

2 0 1 5

A C T I V I T Y

R E P O R T



SOLETANCHE FREYSSINET



SOLETANCHE BACHY



menARD



TERRE ARMÉE



FREYSSINET



NUVA



THIS ACTIVITY REPORT  
CONTAINS  
A WIDE RANGE  
OF VIDEOS.  
SCAN THE QR CODES  
WITH YOUR SMARTPHONE  
TO WATCH THEM.  
PLEASE CHECK  
THAT YOUR APP IS RECENT  
AND UP TO DATE.

INTERVIEW WITH  
MANUEL PELTIER

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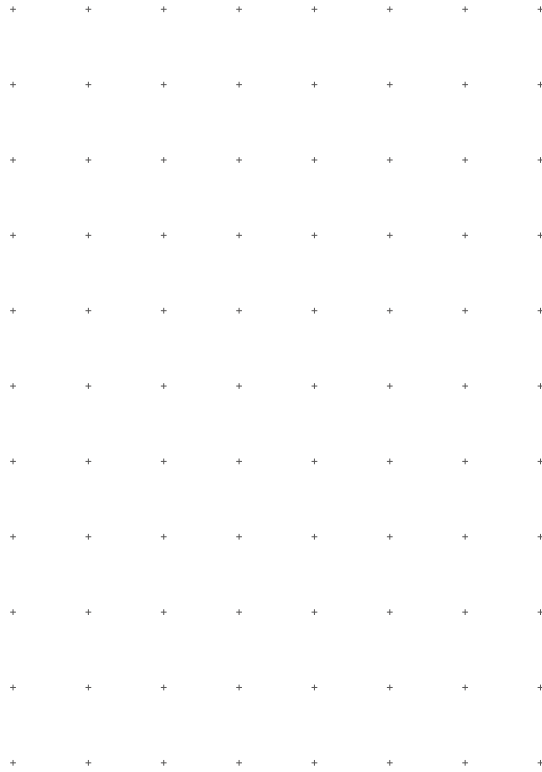
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# THE MAJOR CHALLENGES THAT LIE AHEAD

Interview with **Manuel Peltier**,  
Chief Executive Officer, Soletanche Freyssinet



## How is Soletanche Freyssinet doing today?

*2015 was a very good year for Soletanche Freyssinet. The Group recorded a strong increase in volume of nearly 20% and revenue came in at €3.2 billion. This is an outstanding development, reflecting the strong growth of our five entities operating in soil, structural and nuclear works.*

*Our extensive and well-balanced international coverage is an advantage. Latin America, North America, the Middle East and Asia drove our expansion in 2015. To take advantage of our buoyant markets, we will continue to create new subsidiaries and carry out targeted acquisitions.*

*We can also take pride in our exceptional order intake, which came to nearly €3.3 billion.*

*The order backlog has increased, and so has the proportion of contracts with longer duration. We won a number of outstanding projects: the Tideway sewer tunnel in London, the Lima metro, the Webb Dock terminal in the Port of Melbourne, the I-4 Ultimate project in Florida and the Epure project in France, to name just a few. These successful contract awards reflect the commercial, technical and operational excellence of our teams and their commitment to delivering added value and successfully carrying out the projects entrusted to them.*

*“We are operating at the heart of the transformations taking place in today’s world.”*

## What contribution can Soletanche Freyssinet make in a world undergoing profound change?

*By working on infrastructure projects in such fields as transport, water and energy, we are operating at the heart of the transformations taking place in today’s world. We will continue to serve as specialist engineers, taking a disciplined and imaginative approach to meeting the expectations of our clients and their users.*

*The future holds many challenges - urban expansion, mobility, transport, energy, the environment and the technology revolution. Soletanche Freyssinet’s various general and civil engineering activities address these issues and deliver concrete solutions.* >



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*As the population density of our urban areas continues to grow, infrastructure such as metro systems, drinking water and sewer networks and even retail, leisure and entertainment facilities are being built underground. To tackle the growing number of underground projects we must push the envelope and aim for "new frontiers". More and more of these projects are being built in soils of poor quality. We offer a broad range of improvement techniques to make such construction possible. One example is the La Mer project in Dubai. We must also dig deeper to build foundations for buildings that are getting higher, such as the Entisar Tower in Dubai. We bring sophisticated equipment, a strong track record and good knowledge of soils to these projects. The world's megacities give us an excellent opportunity to show what we can do and demonstrate our innovations.*

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*In structures, we continue to build on the expertise forged by our pioneers to meet the increasing challenges of work on ever larger engineering structures in extreme environments. Our contribution to the Third Bosphorus Bridge in Turkey, an outsized structure in an earthquake zone, is a good illustration.*

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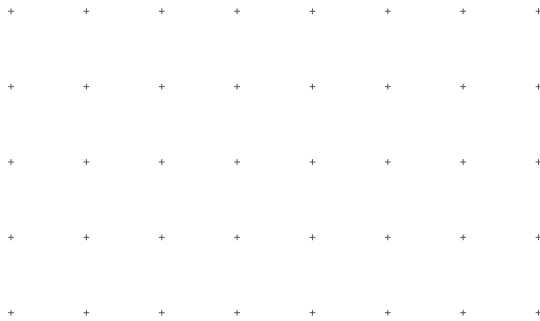
*In our structural repair activity, we deliver solutions that enable contracting authorities to extend the life span of their structures. These high technology content solutions are often very cost effective alternatives to new construction.*

*In the environmental sphere, COP 21, which took place in 2015 and set out very ambitious objectives, reminded us of the huge challenge we face in the effort to reduce greenhouse gas emissions in coming years. We are actively involved in this undertaking in two ways: first, we use construction technologies that save materials compared to conventional solutions; and second, we build structures that help reduce emissions.*

*Low-carbon nuclear energy, for example, has a place in the energy strategies countries will now be drawing up. Soletanche Freyssinet is a dynamic player in nuclear energy, working across the entire life cycle of nuclear power plants from construction to life span extension and decommissioning.*

*We are also involved in a large number of renewable energy projects (wind, hydroelectric, etc.). In addition, we are investing in eco-design to bring down the energy consumption of our sites (Biocalcis® process) and in remediation services.*

