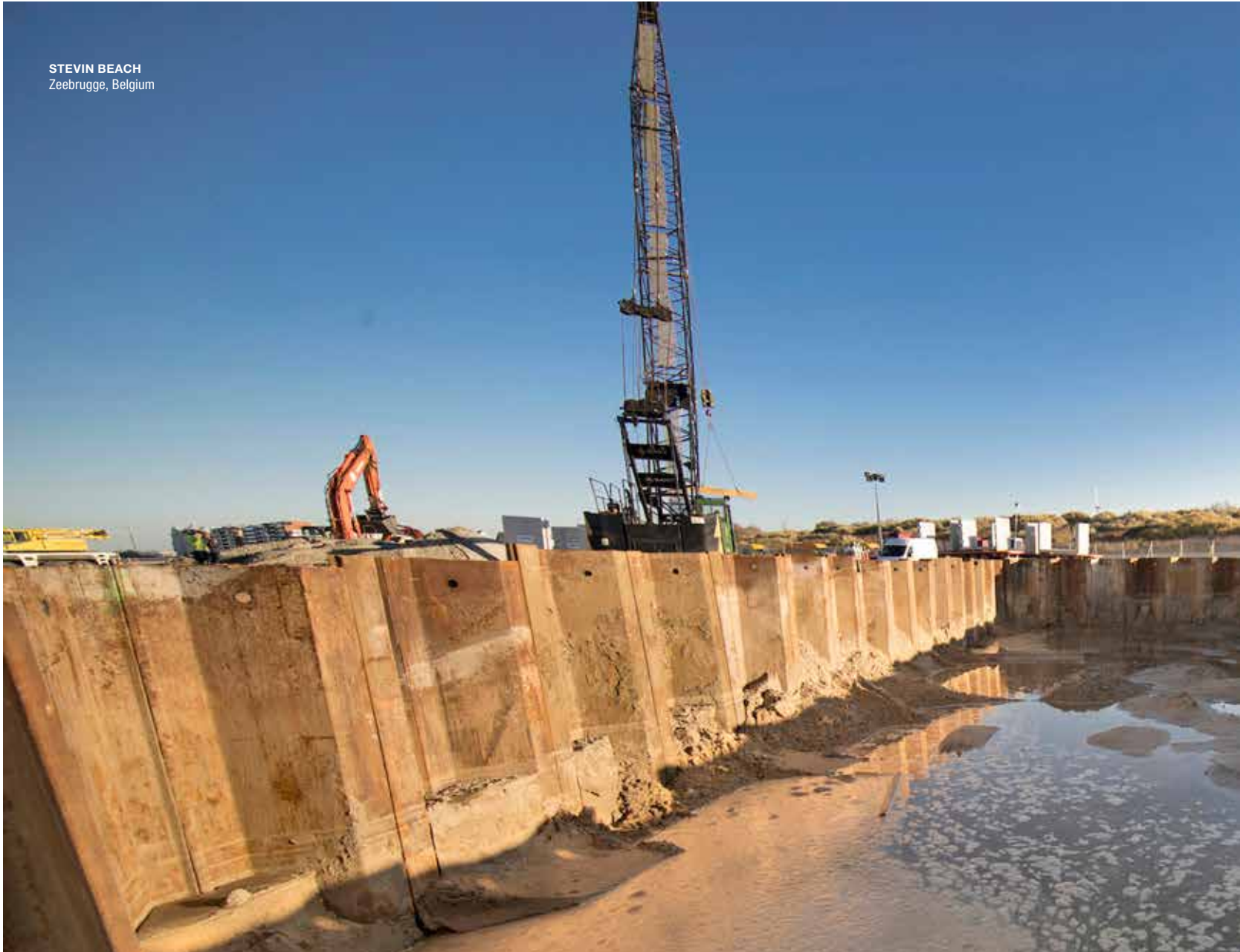
Redevelopment of N457 | Maarkedal, Belgium

Complete rebuilding of regional highway N457 over a distance of 8.5 km to improve road safety, including separate cycle paths.

Aquafin, collector JF Kennedylaan | Ghent, Belgium

Deduplication of underground sewer system. Construction of a new 1,600 mm diameter collector at a depth of 6 m, including underground drilling. An outflow construction is being built in the Ghent-Terneuzen canal.

STEVIN BEACH
Zeebrugge, Belgium



 | www.besixvandenbergh.com

Van den Berg offers its customers high-quality infrastructure solutions based on its extensive experience in cable and pipeline construction: underground and above-ground cables and pipelines, horizontal directional drilling, high voltage and traction installations, networks and structured cabling systems, fiber optic networks, signaling and monitoring systems, house connections, technical tunnel installations and traffic technologies.

The Belgian government recognized and inaugurated these techniques. On 21 November 2017, Elia's new Stevin high voltage connection was officially inaugurated in the presence of the grid operator, the Federal Minister for Energy Marie-Christine Marghem and Prime Minister Charles Michel. The project paves the way to bringing wind energy from offshore wind farms to land and transporting it inland.

In December 2017, Van den Berg also won the contract to build a new gas pipeline along the Albert Canal in Merksem.

On an administrative level, major efforts were made to introduce a new ERP system. More and more customers are developing their own invoicing and monitoring systems, requiring the ERP system to be sufficiently flexible. Van den Berg is seeking to upgrade its internal project administration thoroughly to serve its different business lines, project managers and clients.



In the Spotlight

STEVIN BEACH

In 2017, Van den Berg installed the cabling for an underground 200 kV high-voltage connection between Zeebrugge beach and the Stevin high-voltage substation. The connection is an indispensable link for connecting the future offshore wind farms with the onshore high-voltage grid.

All cables were laid simultaneously in one month. For the cabling, trenchless technology was used for placing of the underground infrastructure. This direction-controlled drilling resulted in less disruption, time savings and extremely accurate work.

On the beach Van den Berg placed 4 m deep connecting wells. In these wells, land cables were connected to sea cables at a later stage. With the burying of the wells the structure was placed in readiness for a major high voltage project. The cables under the 'De Fonteintjes' nature reserve lie at least 18 meters deep to protect fauna and flora.



PIPELINE-LAYING OPERATION | Merksem, Belgium



BICYCLE COUNTER POLE RUE DE LA LOI | Brussels, Belgium

NEW CONTRACTS IN 2017

Signaling for Infrabel | Antwerp Belgium

Renovation of the signaling system for the entire rail network in the port of Antwerp (right bank).

Bicycle counter pole, Rue de la Loi | Brussels, Belgium

Setting up an operating bicycle counting post.

Pipeline-laying operation | Merksem, Belgium

Precision works when laying a new gas pipeline under the Albert Canal using direction-controlled boring.

Fiber To The Home | Hasselt, Belgium

On behalf of Proximus, Van den Berg is working in the Fifthnet temporary consortium on the Design & Build of the Fiber To The Home (FTTH) project, in which a fiber optic telecom network is built right into the living room.

WASTEWATER TREATMENT PLANT
s-Hertogenbosch, the Netherlands



Water activities



In synergy with its BESIX Group partners, BESIX Sanotec offers comprehensive, end-to-end water and energy solutions covering every aspect of the project life cycle. The full suite of services is tailored for turn-key design, engineering, execution, commissioning, and operation and maintenance (O&M) of innovative process and design projects.

These include wastewater treatment plants, treatment plant capacity upgrades, waste valorization (biogas, biofuel, biosolids, etc.), water treatment (ultrafiltration, reverse osmosis, etc.), pumping stations and hydroelectric installations, electricity and heat cogeneration, and the installation and maintenance of underground pipes and sewage disposal systems.

WATER ACTIVITIES

BUSINESS REVIEW

Diversification has been key in BESIX's response to the harsh, competitive and fast changing market conditions of 2017. Besides the conventional EPC (Engineering, Procurement and Construction) water projects, BESIX is seriously considering more tenders of BOT (Build, Operate and Transfer), DBFM (Design, Build, Finance and Maintain) and DBO (Design, Build and Operate). 2017 has also required flexibility to adapt to changing circumstances, such as client-side decisions to postpone project start-ups.

The focus on growth and new developments in the environment sector remains a priority. PPP's (Public-Private Partnerships), long term concessions and O&M contracts are still proceeding successfully. DBFM activities now range from small-scale installations to large water treatment plants, capable of processing capacities up to 1.5 million people-equivalent.