*Lastly we are making the most of the technology revolution that is now under way – digitisation. With robots, BIM, monitoring and big data, we are witnessing the emergence of a new approach to structure design and project management. Our sites will be able to take advantage of these many innovations to speed up our processes, track operations and improve safety.*

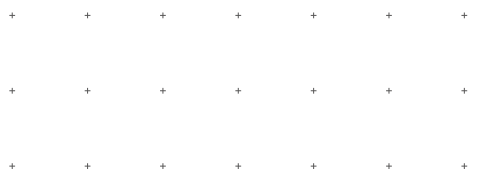


*“We can capitalise on the experience we have accumulated to cope with the unexpected.”*

**In what way does the excellence you strive for make you a standout specialist civil engineering partner?**

*Projects are becoming more and more complex, creating technical challenges that force us to push the envelope and build exceptional structures. We have to build deeper, in more hostile terrain, in very densely packed urban environments. To do this we need new methods and processes and more detailed studies to draw up sophisticated designs, always with a sharp eye out for the safety of our personnel. We can capitalise on the very extensive experience we have accumulated to cope with the unexpected while controlling the risks.*

*In these new projects, we leverage our technical and operational excellence to serve our clients by delivering suitable, lasting solutions and keeping risk firmly under control.*



◆ Entisar Tower, Dubai, United Arab Emirates





*Teams from US Wick Drain,  
Menard Group USA,  
on the Port of Gulfport project  
in the United States*





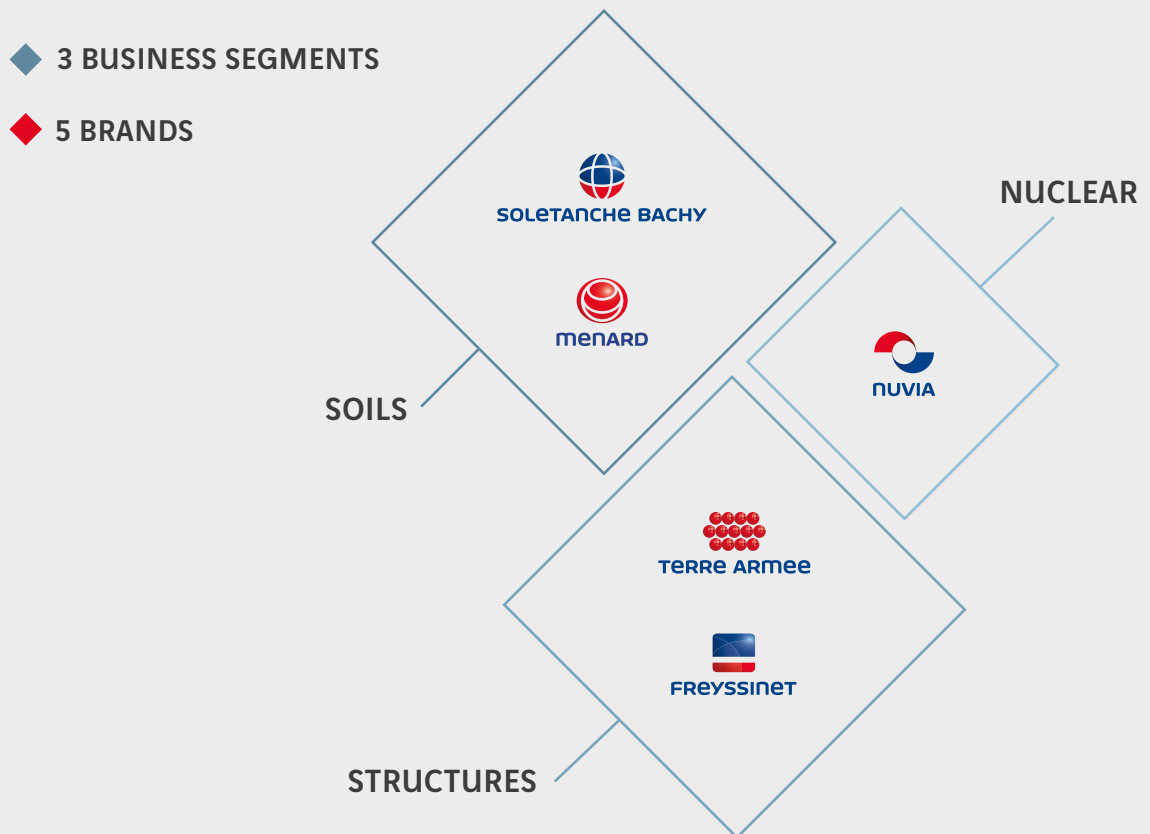
# *1* *GROUP*



# PROFILE

SOLETANCHE FREYSSINET BRINGS TOGETHER SOLETANCHE BACHY, MENARD, TERRE ARMÉE, FREYSSINET AND NUVIA TO DELIVER AN UNPARALLELED ARRAY OF SPECIALIST CIVIL ENGINEERING EXPERTISE. AS A WORLD BENCHMARK IN SOIL, STRUCTURAL AND NUCLEAR ENGINEERING, IT HELPS DESIGN, BUILD, MAINTAIN AND REPAIR A WIDE VARIETY OF STRUCTURES.

Soletanche Freyssinet's more than 22,500 employees, operating in some 100 countries, deliver solutions tailored to the specific features of each project, whatever its complexity and size. The Group builds on the expertise of its teams, its culture of technical excellence and its strong technological creativity to help boost the performance and durability of the structures on which it works.



# GOVERNANCE

SOLETANCHE FREYSSINET COORDINATION COMMITTEE



01.                      02.                      03.                      04.                      05.                      06.                      07.                      08.                      09.