TEAM OF THE MONARAGALA-BUTTALA
INTEGRATED WATER SUPPLY PLANT
Sri Lanka



Adding value through complete, sustainable solutions

BESIX Sanotec contributes to BESIX Group's sustainability vision by delivering leading-edge environmental solutions. Recoverable resources and energy optimization are a must in times of rapid demographic changes and a global transition to green energy.

Internal synergies enable BESIX Group to position the different entities as a 'one-stop shop' solution in the environment sector. The capacity of the different entities to develop projects hand-in-hand with their clients or to have the flexibility to adapt to clients' requirements is an attractive offer. It enables BESIX to define and execute effective, leading-edge solutions while mastering the risk profile of each project.

BESIX Sanotec teams use modeling and simulation software to find and select smart, cost-effective and sustainable technologies and solutions to optimize water treatment and valorize waste.

Delivering key projects all over the world

BESIX recently delivered several important projects. These include a 30,000 m³/day industrial wastewater treatment plant in Doha, **Qatar**, and a complete water treatment solution in south-eastern **Sri Lanka**. The latter comprises river intake water points, a water

treatment plant, water tower, underground storage tanks, office and residential buildings and 100 km of pipelines, across a site area of 300 km². The Monaragala and Buttala region now boasts a modern drinking water supply of 6,000 m³ per day serving 90,000 people.

In **Belgium**, projects underway include the refurbishment of gates and a pumping/turbine station, as part of the reconstruction of three locks on the Charleroi-Brussels canal at Viesville, Gosselies and Marchienne-au-Pont.

BESIX Nederland and BESIX Sanotec have teamed up for the design, renovation and extension of an energy-neutral water supply project in 's Hertogenbosch, **the Netherlands**. The works, scheduled for completion by the end of 2018, will result in an increase of the hydraulic and biological processing capacity of the installation, as well as an increase in biogas production. Work is also underway on the refurbishment of the sludge and biogas line of a wastewater treatment plant in Tiel, the Netherlands (see p. 126 to 129).

Positive prospects

The first projects to be delivered this year include the sludge treatment extension of the plant in Wasmuël (Belgium) and the extension of the Ajman Wastewater Treatment Plant in the **UAE**. Looking ahead, BESIX Sanotec has recently been awarded an EPC contract for the Jebel Ali SWRO desalination plant for the production of 182,000 m³/day of potable water in Dubai, UAE.

BESIX Sanotec will continue to diversify and support new Group initiatives related to water, energy and waste. In coordination with other entities, BESIX Sanotec will continue focusing on the creation and use of byproducts such as biogas, biofuel, heat recovery and recycled water. They will also directly support environment-related projects and ideas for development and growth within the frame of the BESIX Group innovation program, "Unleash".

The increase of synergies with other Group entities remains key, starting with a close collaboration between the teams in Brussels and Dubai (UAE), followed by an integration within the Business Units and other companies of the Group, such as Lux TP, Socogetra and Vanhout.



AJMAN SEWAGE TREATMENT PLANT
Ajman, UAE



'S HERTOGENBOSCH WASTEWATER TREATMENT PLANT
's Hertogenbosch, The Netherlands

Key Figures 2017

5
countries

11
projects
in execution

84
employees

potable water
production for
90,000
people

650,000 PE *
of wastewater treated

2,400,000 PE *
of wastewater facilities
under construction

* Population Equivalent



**Tiel Sewage
Treatment Plant**
The Netherlands

Interview

**DUTCH SEWAGE
TREATMENT PLANT GOES
ENERGY NEUTRAL WITH
BESIX SANOTEC REVAMP**



HANS DE WULF
Project Manager at BESIX Sanotec



100%
energy neutral

**3.5 million
kWh**
generated
through biogas-fed
gas motors

3rd
refurbishment
and extension
water contract
in the Netherlands

BESIX Nederland and BESIX Sanotec have teamed up in a project to refurbish the sludge and biogas line of a sewage treatment plant (STP) in Tiel, the Netherlands. The plant will be transformed into a zero-energy facility by changing and optimizing the sludge process, using generated biogas to fuel the plant.

The 2-year contract was awarded by the Dutch water authority, Waterschap Rivierenland. The design phase of the €11.5 million project began in June 2017 and the project is expected to be completed by the end of June 2019.

A revamp with important environmental impact

“Although it could be seen as ‘just’ a refurbishment, this project has high environmental significance,” **Project Manager Hans de Wulf** points out. “For a start, the refurbishment will render the STP energy neutral, which is an achievement in itself in terms of cost efficient operations and long-term sustainability.”

“The location of the project is also significant,” Hans explains. “The Netherlands’ geography means that water management is one of the country’s most pressing environmental concerns – and one of the government’s most crucial responsibilities.” In addition to managing the country’s sea defenses, the Dutch Water Board regional authorities have a complex river flood prevention and water management program. Within this, the Rivierenland Authority is responsible for water control in a large area in central Netherlands known as the River Area.

This region is crossed by several important European rivers such as the Rhine and the Meuse, so it is susceptible to serious flooding risk.

Water management in the River Area includes water quality management, drainage, road maintenance and wastewater treatment. Several sewage treatment plants handle domestic and other wastewater, including the STP at Tiel.

“The Tiel refurbishment project is part of the client’s plan to centralize wastewater treatment in order to process wastewater more efficiently and sustainably,” Hans continues. “The Tiel plant centralizes the sludge digestion for the whole northern area of the region. At the same time, it contributes to reaching the Water Board’s climate-related objectives. Rivierenland has the ambition to generate 40% of its energy in a sustainable way by 2020 and to have energy-neutral installations by 2040.” The revamping of Tiel will allow the Water Board to close smaller and older STPs.

HANS DE WULF
Project Manager at BESIX Sanotec

“The refurbishment will render the STP energy neutral, which is an achievement in itself in terms of cost efficient operations and long-term sustainability.”



How it works

Describing the BESIX Sanotec solution for Tiel, Hans explains how the plant will become 100% energy neutral through the processing of its own and external sludge in a thermophilic digestion system for the production of biogas.

“To put it simply, treating the wastewater produces organic material called sewage sludge, which is processed in a sludge digestion system; biogas is formed as the organic material decomposes. In the STP at Tiel, the sludge digestion system will be equipped with a biogas CHP (combined heat and power), or ‘cogeneration’ system. The biogas will feed gas engines to generate both electricity for the plant and heat for the sludge digester, at high efficiency.”

The solution designed by BESIX Sanotec involves the integration into the system of state-of-the-art, innovative and energy-saving technologies. The sludge process will be based on thermophilic digestion (using 50-55° C heat), which has the benefit of pasteurizing the greater part of pathogens, viruses and germs. Technologies for the side stream process will include NAS (New Activated Sludge) nitrogen removal and ANPHOS® phosphate recovery. The biogas-fed gas motors will generate 3.5 million kWh of electricity each year to power the plant.

Combined expertise to create the optimal solution

BESIX Nederland and BESIX Sanotec are working side by side on the project. “BESIX Sanotec brings to the table its expertise in terms of comprehensive, end-to-end water and energy solutions,” Hans notes. “And we have extensive experience in delivering leading-edge water treatment facilities, having created solutions for a wide range of situations and requirements in different parts of the world. For example, the process and operations teams have worked on a similar sludge treatment system in the ‘s-Hertogenbosch (the Netherlands) wastewater treatment plant.”

BESIX Nederland teams are in charge of civil works. The Dutch subcontractor Colsen will provide and install the thermophilic digestion and the NAS and ANPHOS® technologies.





HANS DE WULF
Project Manager at BESIX Sanotec

"We have extensive experience in delivering leading-edge water treatment facilities, having created solutions for a wide range of situations and requirements in different parts of the world."

Time and performance challenges

Hans outlines two main challenges to be tackled on this project. "First, the planning. The critical path runs through the construction of the new thermophilic digester and the start-up of the digestion process with sludge in this digester."

"Secondly, the required performances. Our bid was based on a business case with investment and exploitation costs. These costs depend on performance levels achieved for the sludge dehydration and transport and on the energy production to deliver the required electricity and heat. Our process design must allow us to reach these performance levels with a minimum of risks."