**01. RENAUD LAROCHE**  
Chief Administrative and Financial Officer,  
Soletanche Freyssinet

**02. MARC LACAZEDIEU**  
Chief Executive Officer, Menard

**03. JEAN-PHILIPPE RENARD**  
Executive Vice President, Soletanche Bachy

**JÉRÔME STUBLER**  
Chairman, Soletanche Freyssinet

**04. DIDIER VERROUIL**  
Executive Vice President, Soletanche Freyssinet  
Chief Executive Officer, Soletanche Bachy

**05. MANUEL PELTIER**  
Chief Executive Officer, Soletanche Freyssinet  
Chief Executive Officer, Freyssinet

**06. BRUNO LANCIA**  
Chief Executive Officer, Nuvia

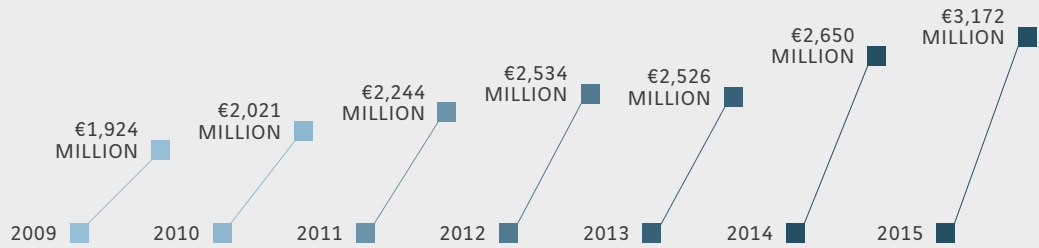
**07. ROGER BLOOMFIELD**  
Chief Executive Officer, Terre Armée