Status and milestones

The project is divided into two phases. "March 27, 2018, was the deadline for phase 1," says Hans. "This involved installing the gasholder and the flare. The first, as the name suggests, is a large container that collects and stores the biogas emanations from the sludge. The flare is a system for regulating the gas flow and burning the gas. A permit for these installations is required before moving on to phase 2, construction of the piling for the foundation of the digester. So far, everything is moving on schedule."

For phase 2, renovation works in the plant are scheduled to start in summer 2018. New structures will be executed in the second half of 2018, and the project should be completed by summer 2019.



Our people

HANS DE WULF
BELGIAN / 53 YEARS OLD

Hans joined BESIX Sanotec as Project Manager in January 2015. For the Tiel project, which was awarded in June 2017, he was first assigned as Tender Manager, then Project Manager. Before joining BESIX he worked 12 years in France for a global expert company in the water and waste sectors. Hans has extensive experience in the fields of drink water and sewage water systems, drink water distribution and water systems, in Belgium and France.

Project details

TIEL SEWAGE TREATMENT PLANT
TIEL, THE NETHERLANDS

Activity & area of expertise
Environment / Municipal Wastewater Treatment Plants

Client
Waterschap Rivierenland

Stakeholders
BESIX Sanotec and BESIX Nederland

Contract value (BESIX Sanotec's part)
€11 million

Period
June 2017 to July 2019



Real Estate Development



BESIX RED has been developing major urban projects for over 30 years. Its strategic vision has enabled it to diversify both in terms of sector – in the residential, office and retail and services markets – and geographically: Belgium, Luxembourg, France and, recently, the Netherlands and Portugal.

Keen to play its part in developing the city of tomorrow, BESIX RED relies on a team of superb talents. Architects, engineers and contractors serve its customers' specific interests with developments that meet demanding criteria like architectural and technical quality and optimal occupant comfort.

With a concern to create sustainable buildings that reflect its customers' needs, societal and ecological components, as well as innovation, form an integral part of its effort to conceive the real estate of tomorrow.

REAL ESTATE DEVELOPMENT

BUSINESS REVIEW

GABRIEL UZGEN

Managing Director BESIX RED

“The strong and continuous growth of our real estate development activity demonstrates the effectiveness of our strategy of sectoral diversification and international development. Our excellent 2017 results, attributable to the expertise of our teams, reinforce our position as a major player on the Belgian and Luxembourg markets.”

Innovation will be one of the pillars of our growth strategy in 2018. Not innovating for innovation’s sake, but innovation that makes a difference for our customers in the various sectors we cover: Office, Residential and Shops & Services.”

Belgian anchoring and European expansion

Historically specialized in residential building, BESIX RED now has a balanced portfolio of projects with around 40% of turnover in non-residential. In 2017, it worked on 20 projects totalling around 500,000 m² in 13 cities.

As part of its Europe-wide growth policy, BESIX RED has also become a reference player in the Grand Duchy of Luxembourg, with seven projects under way in the office and residential markets. Already active in France, it is today confirming its expertise and added value with a first project in the Netherlands, the iconic Sluishuis residential complex in Amsterdam. BESIX RED is keen to expand its activities in three other Dutch cities: Rotterdam, The Hague and Utrecht.

In 2017, BESIX RED also entered the Portuguese market, acquiring a site in Lisbon to build 43,000 m² of offices and residential space for an internationally reputed client.

This geographical and sectoral diversification allows BESIX RED to reduce its exposure to market cyclicity while taking calculated

risks. It is also partnering with local reference players in order to penetrate markets faster. This applies, for example, to certain projects in Luxembourg (Félix Giorgetti, Soludec), France (Rabot Dutilleul) and Lisbon (a French investment group).

In the office market, BESIX RED seeks to offer its customers office environments that make for successful business activity. Well-known groups are being persuaded to entrust it with their head office buildings. These include:

- **Kons (Luxembourg):** 15,000 m² for the ING banking group
- **Casa Ferrero (Luxembourg):** 30,000 m² for the Ferrero agro-food group
- **Parque Oriente (Lisbon, Portugal):** 43,000 m² for an internationally-known French company

A dynamic Belgian market

2017 was a positive year for the Belgian residential market. New apartment sales were buoyant despite a small rise in the average price (slightly above inflation), due to mort-



IMPULSE
Luxembourg city, Grand Duchy of Luxembourg

gage interest rates remaining at historically low levels. As in previous years, private investors and buyer-occupiers shared the market relatively equitably (60-40).

A slight rise in interest rates is expected for 2018, but not enough to discourage future buyers. The fact is, however, that the market remains hard to access for the youngest buyers because of the high equity contribution banks are requiring before giving loans.

2017 also saw a continuing clean-up of the office market with a decrease in vacant space. In Brussels, this applied in particular in the CBD (Central Business District) and the Leopold district. The clean-up of the Brussels periphery market comes mainly from the conversion of empty office buildings into housing. In Brussels, this phenomenon is more marked in the ‘second ring’ districts, where many apartment buildings have replaced neglected offices.

If the real estate market is mainly focused on Brussels, we are seeing the same trends in Flanders and Wallonia.



Innovation

BESIX RED places itself in a category apart by the particular attention it pays to the urbanistic quality of its projects. These are conceived to integrate perfectly into their environments and meet the needs of future inhabitants and users. Innovation will be crucial in the coming years in response to new trends such as co-living. An ‘Innovation’ unit was created in 2017 to reflect on new concepts and on the integration of IOT (Internet of Things) into new real estate projects: digital door locking, smart mailboxes, collaboration with products from Google (Nest), etc.

Acquisitions

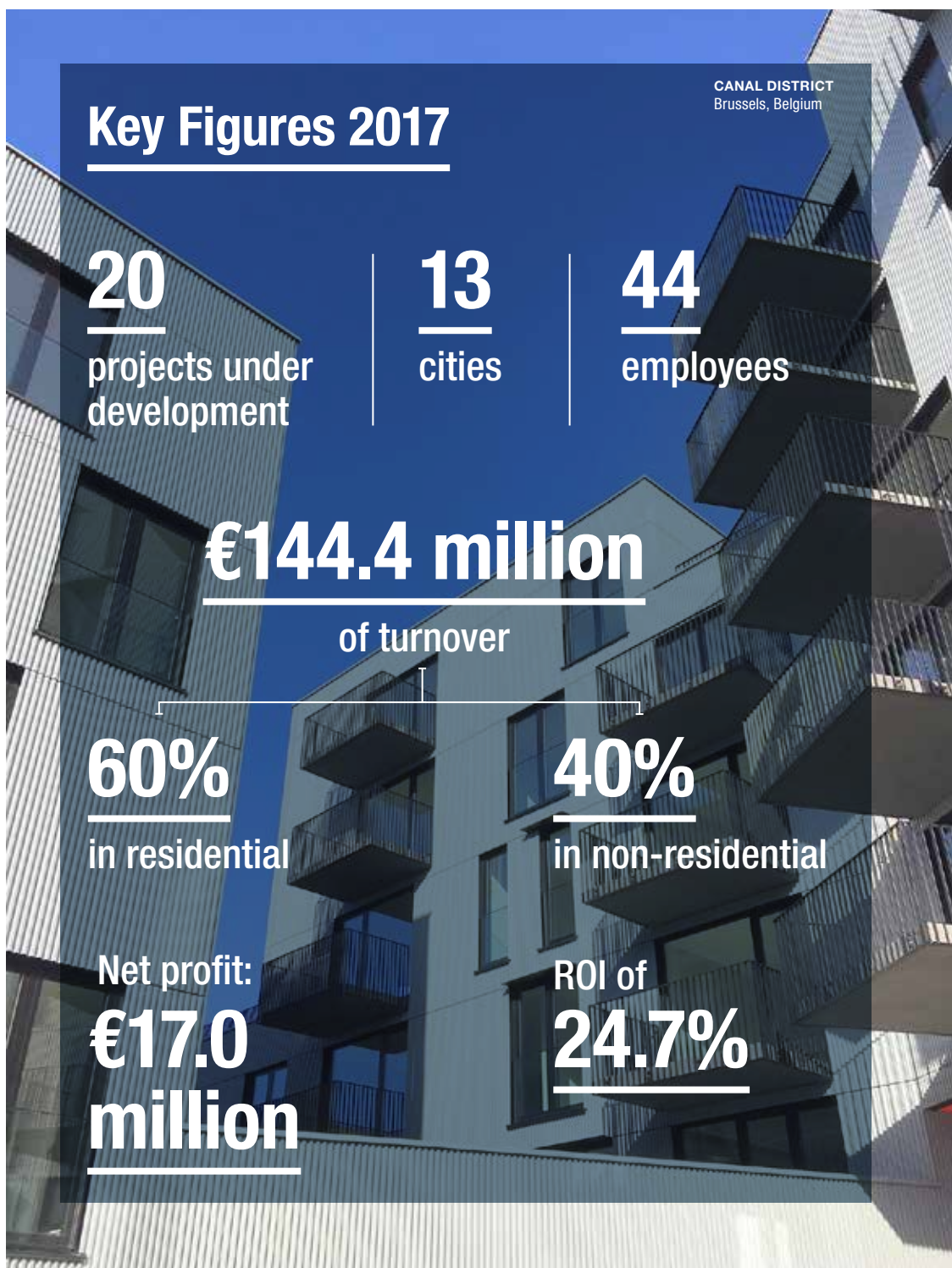
BESIX RED’s most recent acquisitions fit perfectly with its growth strategy aimed both at increasing its activities in dynamic metropolitan markets and at developing large-scale projects that integrate harmoniously into the urban landscape. In 2017, BESIX RED acquired new sites in Belgium and abroad, giving it a total of 247,000 m² to develop in the coming years.