**08. PIERRE-YVES BIGOT**  
Human Resources Director,  
Soletanche Freyssinet

**09. MARINE d'ANTERROCHES**  
Communications Director,  
Soletanche Freyssinet

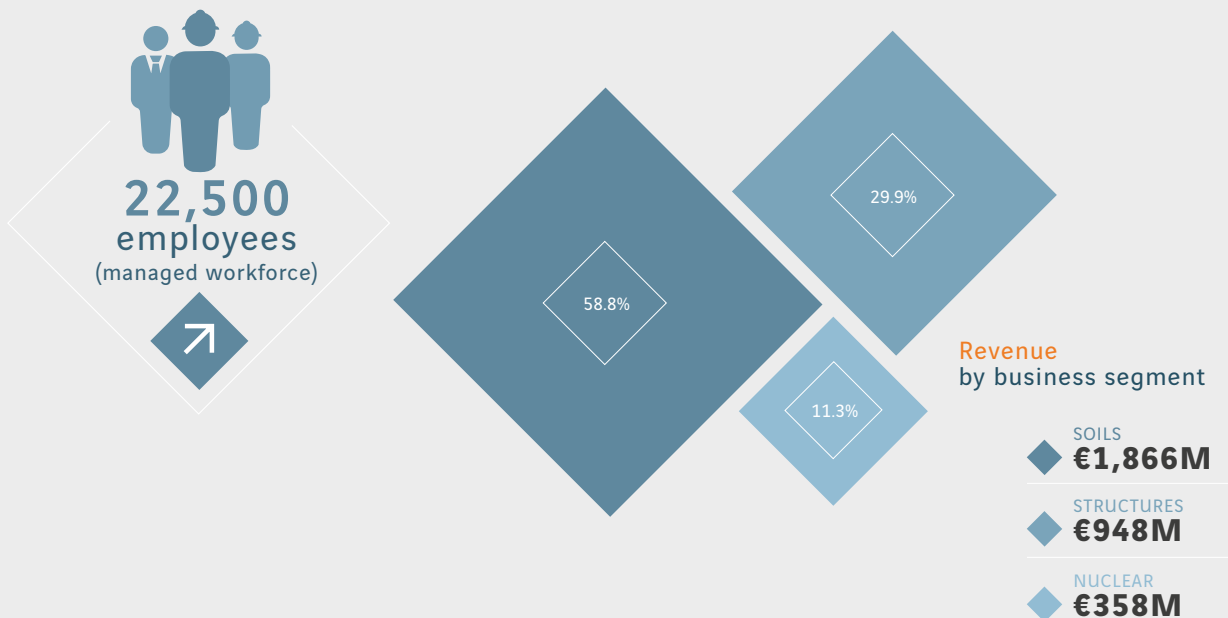
# KEY FIGURES & LOCATIONS

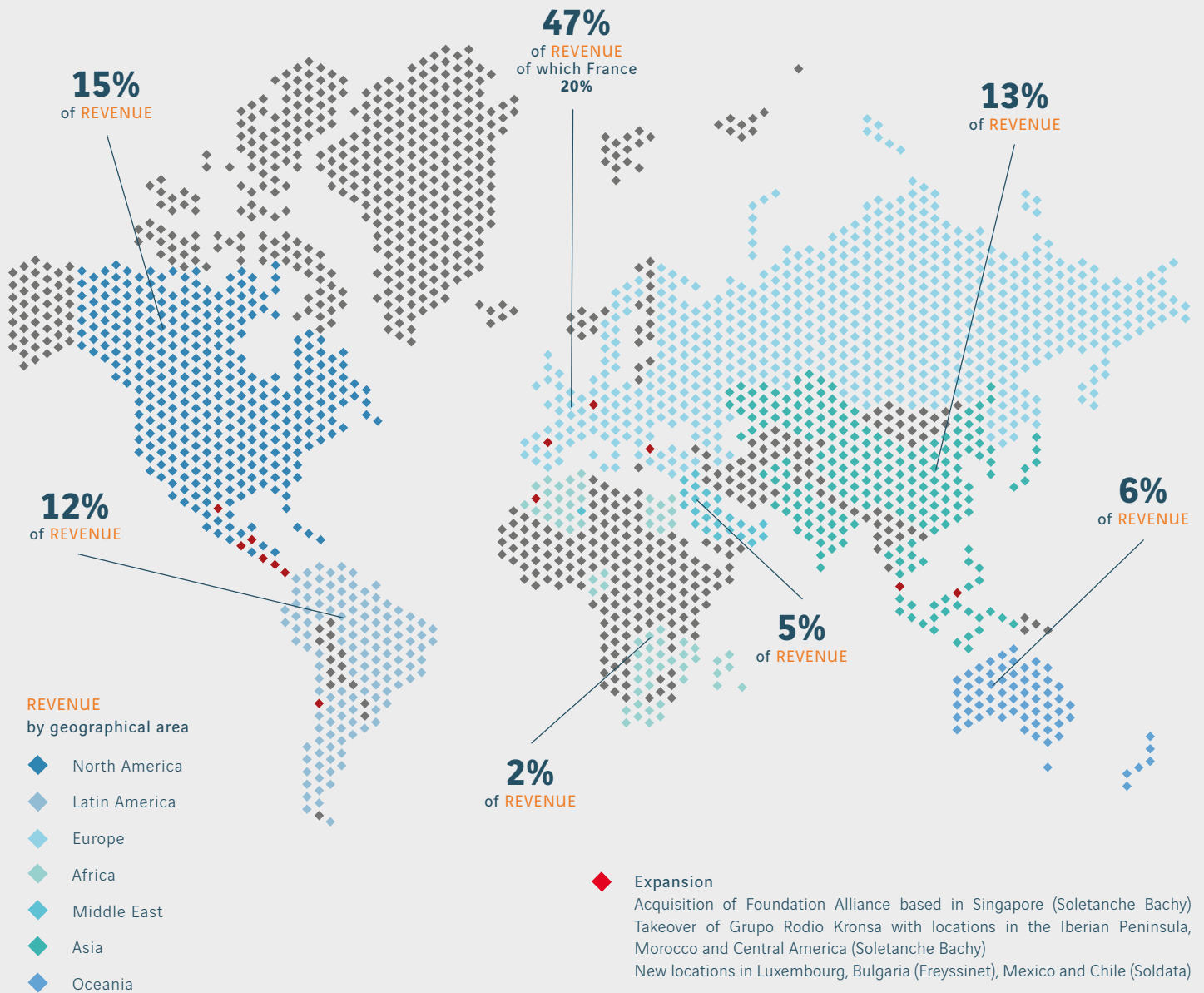
## ↗ €3.2 BILLION REVENUE IN 2015



## ↗ €2.6 BILLION ORDER BACKLOG IN 2015

## ↗ €169 MILLION OPERATING PROFIT FROM ORDINARY ACTIVITIES IN 2015





**80**

countries (locations)

**100**

countries (operations)

## Locations

ALGERIA  
ARGENTINA  
AUSTRALIA  
AZERBAIJAN  
BELGIUM  
BOTSWANA  
BRAZIL  
BULGARIA  
CAMEROON  
CANADA  
CHILE  
CHINA  
COLOMBIA  
COSTA RICA  
CZECH REPUBLIC  
EGYPT

EL SALVADOR  
FRANCE  
FRENCH GUIANA  
GERMANY  
GUADELOUPE  
GUATEMALA  
HONDURAS  
HONG KONG  
HUNGARY  
INDIA  
INDONESIA  
IRELAND  
ITALY  
JAPAN  
JORDAN  
KAZAKHSTAN

KUWAIT  
LEBANON  
LUXEMBOURG  
MACAO  
MALAYSIA  
MARTINIQUE  
MEXICO  
MONACO  
MOROCCO  
MOZAMBIQUE  
NETHERLANDS  
NEW ZEALAND  
NICARAGUA  
OMAN  
PAKISTAN  
PANAMA

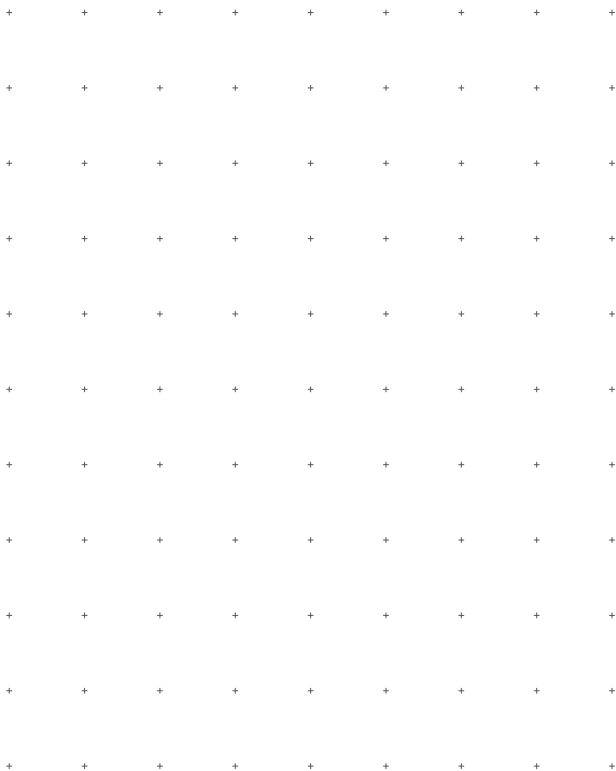
PERU  
PHILIPPINES  
POLAND  
PORTUGAL  
QATAR  
REUNION ISLAND  
ROMANIA  
RUSSIA  
SAUDI ARABIA  
SERBIA  
SINGAPORE  
SLOVAKIA  
SLOVENIA  
SOUTH AFRICA  
SOUTH KOREA  
SPAIN

SWEDEN  
SWITZERLAND  
THAILAND  
TRINIDAD AND TOBAGO  
TURKEY  
UKRAINE  
UNITED ARAB EMIRATES  
UNITED KINGDOM  
UNITED STATES  
URUGUAY  
VENEZUELA  
VIETNAM



# SHARED VISION

SOLETANCHE BACHY, MENARD,  
TERRE ARMÉE, FREYSSINET AND NUVIA  
SHARE THE SAME GOAL: EXCELLENCE.  
THE QUEST FOR EXCELLENCE GUIDES  
DECISION-MAKING AND ACTION IN ALL  
ASPECTS OF EVERY PROJECT: SAFETY,  
HUMAN RESOURCES, ETHICS, SOCIAL  
AND ENVIRONMENTAL RESPONSIBILITY,  
INNOVATION AND RESEARCH &  
DEVELOPMENT.