Prospects

Thanks to sustained and sustainable growth, and with a diversified portfolio of projects and an innovation-based strategy, BESIX RED is confident about its future development.

It is targeting the office market in France and the residential and office sector in Portugal and the Grand Duchy of Luxembourg.

It is also paying close attention to opportunities in strong markets like Germany and the Scandinavian countries. BESIX RED is targeting individual cities rather than specific countries because it sees urban socio-economic dynamism as a stepping stone to making an international name for itself.





Les Promenades d'Uccle Belgium

Interview

A NEW RESIDENTIAL DISTRICT WITH A CHARM ALL OF ITS OWN





Left to right:
DIDIER HEYMANS, Director of the Urban Planning Department, Municipality of Uccle
LAURENT GRAAS, Deputy Director of Development BESIX RED
MARC COOLS, First Alderman of the municipality of Uccle



In south-west Brussels, the Promenades d'Uccle housing project is starting to rise out of the ground. Spread over four phases, this project for 238 apartments and 60 houses will welcome some 800 inhabitants to what will be a new and privileged neighbourhood for lovers of nature. The project is located on the edge of a Natura 2000 nature reserve, and offers a magnificent view over the west of the Brussels Region from the Engeland Plateau.

The Promenades d'Uccle site is exceptionally large for the Brussels Region: extending over a 11.5 hectares, of which 6.4 ha are zoned for building. This is a whole new residential district which is coming into being at the initiative of BESIX RED, in partnership with Belgian promoter MATEXI. The first phase started in 2017, with the first building expected to be delivered in the second half of 2018.

Trees and gardens

The project gives pride of place to nature. In addition to the 4.37 ha 'Green Zone with High Biological Value' of 4.37 ha that will be transferred to the Region and two other wooded plots that will be transferred to the municipality, Les Promenades d'Uccle are spread around a central square that exudes a remarkable charm and which has become the symbol of the project. Gardens, terraces, green roofs and pedestrian paths will reinforce the sense of spaciousness. An ideal place for families and those who love quiet and nature.

Les Promenades d'Uccle are also a good example of team perseverance: the project started in 2002 and will last until 2024! "When I joined BESIX RED as Project Manager, this is the first project I worked on," recalls **Laurent Graas**, who is currently overseeing the project as **Deputy Director of Development**. "We were confronted with numerous and lengthy administrative and legal recourses because the site neighbours were initially completely closed to dialogue and opposed to any construction project. Today, tensions have fortunately eased."

Bringing solutions

"We are very proud of this project which is a first for Uccle in terms of rainwater management," says **Marc Cools**, **First Alderman**, whose responsibilities include Urban Planning, Environment and Housing. "Thanks to a system of individual cisterns (to supply the toilets) and private infiltration storm basins for each building, and a lagoon system to collect any surpluses, we will avoid any rainwater run-offs towards neighbourhoods downhill from the plateau."

DIDIER HEYMANS

Director of the Urban Planning Department at the Municipality of Uccle

"Throughout these years and despite the difficulties, we have always had an open dialogue with the project team."

238
apartments

60
houses

42,000 m²
of living space



Instead of increasing the risk of flooding, which was a major concern of inhabitants, the project should instead reduce this risk and have a positive impact! Another first for us is the social mix in a project of this type. The plans include 40 subsidized housing units to allow young households to gain access to the property market.”

Listening to each other

“The constructive dialogue with the authorities, especially with the Uccle municipality, was a decisive factor in obtaining the permits,” **Laurent** says. “After the municipal consultation committee rejected the first version of the project in 2003, we reintroduced our application, taking into account the committee’s remarks. In particular, we reduced the density of the project, which initially consisted of 401 dwellings. In this way we obtained a favourable opinion.”

“Nevertheless, the local Uccle inhabitants were so concerned at the effect in terms of mobility and hydrology that all together we requested and got the Brussels government to impose an impact study,” says **Didier Heymans, Director of the Urban Planning Department of the Municipality of Uccle**. “The following of the recommendations of this 1,300-page study, released in 2005, strengthened the file. Throughout these years and despite the difficulties, we have always had an open dialogue with the project team.”

It was only in February 2011 that the ‘permis de lotir’, allowing the site to be divided into individual building lots, was issued, once issues around the opening of new roads and rehabilitating existing ones had been settled. After that, planning and environmental permits had to be obtained for laying the roads and building the 18 houses and 76 apartments of the first phase. The final permit was obtained in October 2017.

“Working in phases is very useful, especially in a project that is staggered over time. In this way we are able to adapt subsequent phases to market needs. For example, we will be slightly reducing the size of the houses in phase 2 compared to those of phase 1 in order to be able to offer more competitive prices that are more affordable to today’s buyers,” **Laurent** tells us.



Our employees

LAURENT GRAAS

BELGIAN // AGE 51

A lawyer by training, Laurent has always worked in real estate. Joining BESIX RED in 2001 as Project Manager, he is now Deputy Director of Development.

Laurent enjoys the diversity of his profession, each project being a unique adventure serving our customers, like an orchestra conductor tasked with getting various talents – architects, engineers, entrepreneurs, and others – all playing together from the same score.

Project Details

LES PROMENADES D'UCCLE
BRUSSELS (UCCLE), BELGIUM

Client

Retail sales

Project owner

Engeland Development
(partnership between BESIX RED and Matexi)

Architects

Espace Architectes and A2RC;
Landscape architect: JNC International

Stakeholder

Entreprises Jacques Delens

Project Value

€19 million

Period

2002 to 2024



SOHO-Luxembourg
Grand Duchy of Luxembourg

Interview

**A QUIET
URBAN HAVEN**





GEOFFROY BERTRAND
Director Luxembourg, BESIX RED

“One challenge was to increase the dwelling density while maintaining a calm living space. The housing block meets these requirements.”



In Luxembourg-City, BESIX RED is helping revitalize the station area by transforming a large urban block in a way that will have a major impact on the surrounding area. The attractiveness of the project for both investors and occupants is confirmed by the fact that nearly all units have already been sold off-plan.

Soho is a project focused on local neighbourhood life with, as its name evokes, the desire to bring renewal. It consists of four residential buildings with ground floor shops (including a supermarket and a bookstore) and a small number of offices. It is being carried out in three phases, with deliveries phased between 2019 and 2020.

Partnering with a local player helps in positioning oneself in this market. “For each project, we try to identify top class local co-developers to partner up with. In this way, we can match up everyone’s expertise and develop high-quality projects, both architecturally and technically”, explains **Geoffroy Bertand, Director Luxembourg BESIX RED**. In the case of Soho, this partner is Soludec, which is also taking part in the construction work, in partnership with two BESIX subsidiaries, Lux TP and Wust.