## VALUES

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## INNOVATION AND R&D

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# VALUES



## 1. SAFETY

In keeping with their watchword "The safe way is the only way", the five entities give top priority to keeping people safe. Every subsidiary and branch strive for Zero Accidents. In 2015 they continued their drive for safety, supported by a three-part safety plan covering health and safety rules, training and objectives and resources.

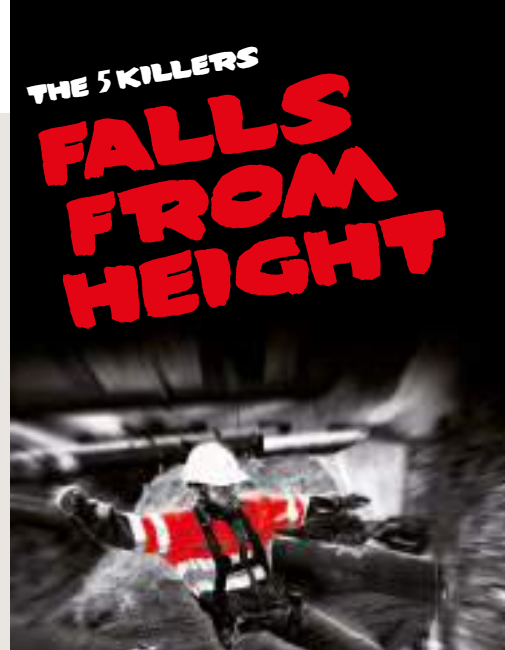
### SEVEN SAFETY HIGHLIGHTS

- February**  
Release of the Soletanche Freyssinet health and safety film "A Fatal Second", which received an award at the Festival Film and Companies and the Deauville Green Awards
- April**  
Soletanche Freyssinet's international safety campaign: poster on ways to mitigate road risk
- June**
  - 1<sup>st</sup> Soletanche Freyssinet seminar for regional Quality Safety Health Environment coordinators
  - Safety stand-down: all Soletanche Freyssinet employees take part in a week-long event focused on safety issues
- October**  
Soletanche Freyssinet international safety campaign: poster on key roles and responsibilities to ensure safe lifting operations
- November**
  - Introduction of eight essential golden rules
  - 2<sup>nd</sup> International Safety Week



## SOLETANCHE BACHY FIVE KILLERS

In 2015, Soletanche Bachy carried out a study to analyse the main hazards it faces. The result led to the identification of “five killers”: falling objects, falls from height, modified equipment, working platform and moving machinery or parts. Training, with supporting posters, was introduced to reduce these causes of accidents. The system was rolled out across all Soletanche Bachy subsidiaries and branches. In Singapore, for example, site supervisors and health and safety managers took action in three areas to address the safety of site personnel: identification of dangerous situations in the field; meetings to provide information and foster discussion; and accident simulation drills.



## MENARD SAFETY OFFICER

In 2015, Menard applied the “Eye on the Site” initiative included in the Soletanche Freyssinet safety plan. It consists in appointing a “Safety Officer” every week on every site. In addition to his job, the Safety Officer oversees safety on the site and brings his and her colleagues together for safety briefings. In the United States, where the STOP Card system was already in use, the Safety Officer system was introduced across the board. The move raised safety awareness and resulted in improved dangerous situation and near miss reporting indicators.

## FREYSSINET, TERRE ARMÉE WORKING AT HEIGHT

Freyssinet and Terre Armée focused on working at height in 2015, as much of their work is performed at height and falls from height account for a significant proportion of serious accidents. They carried out a broad-based awareness campaign and developed and conducted an instructor-based training course for workers and foremen across the various subsidiaries and branches around the world. To foster dissemination, the two-hour training course is designed to be easy to conduct. It is given by a local instructor based on a presentation, a guide and a multiple-choice test to check trainee knowledge. An e-learning course is also planned. It will be made available to all employees in 2016 and used to train supervisors and technicians in both entities.



## 2. HUMAN RESOURCES

The five entities support the development of their people, who represent their main asset, and do their utmost to foster skills development, diversify missions and boost team spirit and quality of life at work.

The internationalisation and training drive continued in 2015. In a reflection of the strong local roots of Soletanche Freyssinet's companies, no single nationality now accounts for more than 20% of the Group's total workforce. At the same time, the Group's ability to project resources to handle major projects remains a focus and the number of expatriate employees and the number of their countries of origin are steadily increasing. Underpinning the drive to internationalise is the increasing development of special relationships with universities in a wide variety of countries, with a particular focus on Asia and Latin America.



**82**  
NATIONALITIES  
REPRESENTED



**38**  
AVERAGE AGE



**77%**  
PERMANENT  
CONTRACTS



**194,000**  
HOURS OF HEALTH  
AND SAFETY TRAINING  
NEARLY 2% OF HOURS WORKED



**17%**  
WOMEN MANAGERS



**110,000**  
HOURS OF TECHNICAL  
TRAINING

## SOLETANCHE BACHY, MENARD ORCHESTRA AND SPECIAL SEMINARS

Soletanche Bachy and Menard organised Orchestra training sessions and seminars for young managers and design engineers. The Orchestra training course, carried out in the United Kingdom in 2014, was offered in Poland and Hong Kong in 2015. The survey course designed for junior works engineers and contract managers is focused on site organisation. It offers a methodology covering each phase of the project, from preparation to closeout, and takes account of local features and regulations and the procedures applying within the two entities. In early October, 180 design engineers came together for a first engineering seminar. The purpose of the meeting was to discuss feedback with respect to works, methods, materials and design. In late October, 120 managers with less than five years seniority from more than 30 countries gathered for an induction seminar, at which both entities were presented and participants were given an opportunity to hold discussions with senior managers about the passion that drives them.