“BESIX RED immediately sensed the potential of this neighbourhood that had been passed over by

local developers,” says **Stefano Moreno, one of the two architects** of the project who had previously conducted a feasibility study and sought to have the authorities zone the site for housing under a Special Development Plan.

“Luxembourgers prefer quiet neighbourhoods like Belair or Merl. This being said, the station area is extremely well located in terms of mobility and facilities (schools, etc.). Very central, it also adjoins other sought-after neighbourhoods, which offers a very good potential for added value,” adds **Geoffroy Bertrand**.

“We were quickly on the same wavelength for developing the site. The target group was clear to everyone: young families and urban expatriates who love movement, going out at night, doing their shopping on foot, living in a big cosmopolitan city. Our common vision was also to build quality buildings that will maintain our companies’ visibility and reputation in the long-term.”



STEFANO MORENO
Architect

“BESIX RED immediately sensed the potential of this neighbourhood that had been passed over by local developers.”

In style!

Each building will have its own style while maintaining a certain consistency with the other three (dimensions, balconies/terraces, green roofs, energy certification ...), in order to integrate perfectly into an urban fabric with varied architectures.

“One challenge was to increase the dwelling density (150 dwelling units) while maintaining a calm living space. The site meets these requirements: inside it, we have planned green spaces and very low speed traffic in an almost private street, offering residents a haven of peace and quiet in the city. It is a very unusual product in Luxembourg, a one-off,” **Geoffroy** says.

“I welcome BESIX RED’s conviction of the importance of offering architecture and quality materials that will stand the test of time,” **Stefano Moreno** continues. “For example, we have used brick and fibre to texture the façades instead of the unsightly white plaster that is commonly used in Luxembourg and ages badly. A plant wall between two buildings is another feature that will give a particular cachet to the site. I for one am delighted with this first collaboration with BESIX RED.”

A growing reputation

Reinvigorated since 2013, BESIX RED’s presence in Luxembourg is supported by 7 projects, all at different stages, from land acquisition to delivery. Locally, Geoffroy Bertrand’s team, currently composed of 5 people, plans to expand in 2018 in line with the growth of projects.



Our people

GEOFFROY BERTRAND

BELGIAN // AGE 43

Coming from Luxembourg’s real estate world, Geoffroy joined the BESIX RED team in 2015, where he now holds the position of Director Luxembourg. Since 2013, Luxembourg has been an important part of BESIX RED’s growth strategy.

More than half of its income currently comes from this country. Its partnering policy and the reputation it has forged with projects like Kons and Soho have enabled BESIX RED to position itself as a major player in the Grand Duchy.

Project Details

SOHO

LUXEMBOURG-CITY, GRAND DUCHY OF LUXEMBOURG

Client

Retail owners

Project owner

BSD Development
(partnership between BESIX RED and Soludec)

Architects

Architectes Moreno and M3 Architectes

Stakeholders

BESIX RED (LUX TP, WUST), SOLUDEDEC

Contract Value

€102 million

Period

2014 (purchase of the land)
to 2020 (delivery of the 3rd phase)



SAFI WATER REUSE STATION
Ajman, United Arab Emirates

Concessions & Assets



BESIX Concessions & Assets devises tailor-made solutions covering the complete infrastructure life-cycle. By bringing appropriate expertise together and working with our clients, we devise innovative infrastructure partnerships to better serve the local communities. Public-Private-Partnerships or Private-Private-Partnerships under DBFM/BOOT,... contract: from the early stage we align with our clients' vision and customize schemes technically and commercially to meet their expectations. With successful references in water, wastewater, public transportation and many other sectors, we believe that partnerships are the key to deliver quality infrastructures benefiting the community whilst using each partner's strength.

With our broad experience in European and Middle-Eastern Public Private Partnerships, we recognize that each project, customer and community has a unique set of challenges and we pride ourselves on being able to form collaborative partnerships to deliver on their aspirations.

CONCESSIONS & ASSETS

BUSINESS REVIEW

Whilst the Netherlands continued to contribute the bulk of activities in Europe, a new string of PPP tenders was launched in Belgium in 2017 following a few years of uncertainty in respect of the legal and budgetary framework for those projects at federal and regional level. New projects in the Netherlands are still very much about civil works (motorways and tunnels), but Belgium sees a more diverse portfolio also comprising bridges, prisons, large tram and bus stations,... In the Middle East, infrastructure and buildings PPPs have not yet materialized, and the model is almost exclusively used for power, desalination, water treatment and waste projects.



A6 ALMERE
Almere, The Netherlands

HAMRIYAH POWER AND DESALINATION STATION
Hamriyah, Sharjah, United Arab Emirates



Positioning

Thanks to an impressive streak of wins over 2014 – 2016, BESIX Concessions & Assets has become a much sought after partner for the large infrastructure PPP tenders in the Netherlands, which allows BESIX to be part of the consortiums that have good odds to win the projects. Given the more diverse type of PPP tenders in Belgium, where the projects are also smaller, positioning is more on a case by case basis without any preferred partners. For the Middle East, 2017 was a pivotal year during which Concessions & Assets broadened its scope of activity by also participating in tenders for waste projects and desalination, besides the municipal water treatment projects that still represent the core operational activities today.

Milestones 2017 & Q1 2018

The first months of 2018 saw material project awards, rewarding a very intense period of tendering efforts throughout 2017: the Leopold II tunnel in Brussels, the A16 motorway in Rotterdam, and the largest ever waste to energy project in Dubai.



LEOPOLD II TUNNEL
Brussels, Belgium



PRINCESS BEATRIX LOCK
Nieuwegein, The Netherlands

Outlook 2018 (and beyond)

As the pipeline of very large infrastructure PPPs in the Netherlands is now nearing its end, PPP tenders in which BESIX participates in 2018 will again be more balanced between Belgium and the Netherlands. In the Middle East, the teams will aim at portfolio diversification into desalination, waste projects and renewable energy, together with a further consolidation of the existing highly performing wastewater treatment assets. C&A will also participate as a developer in PPP tenders that might not bring about any work for the Contracting division, thus also entering revenue models based on O&M revenues, development fees and equity returns only.

Key figures 2017

6
countries

2.3 million
people served daily by
the managed assets

Value of
managed assets:

€838
million

Net
result:

€24.7
million



SAFI Water Reuse Station United Arab Emirates

Interview

REVAMP IMPROVES PERCEPTION OF WATER REUSE

10,000 m³/day

Selling capacity

99%

plant availability

700 tankers/day

managed during peak season



Left:
PETER LEMBRECHTS
Responsible for BESIX Concessions
& Assets in the Middle East

Right:
GURVAN DERSEL
General Manager of SAFI

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“The driving goal has been to translate a sustainability vision into a commercially viable business. It has made huge improvements in operations and brought the day-to-day management of the site to what it is today.”



BESIX Concessions & Assets is meeting a growing demand for high-quality recycled water for industrial and commercial use with the SAFI water station in Ajman. Truck tanker drivers bringing recycled water to clients can now refill quickly and efficiently at an improved and rebranded facility. With its supply capacity doubled to 10,000 m³, the station can fill up to 700 truck tankers per day.

Water is in very short supply in the UAE. The country faces scarcity of groundwater reserves, the high cost of producing drinking water, and limited collection and treatment of wastewater.

BESIX Concessions & Assets has been supporting wastewater management in the densely populated and rapidly growing Emirate of Ajman since 2003.

Ajman now boasts a modern and environmentally sustainable BESIX-built sewage system. Wastewater treatment effluent from the Ajman sewage system supplies the SAFI water treatment plant, to produce high-quality, non-drinking water for Ajman industrial and commercial clients. Customers include a district cooling plant, hydro testing facilities and readymix companies.

To address the growing demand and improve perception of recycled water, the SAFI plant has recently been rebranded and fully refurbished to double its previous capacity.

A sustainable choice for Ajman

SAFI is the first company in the region that brings the concept of commercializing recycled water fully into practice. It takes the treatment effluent and

polishes it through energy-efficient ultra-filtration and reverse osmosis processes.

From a sustainability perspective, treated sewage water that was previously thrown back into the sea is now reused on a large scale. SAFI water is a low-cost and sustainable alternative to ground water. And it's an environmentally friendly substitute for the water from energy-intensive and expensive seawater desalination plants.

Translating a sustainability vision into a viable business

The SAFI wastewater treatment plant opened in 2011. It is a public-private partnership between the Ajman Municipality, BESIX and Veolia. BESIX is the main shareholder, responsible for daily management, finances and ensuring smooth and continuous operations.

“Over the past years, BESIX has invested a lot of energy to develop the plant,” says **SAFI General Manager Gurvan Dersel**. “The main goal has been to translate a sustainability vision into a commercially viable business. It has made huge improvements in operations and brought the day-to-day management of the site to what it is today.”

The Ajman Municipality's main contributions are indirect, making land available for facilities and providing treatment effluent water from Ajman Sewage. It also passes legislation to promote water reuse and acts as a public authority ensuring proper enforcement against any illegal water activities.

Challenging preconceptions about reused water

SAFI has established itself as the main provider of industrial recycled water through tankers for Ajman. And it helps position Ajman as a leader in environmental initiatives in the UAE. But despite recognition of the sustainability benefits of water recycling and reuse, acceptance of reused water in Ajman is not a given.

“Local authorities and experts recognize the increasing scarcity of water and the opportunity that treated sewage water presents,” explains **Peter Lembrechts, responsible for BESIX Concessions & Assets activities in the Middle East**. “Waste and wastewater are no longer seen as a ‘problem to deal with’ but as a valuable resource and opportunity. Stakeholders also recognize that today's technology can give an absolute quality assurance. In the early days, a lot of perseverance was required for people to accept our water as fit for human contact. But in the end, our quality assurance, guaranteed supply and attractive pricing convinced the market. SAFI is now the supplier of choice in the region.”

Delivering a great customer experience

Improving awareness and perception of recycled water was one of the goals for the SAFI revamp. The newly-refurbished, modern and streamlined water filling station was inaugurated in November 2017. Although its customers are drivers of truck tankers, it is designed to reproduce the easy and familiar customer experience of filling your car tank at a gas station. Open 24/7, it offers: 24 filling bays with roofs for sun shade; an organized queueing system; a distinctive and easily-recognizable brand identity displayed in illuminated signboards and a public-address system to broadcast safety and other messages. Other facilities include prepaid cards, a payment kiosk, leisure area and prayer room. An app enables drivers to assess waiting times and to access the latest water quality results and news.

The station offers important business benefits too. Not only are waiting times reduced, even at peak times, by the addition of more filling bays, but filling speed has improved 30% by increasing pipe diameters. This means trucks are immobilized for shorter periods, improving their cost-efficiency.

Future focus: piped distribution and a range of water qualities

Future development will focus on the distribution model. Today, the revamped station is helping to meet growing demand and improving the customer experience. However, 100% reliance on distribution via truck tankers limits growth opportunities. SAFI is working hard on transforming its distribution model from tankers to piped solutions, to reduce the cost and carbon footprint of distribution.

“We will continue to improve our offer of sustainable water solutions in the region,” says **Gurvan**. “There are opportunities to provide solutions covering the complete infrastructure lifecycle. We also aim to diversify our offer by implementing different ‘qualities’ of water, determined by their final use.”

BESIX Concessions & Assets is well placed to meet the growing demand in the region for innovative and sustainable water solutions. “Our local presence in the communities and excellent working relations with our partners ensure that we receive the required support and that we can realize efficiencies,” **Peter** notes. “Add to that BESIX Group’s entrepreneurial spirit and flexibility and we have an attractive offer for clients and stakeholders.”



Our people

GURVAN DERSELE

FRENCH // AGE 34

Gurvan started at Six Construct in 2010 where he worked for two years. After leaving the company to get an MBA in entrepreneurship, Gurvan joined the C&A team in 2015. Today he is responsible for developing and managing ventures, tackling all fields from technical and legal to finance and management. Gurvan manages the SAFI plant since March 2016.



Our people

PETER LEMBRECHTS

BELGIAN // AGE 38

Peter joined BESIX in 2010 as General Manager of the Ajman wastewater treatment plant (UAE). He then developed SAFI as a spin-off of this concession. Peter left Ajman in 2014 to head the BESIX Concessions & Assets Middle East business unit. He is a vivid supporter of the reuse and upscaling ideas as part of a wider waste management approach.

Project details

SAFI WATER REUSE STATION

AJMAN, UNITED ARAB EMIRATES

Activity & area of expertise

Concessions & Assets / Environment

Client

SAFI

Recognized as National Winner at the MEED Project Awards 2018, winning 'Water Project of the Year'

Stakeholders

PPP between the Municipality of Ajman, BESIX Concessions & Assets and Veolia

Project value

€7 million



Princess Beatrix Lock The Netherlands

270 m

long

25 m

wide

± 50,000

vessels/year

Interview

**DUTCH WATERWAYS
PROJECT
SHOWCASES
BESIX END-TO-END
CAPABILITIES**

PAUL ZANEN

Asset Manager at BESIX Concessions & Assets and Project Director for the lock maintenance company

"This project has given us the opportunity to showcase what BESIX Concessions & Assets and BESIX as a whole are capable of, from financing and early conceptual design to construction and long-term maintenance."



The Princess Beatrix Lock is undergoing important renovations to handle increasing ship traffic between the ports of Rotterdam and Amsterdam. Maintenance of the lock and efficient, uninterrupted service are key during the works and for the next 30 years.

The Princess Beatrix Lock at Nieuwegein (near Utrecht, The Netherlands) lies on the Lek Canal, the main direct link between the ports of Rotterdam and Amsterdam. Built in 1938, today it is one of the busiest locks in the country with around 140 vessels passing through it every day. It is also the largest monumental inland waterway lock in the country. With more and more ships, and ships of increasing size, using the Lek Canal, the Dutch Ministry of Infrastructure and Water Management, Rijkswaterstaat, commissioned works to renovate the lock and improve traffic flow.

Rijkswaterstaat needed to improve the lock's ship traffic capacity to prevent the Princess Beatrix Lock from becoming a bottleneck. The contract also called for seamless integration of the lock within the landscape, minimal interruption to current traffic, as well as continuing maintenance of the lock for the next 30 years.

From financing to long-term maintenance

The contract was awarded to a Public-Private Partnership (PPP), Sas van Vreeswijk.

BESIX Concessions & Assets has been involved since the early tender stage, both from a finance and maintenance perspective. As part of the Sas van Vreeswijk consortium, BESIX is also contributing to design and construction. BESIX will secure the maintenance of the entire lock complex for the next 27 years after completion of the works.

Designed for uninterrupted service

Together with its partners, BESIX developed a design that increases the lock's traffic capacity, exceeding the initial target set by Rijkswaterstaat. It entails widening the canal to include a third, longer lock chamber and creating additional berths for ships. The new lock is 270 m long, 25 m wide and will be able to handle ships with a draft up to 4 m.

Paul Zanen, Asset Manager at BESIX Concessions & Assets and Project Director for the lock maintenance company, outlines some of the design characteristics. "In classic inland waterway lock design," he explains, "just two lock gates are normally included, one at each end of the lock, plus a spare gate. However, since about 50,000 vessels pass through the Princess Beatrix

Lock every year, the consortium opted for a 'Lockage XL' design with four rolling doors – two at each end – and an additional, extra-long lock chamber."

Having double doors ensures that if either of the lock gates fails, the other is still available. Moreover, the wider outer gates and extra space in the new chamber mean that vessels can pass through quickly, even at busy times.

Learning from the old to build the new

It's a daily challenge to maintain the two existing locks, and other infrastructure, while the third lock is being built and during the renovations. But it is also a learning process that contributes to the design. "The existing locks are 80 years old and have large original components," **Paul** explains. "We needed to quickly understand the quirks and workings of these old components so maintenance would be adequately carried out and the locks perform as required."

At the same time, design and construction of the third lock continues. Collaboration between the construction team and the maintenance team, with both teams reviewing the design and considering tradeoffs, helps ensure that once completed the new lock will perform and can be maintained seamlessly.

“On the day we started with the works,” **Paul** continues, “a ship struck one of the lock doors of the existing locks. The incident was well handled by our maintenance mechanics, proving that our preparation was done well. But perhaps more importantly, it confirmed how essential it is to design a solution that will allow uninterrupted traffic even under unforeseen circumstances.”