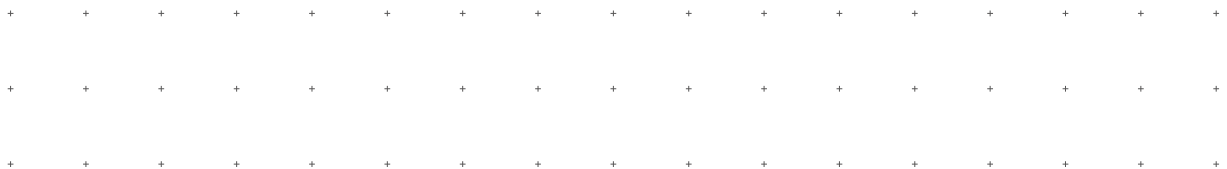


## TERRE ARMÉE, FREYSSINET PM+ AND STEP

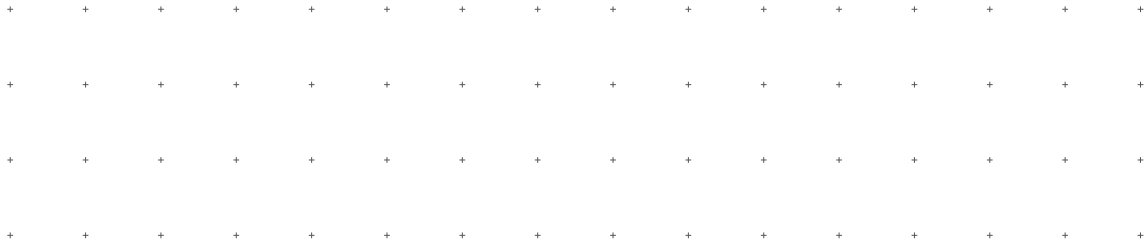
The PM+ programme and the STEP meetings were highlights of the year at Terre Armée and Freyssinet. In 2015, PM+ and STEP were rolled out in Mexico and rollout continued in France, the United Kingdom and Poland. PM+, designed for experienced site managers, focuses on identifying success factors in project management. It helps to build a common international Project Manager culture. Meanwhile, Freyssinet held the first STEP (Share – Together – Enjoy – Prospective) meeting in September. The initiative is an informal get-together at which 10 managers between the ages of 30 and 35 with at least five years seniority meet with the Freyssinet CEO to discuss current events and strategy and give each participant an opportunity to present his or her own ideas about future development. Launched in 2015, the STEP meetings are set to be renewed in the following years.

## NUVIA TRAINING

Employee skills development and engagement are central to Nuvia's overall strategy. In a business environment geared towards excellence, the teams must meet stringent technical and functional requirements and Nuvia provides training and individual development plans to help them do so. The IFCEN centre offers all types of specialised nuclear training. In 2015, nearly 30,000 hours of training were provided for a total of 2,120 employees. Several initiatives were taken in the fields of training, career management and employee engagement and will be continued in 2016. A comprehensive programme covering regulatory and skills development training is being rolled out and training pathways focused on projects, design studies, works, sales and management have been developed.







# 3. ETHICS, SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

Beyond serving their clients, the five entities serve society at large. In line with their corporate responsibility, they make sustainable development an integral part of their business activity and are committed to meeting social and environmental challenges.

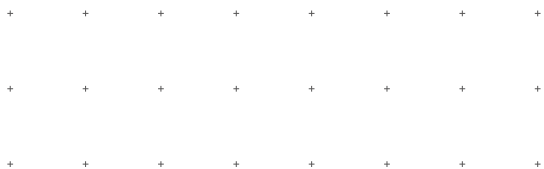
## COMPLIANCE PROGRAMME

Soletanche Freyssinet has adopted a compliance programme covering organisation and responsibilities; bid validation; relations with agents and other intermediaries, partners, subcontractors and suppliers; purchasing; internal control; and monitoring. To facilitate implementation of the programme in Soletanche Bachy, Menard, Terre Armée, Freyssinet and Nuvia subsidiaries and branches, an ethics and compliance officer was appointed and a best practices guide was drawn up in 2015. An awareness, training and e-learning system setting out the principles governing corruption prevention and spelling out the detailed programme will be added in 2016.

## CSR INITIATIVES

In 2015, Soletanche Bachy introduced the innovative “ecofuel” programme to boost eco-design and eco-construction. The goal is to reduce fuel consumption by properly sizing generator sets and activating e-mode in excavation cranes. More broadly, it draws attention to the responsible use of equipment – factoring fuel consumption into the choice of machinery to be purchased and switching off machinery when it is not in use. Applied to all equipment belonging to the entity’s French subsidiary, the ecofuel programme has reduced consumption by about 7%.

Aware of the potential impact of a site, Soletanche Bachy often goes above and beyond its legal and contractual obligations to devise ways to further mitigate disruption. On the Thomson Line Orchard Station project in the heart of Singapore, Bachy Soletanche Singapore manages relations with local residents and users. To maintain the environment adjacent to the site, Soletanche Bachy’s local subsidiary regularly measures dust and noise levels and has introduced a number of rules and corrective measures, including sweeping machines on the site, green spaces around the site, equipment generating less noise and mobile acoustic screens placed around the noisiest equipment.



# INNOVATION AND R&D

As part of the DNA of Soletanche Bachy, Menard, Terre Armée, Freyssinet and Nuvia, innovation enables them to devise outstanding solutions to current and future technical challenges. Ambitious R&D policies support innovation and are the source of some of the industry's major advances.

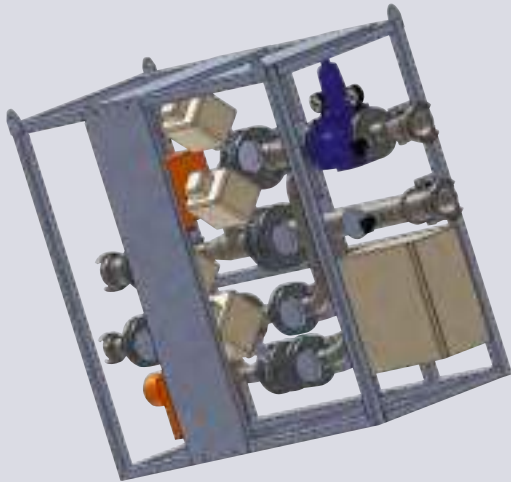
## 1. SOLETANCHE BACHY

### LOW HEADROOM GEOMIX®

Developed in tandem by Soletanche Bachy's technical department and its subsidiaries in Asia, the Low Headroom Geomix® extends the range of Soil Mixing tools. Soil Mixing is a process in which the soil is mechanically mixed in-situ with cement slurry. Unlike existing Geomix® machines, which use a Kelly, the new tool is cable-suspended. Mounted on a compact HC05 Hydrofraise® machine, it can build 2.8 metre by 1.2 metre Soil Mixing panels at depths up to 35 metres and can operate under limited headroom (6.2 metres). The first tests carried out on the Thomson Line Gardens by the Bay project in Singapore were very successful and help promote this new tool for the Asian market.