Business as usual with minimal disruption

To minimize the disruption to shipping during the works, Sas van Vreeswijk is building the new lock chamber first. The existing chambers will only be renovated after the new one is fully operational. They will be worked on one at a time, so that there will always be two functioning chambers open for ships to pass through.

“Road users have not been forgotten,” says **Paul**. “During the morning and evening rush hours, none of our trucks will be allowed to travel to and from the site. To guarantee the safety of vulnerable road users, parallel routes have been set up around the site.”

Once works are completed, the three locks will be handed over to the maintenance team, which is currently already preparing for this handover and the start of the 27-year maintenance period.

Preserving the landscape, heritage and wildlife

The Princess Beatrix Lock is located on the New Holland Waterline, a historic line of defense that has been nominated for UNESCO World Heritage site status. The lock is a monument dominating the landscape, providing a view that cannot be altered. Adding another lift tower would thus have been unacceptable. Using rolling doors for the new lock instead of lift gates helps preserve the view and the historic character of the lock.

The lock is also in a nature reserve. Sas van Vreeswijk consulted with ecologists in the design and phasing of the project to protect the reserve’s fauna and flora. For example, trees that had to be dug up were replanted elsewhere in the surrounding area. Fish, frogs, bats and other animals were captured and released in nearby safe locations.

Unlocking future opportunities

The Princess Beatrix Lock project reaffirms BESIX’s expertise in complex projects and its ability to come up with innovative solutions in infrastructure and marine works.

“This project has given us the opportunity to showcase what BESIX Concessions & Assets and BESIX as a whole are capable of, from financing and early conceptual design to construction and long-term maintenance,” **Paul** says proudly. “The 27-year maintenance period is a perfect opportunity to show Rijkswaterstaat and other clients that BESIX can fulfil the role of asset management partner and handle all phases in the infrastructure life cycle,” he concludes.



Our people

PAUL ZANEN

DUTCH // 35 YEARS OLD

Paul started at BESIX in 2015 as Asset Manager. Since then he has worked on various maintenance contracts and PPPs in the Netherlands and Belgium, such as the R4 Ghent, the Leidsche Rijn Tunnel, the Limmel lock and the A6 Almere highway. Today he is the Project Director for the maintenance company of the Princess Beatrix Lock.

Project details

EXPANSION OF THE LEK CANAL AND CONSTRUCTION OF THE 3RD CHAMBER OF THE BEATRIXSLUIS NIEUWEGEIN, THE NETHERLANDS

Activity & area of expertise

Concessions & Assets / Locks

Client

Rijkswaterstaat

Stakeholders

The Sas van Vreeswijk consortium has formed three entities for the project, with different members:

- SPC (formally the contractor for the client, investor in the project): BESIX, Jan de Nul, Heijmans, RebelValley and TDP
- EPC (design and build): BESIX, Jan de Nul and Heijmans
- MTC (maintenance): BESIX, Jan de Nul, Heijmans, Martens & van Oord and Agidens

Contract value

€50 million (maintenance only)

Period

2016-2019: construction and renovation
2016-2046: maintenance



BESIX Park

BESIX Park joined BESIX Group in 2010. Since then, the number of off-street, on-street and blue zone parking spaces in its management portfolio has tripled. BESIX Park kept growing in 2017, winning 10 new contracts and renewing 3 existing contracts in Belgium. At the end of the year, the company managed more than 45,000 parking spaces in Belgium, and approximately 10,000 in the Netherlands.

The most important results were achieved in off-street parking, with a 50% growth in Belgium, with parking spaces under management growing from 4,200 to more than 6,700. This is in sharp contrast to 2016, when growth was concentrated in the Netherlands, and only the blue-zone activity grew in Belgium. BESIX continues to be a front-runner in off-street parking technology: most of its car parks are equipped with license plate recognition systems to ensure maximum comfort and safety for its customers, and two control rooms (in Brussels and Antwerp, Belgium) end users can directly connect with from the terminals in all off-street parkings.



BESIX Park had a very high tender success ratio in 2017, winning 68% of the (high number of) tenders in which it participated. The company's many long-term contracts with municipalities, together with parkings in ownership, resulted in attractive and stable long-term generation of turnover and cash flow. BESIX Park continues to invest in developing on- and off-street concessions and management contracts, increasingly so in the southern part of Belgium. It also investigates how to broaden its activities and increase its visibility on the internet, introducing a booking software for some of its car parks, and being the car parks to which corporate, hospitality, leisure and restaurant websites direct their clients.

Through its affiliate IP-Mobile, BESIX Park acts as a distributor and reseller of parking management systems and equipment, and also offers installation and maintenance services for BESIX Park as well as third-party customers. The latter now contribute to more than 75% of IP-Mobile's gross margin. The Belgian Parking Register was also developed by IP-Mobile: it is the first platform to aggregate all mobile parking providers on the Belgian market. A commission is charged by IP-Mobile on the mobile parking payments that it manages.



Investments in the hotel industry

In Brussels (Belgium), BESIX Concessions & Assets has a 50% share in the Courtyard by Marriott Hotel, whose 191 rooms, reception area and restaurant were completely renovated by Sud Construct (subsidiary of Jacques Delens). The hotel increased its occupancy rate by more than 5% when compared to 2016, and its revenues increased by more than 10%.

In Poland, we have a 29% stake in the Sheraton Hotel in Poznań. In 2017, BESIX continued the construction works for the Design & Build contract of the Gotthard Hotel & Residences development (180 hotel rooms and 109 residences) in Andermatt, Switzerland, which is set to open its doors on schedule. BESIX has a 49% stake in the project. Finally, the summer of 2018 will see the opening of a new 5-star hotel, under the Chedi brand in Luštica Bay (Montenegro), with 50 hotel rooms and 60 hotel serviced condominiums, for which BESIX is executing the construction works and will be a 50% owner.

Cofely-BESIX Facility Management

Cofely BESIX Facilities Management was formed in 2008 through a joint venture between BESIX and Cofely Services (ENGIE group) to deliver facilities management through direct service provided to customers. The company provides a wide range of services including mechanical, electrical, fabric maintenance and energy management, as well as cleaning and various technical services. It employs around 2,000 people, mainly in the UAE but also in Qatar.

In 2017, the facilities management sector continued to grow, with new developments and the outsourcing model reflecting that of an even more maturing market. Tender processes are more structured and client documentation more sophisticated.





FINANCE



CONSOLIDATED BALANCE SHEET

(in EUR '000)	31 Dec. 2017	31 Dec. 2016
ASSETS		
NON-CURRENT ASSETS	496,653	416,085
Intangible assets	35,569	12,306
Goodwill	12,715	0
Tangible assets	237,032	197,410
Investments in associates	100,006	100,840
Receivables	94,130	96,731
Other assets	14,058	7,723
Deferred income tax assets	3,143	1,075
CURRENT ASSETS	1,881,535	1,990,964
Inventories	27,061	23,240
Construction contracts in progress	77,698	99,740
Real estate held for sale	217,330	207,201
Trade receivables	907,621	903,504
Other receivables and other assets	275,086	307,288
Cash and cash equivalents	360,535	449,991
TOTAL ASSETS	2,361,984	2,407,049
EQUITY AND LIABILITIES		
EQUITY		
SHAREHOLDERS EQUITY	660,395	653,023
Capital	32,000	32,000
Retained earnings	635,225	584,102
Hedge reserves	-13,938	-20,056
Translation differences	7,108	56,977
MINORITY INTEREST	2,970	2,540
TOTAL EQUITY	663,365	655,563
LIABILITIES		
NON-CURRENT LIABILITIES	387,156	350,818
Borrowings	244,192	192,645
Provisions	75,258	80,825
Other liabilities	45,692	57,347
Deferred income tax liabilities	22,014	20,001
CURRENT LIABILITIES	1,311,463	1,400,668
Borrowings and bank overdraft	82,224	84,944
Trade payables	721,342	712,328
Advances received on contracts	162,647	220,395
Billing in excess on construction contracts	151,050	112,555
Current income taxes payable	20,182	15,924
Provisions	24,877	31,346
Other liabilities	149,141	223,176
TOTAL EQUITY AND LIABILITIES	2,361,984	2,407,049