## 2. MENARD



### AIR AND WATER DISTRIBUTION VALVES

On vibrocompaction and stone column projects, air and/or water are injected under pressure at the tip and on the sides of the vibroflots to facilitate their penetration into the soil and ease the compaction of the soil or the columns. The opening of the air and water distribution valves and the pressure must be constantly adapted to the work phases and the terrain. Until recently, adjustments were made manually, but the control of the air and water distribution was automated in 2015. The valves can now be remotely opened and closed by the operator of the vibro rig. Several valve settings can be pre-configured and recorded at the start of the project. The different settings are then automatically activated by the assisted control system according to the work phase or the soil. Alternatively, the operator can use a touch screen to select the most appropriate setting, rather than having to manually adjust four or even eight valves. This frees him to concentrate on the process. Following a prototype test at the beginning of the year, the system was introduced on all sites in Europe.

## 3. TERRE ARMÉE

### GEOTREL™ WALLS

Terre Armée worked with IFSTTAR in 2014 and 2015 to carry out a full-scale test of the ability of GeoTrel™ structures to withstand rockfalls in mountainous areas. A metal ball was hurled at a wall fitted with accelerometers and its impact was filmed with high-speed cameras. The first two tests at low energy assessed the Reinforced Earth® contribution to energy dissipation. The third and last test, carried out at higher energy, targeted an area above the centre of gravity of the wall to test its stability. The series demonstrated the stability of GeoTrel™ structures due to their excellent internal dissipation of energy. Terre Armée is a partner in French (C2ROP) and European research on protection against natural disasters.



## 4. FREYSSINET

### UHPFRC

On the 630-metre Hammersmith Flyover in London, which carries a major traffic artery, Freyssinet teams undertook the replacement of the entire post-tensioning system without interrupting the flow of traffic. The post-tensioning tendons of the flyover, which was built in 1961, had become severely corroded. In two works phases, all tendons were replaced. Several Freyssinet innovations made it possible to meet this challenge. They included the use of UHPFRC "blisters" – anchors – to support customised tendons. A machine specially invented for the project was used to install all parts, which speeded operations. State-of-the-art techniques and a project management system closely involving the main subcontractors made it possible to deliver a product meeting the client's expectations. Freyssinet won a 2015 CIHT/Ringway Innovation Award for the many innovations used on this large-scale project.

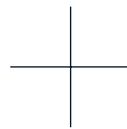
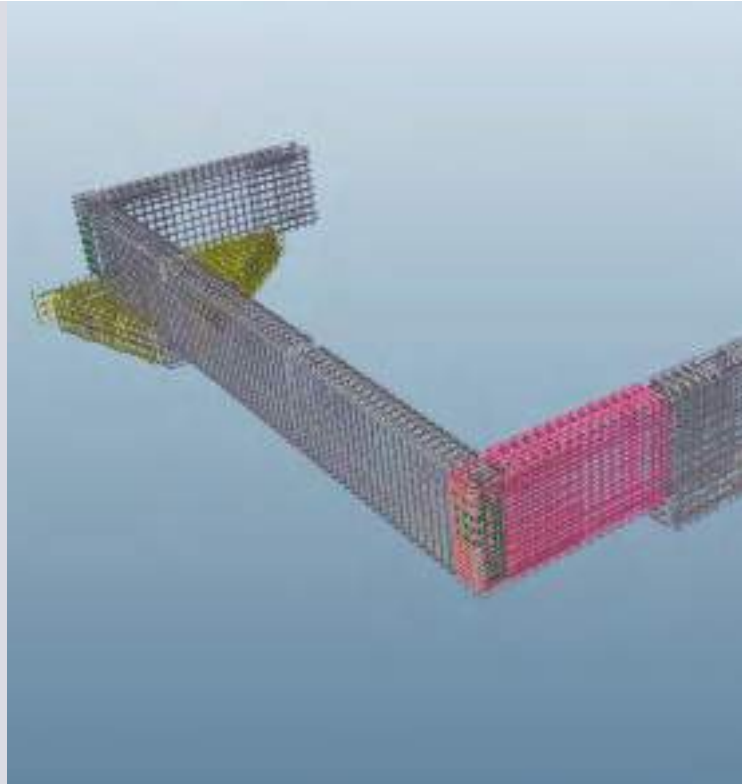




## 5. NUVIA

### 3D REINFORCEMENT

Nuvia Structure designed and built the Fessenheim cooling tank containment building in France. The reinforcement was designed in 3D using the ARMA3D® software developed by VINCI Construction Grands Projets in CATIA language. The software notably supports dynamic collision functions, which are used to ensure, in real time, that reinforcement clash checking in one place has not created a problem elsewhere. These functions are also used to automatically check the possibility of introducing a plate or complex reinforced sub-system without collision and to automatically calculate the assembly path. Efficient implementation of a 3D reinforcement model also requires simultaneous pooling of complementary profiles. A technical unit was therefore set up to systematically bring together the design, methods and site managers and the reinforcement fabrication company.



THE INNOVATIVE SPIRIT ON WHICH THE FIVE ENTITIES HAVE BUILT THEIR REPUTATION RECEIVED EXTENSIVE RECOGNITION THROUGHOUT 2015. AWARDS INCLUDED THE GRAND PRIX DES TROPHÉES DES TP IN FRANCE FOR THE BIOCALCIS® PROCESS DEVELOPED BY SOLETANCHE BACHY, WHICH USES A BACTERIUM, SPOROSARCINA PASTEURII, IN GROUND IMPROVEMENT WORKS.