CONSOLIDATED INCOME STATEMENT

(in EUR '000)	2017	2016
CONSOLIDATED INCOME STATEMENT		
SALES	2,337,044	2,359,132
COST OF SALES	-2,084,547	-2,096,880
of which depreciation	-38,617	-41,864
of which provisions	7,890	11,139
GROSS PROFIT	252,497	262,251
GENERAL & ADMINISTRATIVE EXPENSES	-177,753	-148,257
of which depreciation	-4,894	-8,447
of which provisions	-3,746	1,255
OTHER INCOME / EXPENSES	4,201	3,793
OPERATING PROFIT	78,945	117,787
Financial income	25,697	6,546
Financial charges	-16,092	-10,720
Results from associates	26,955	21,337
PROFIT BEFORE INCOME TAXES	115,505	134,950
INCOME TAX EXPENSE	-12,466	-13,609
of which current taxes	-17,921	-16,743
of which deferred taxes	5,455	3,134
CONSOLIDATED PROFIT	103,039	121,341
Minority interest	-481	-587
GROUP CONSOLIDATED PROFIT	102,558	120,754
EARNINGS PER SHARE (in EUR)	36.21	42.63
CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME		
PROFIT FOR THE YEAR	102,558	120,754
OTHER COMPREHENSIVE INCOME		
Cash flow hedges	4,019	1,765
Actuarial impact pension plans	-1,433	-2,491
Currency translation differences	-47,769	14,713
Other comprehensive income for the year, net of tax	-45,183	13,987
ATTRIBUTABLE TO		
Owners of the parent	57,372	134,731
Minority interest	0	0
TOTAL COMPREHENSIVE INCOME FOR THE YEAR	57,372	134,731

CONSOLIDATED CASH FLOW STATEMENT

(in EUR '000)	2017	2016
Operating result	78,945	117,787
Adjustments for:		
Depreciation	43,511	50,310
Result on disposal of (in)tangible assets	-4,411	-5,132
Result on disposal of other long term assets	0	0
Result on disposal of investment in associates	0	-1,666
Provisions	-4,144	-12,393
Allowances	614	3,005
Other	0	0
OPERATING CASH FLOW BEFORE CHANGES IN WORKING CAPITAL	114,515	151,911
Income taxes paid (net)	-14,517	-8,828
Changes in working capital	-40,718	47,515
CASH FLOW FROM OPERATING ACTIVITIES	59,280	190,598
TRANSLATION DIFFERENCE CASH AND CASH EQUIVALENTS	-29,606	-9,925
Purchase of intangible assets	-3,416	-4,571
Purchase of tangible assets	-55,588	-43,426
Purchase of other long term assets	-2,416	0
Acquisition and capital increase / (decrease) investment in associates	-5,417	-2,319
Proceeds from sale of intangible assets	0	0
Proceeds from sale of tangible assets	8,513	9,830
Proceeds from sale of other long term assets	28	12
Proceeds from sale of investment in associates	5	2,065
Dividends received from investment in associates	27,189	15,814
Change in consolidation scope	-58,282	40
NET CASH FROM INVESTING ACTIVITIES	-89,384	-22,555
CASH FLOW FROM FINANCING ACTIVITIES		
Net difference borrowings	38,405	43,351
Net difference long term receivables	-16,128	-14,868
Interest paid (net)	-1,963	-2,492
Change in consolidation methods	180	0
Dividends paid to Group shareholders	-50,000	0
Dividends paid to minority interests	-240	-320
NET CASH FROM FINANCING ACTIVITIES	-29,746	25,671
(DECREASE)/INCREASE IN CASH & CASH EQUIVALENTS	-89,456	183,789
MOVEMENTS IN CASH & CASH EQUIVALENTS		
Cash at beginning of the year	449,991	266,202
(Decrease)/Increase	-89,456	183,789
Cash at the end of the year	360,535	449,991

STATUTORY AUDITOR'S REPORT

REPORT TO THE GENERAL MEETING OF BESIX GROUP NV
FOR THE YEAR ENDED 31 DECEMBER 2017

In the context of the statutory audit of the consolidated financial statements of the company BESIX Group NV (the Company) and its subsidiaries (together referred to as 'the Group'), we hereby present our statutory auditor's report. It includes our report on the audit of the consolidated financial statements as well as our report on the other legal and regulatory requirements. These reports form part of an integrated whole and are indivisible.

We have been appointed as statutory auditor by the general meeting of 12 June 2015, following the proposal formulated by the board of directors. Our statutory auditor's mandate expires on the date of the General Meeting deliberating on the consolidated financial statements closed on 31 December 2017. We have been in place since at least 12 years.

Report on the audit of the consolidated financial statements

Unqualified opinion

We have performed the statutory audit of the Group's consolidated financial statements, which comprise the consolidated balance sheet as at 31 December 2017, the consolidated income statement, consolidated statement of comprehensive income, the consolidated statement of changes in equity and the consolidated statement of cash flows for the year then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies and other explanatory information, and which is characterized by a consolidated balance sheet total of KEUR 2.378.188 and for which consolidated income statement and other comprehensive income shows a profit for the year of KEUR 103.039.

In our opinion, the consolidated financial statements give a true and fair view of the Group's net equity and financial position as at 31 December 2017, as well as of its consolidated financial performance and its consolidated cash flows for the year then ended, in accordance with International Financial Reporting Standards (IFRS) as adopted by the European Union and with the legal and regulatory requirements applicable in Belgium.

Basis for unqualified opinion

We conducted our audit in accordance with International Standards on Auditing (ISA) as applicable in Belgium. Our responsibilities under those standards are further described in the 'Statutory auditor's responsibilities for the audit of the consolidated financial statements' section in this report. We have complied with all the ethical require-

ments that are relevant to the audit of consolidated financial statements in Belgium, including those concerning independence.

We have obtained from the Board of Directors and company officials the explanations and information necessary for performing our audit.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of the Board of Directors for the consolidated financial statements

The Board of Directors is responsible for the preparation of consolidated financial statements that give a true and fair view in accordance with the International Financial Reporting Standards (IFRS) as adopted by the European Union and with the legal and regulatory provisions applicable in Belgium, and for such internal control as the board of directors determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatements, whether due to fraud or error.

In preparing the consolidated financial statements, the board of directors is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the board of directors either intends to liquidate the Group or to cease operations, or has no realistic alternative but to do so.

Statutory auditor's responsibilities for the audit of the consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue a statutory auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but it is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with ISAs, we exercise professional judgment and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control;
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors;
- Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our statutory auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our statutory auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern;
- Evaluate the overall presentation, structure and content of the consolidated financial statements and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation;
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the management, the supervision and the performance of the Group audit. We assume full responsibility for the auditor's opinion.

We communicate with the Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control identified during the audit.

Report on other legal and regulatory requirements

Responsibilities of the Board of Directors

The board of directors is responsible for the preparation and the contents of the management report on the consolidated financial statements.

Responsibilities of the statutory auditor

In the context of our mandate and in accordance with the Belgian standard (revised in 2018) that is supplementary to the International Standards on Auditing (ISA) as applicable in Belgium, it is our responsibility to verify, in all material aspects, the management report on the consolidated financial statements, as well as to report on this element.

Aspects relating to the management report on the consolidated financial statements

In our opinion, after having performed specific procedures in relation to the management report, the management report is consistent with the consolidated financial statements for the same financial year, and it is prepared in accordance with article 119 of the Company Code.

In the context of our audit of the consolidated financial statements, we are also responsible for considering, in particular based on the knowledge we have obtained during the audit, whether the management report on the consolidated financial statements contains any material misstatements, i.e. any information which is inadequately disclosed or otherwise misleading. Based on the procedures we have performed, there are no material misstatements we have to report to you.

We do not express any form of assurance whatsoever on the management report on the consolidated financial statements.

Statement concerning independence

- Our audit firm and our network did not provide services which are incompatible with the statutory audit of consolidated financial statements, and we remained independent of the Group throughout the course of our mandate.
- The fees related to additional services which are compatible with the statutory audit as referred to in article 134 of the Company Code were duly itemised and valued in the notes to the consolidated financial statements.

Antwerp, 4 May 2018

Mazars Bedrijfsrevisoren – Reviseurs d'Entreprises CVBA
Statutory auditor
Represented by

Anton Nuttens
Registered auditor



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