*The highest TechSpan® arch  
in the United Kingdom, installed by  
The Reinforced Earth Company  
on the Heads of the Valleys project*



# *BUSINESS ACTIVITY*







# SOILS



**Port of Buenaventura, Colombia**  
*Design-build construction by Soletanche Bachy  
Cimas and Soletanche Bachy International  
(the Group's Major Projects division) of the SPIA  
and Boscoal terminals between 2014 and 2016.*



## SOLETANCHE BACHY



### INTERVIEW WITH DIDIER VERROUIL

**Chief Executive Officer,** Soletanche Bachy

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**What is your assessment of 2015?**

*2015 was a banner year at Soletanche Bachy, with volume up 15% and order intake surpassing revenue. The prerequisites for this growth, safety and innovation, also recorded excellent results, which are reflected in particular in our low accident frequency rate and strong showing in the innovation awards.*

**How do you manage to maintain performance over the long haul?**

*We take a long-term approach. We have set our bar higher and are geared towards achieving excellence across the board, all the time. We will consolidate, maintain and expand it to constantly increase our ability to meet our clients' needs. By reinforcing our local roots and capitalising on our techniques we can continue to deliver the operational excellence required to ensure long-term performance.*





*“We can continue to deliver the operational excellence required to ensure long-term performance.”*

#### What were the year’s main projects?

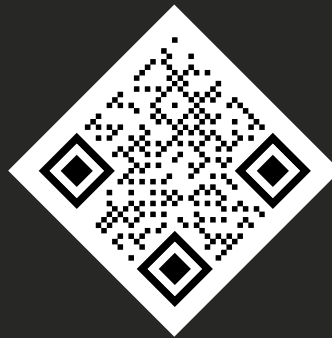
A number of major projects were ramped up during the year. In marine works, there were the SPIA and Boscoal terminals in the port of Buenaventura in Colombia and the H quay in the port of Sète in France; in transport infrastructure, the Thomson Line in Singapore, the East-West tramway in Nice, France, the CEVA railway in Geneva, Switzerland, Line 14 of the Paris metro and the Crossrail project in London; and in water and sewerage works, the Lee Tunnel in London and the Norris Cut force main in Miami. We also worked on challenging heavy foundations for major infrastructure projects: the M+ Museum in Hong Kong, the Vincom Landmark 81 tower and Dai Quang Minh bridge projects in Vietnam and the Reforma 509 tower in Mexico. Lastly, we continued to work in our longstanding core business activity, dams, with the Wanapum Dam in the United States, Chacrillas Dam in Chile and Waitaki Dam in New Zealand.

#### What are your expectations for 2016?

We will continue to make progress, first and foremost in safety. Driven by order intake in 2015, our order backlog holds wonderful challenges in our various markets and major programmes. One focus will be the marine and port works segment, in where we want to make further inroads, and another will be the Grand Paris projects, where we will hit the ground running. We will rise to these challenges.

## WORLD BENCHMARK IN FOUNDATIONS AND SOIL TECHNOLOGIES

The Soletanche Bachy Group delivers the full range of geotechnical processes, including deep foundations, strengthening, cut-off and retaining structures. In addition to this expertise it offers specialist underground and marine works and ground, structural and environmental monitoring.



Scan this QR code to watch the video of the year’s main projects.



**10,700**  
EMPLOYEES



**€1.609 BILLION**  
REVENUE

**€1.661 BILLION**  
MANAGED REVENUE

Revenue including the share of revenue in jointly controlled companies

#### NEW ORDERS:

- Plaza Claro in Colombia
- Lima metro in Peru
- Port of La Brea in Trinidad and Tobago
- Tideway East in the United Kingdom
- East-West tramway in Nice, France
- Idris sewer system in Qatar
- Entisar Tower in Dubai, United Arab Emirates
- Hong Kong-Zuhai-Macao bridge in Hong Kong
- Dai Quang Minh project in Vietnam

## MARINE WORKS

MOST GOODS ARE CURRENTLY TRANSPORTED BY SEA. MARITIME TRANSPORT, ACCOUNTING FOR 80% OF GLOBAL TRADE VOLUME, IS EXPECTED TO INCREASE DESPITE THE ECONOMIC AND FINANCIAL CRISIS. THIS CONTEXT FOSTERS STRONG DEVELOPMENT OF PORT FACILITIES AND INFRASTRUCTURE, INCLUDING TERMINAL CONSTRUCTION, QUAY EXTENSION AND HARBOUR DEEPENING WORKS.

For several decades, Soletanche Bachy has been a leading provider of marine infrastructure works. Combining geotechnical and marine works, the Group has built a number of standout projects. Examples include the SPIA terminal in the port of Buenaventura and the Puerto Brisa jetty and wharf in Colombia; Muelle C in Uruguay; 10 berths as part of the Port 2000 project in Le Havre and extension of the Quai des Flamands in the port of Cherbourg in France; Terminal 3 in the Jebel Ali Port in Dubai, United Arab Emirates; the third quay in the port of Lomé, Togo; and the quay in the port of Cotonou, Benin.



# ADVANTAGES

## A DUAL LOCAL AND GLOBAL APPROACH

The Group's local roots and global expertise combine to support an organisational structure that can adapt to market requirements. Building on a network of subsidiaries and branches spread across all continents, the Group operates in close proximity to both local and global contracting authorities and offers a wide palette of techniques to meet their needs.

## DESIGN-BUILD TURNKEY CAPABILITY

To carry out marine works, the Group mobilises the right processes, equipment and materials. It delivers the full range of design-build techniques to cover the broad diversity of projects.

## INNOVATION CAPACITY

The Group is a pioneering innovator, constantly devising ways to surpass conventional solutions. After integrating the diaphragm wall in the construction of port and inland waterway projects in the 1960s, it recently developed the SolJetty ready-to-build packaged solution for bulk transport and ship loading.



◆ Guillermo Brown power plant jetty, Argentina

## FIVE PROJECTS

IN 2015, THE GROUP DID BRISK BUSINESS AROUND THE WORLD, ESPECIALLY IN MEXICO, SINGAPORE AND VIETNAM AND IN MAJOR INTERNATIONAL PROJECTS AND TUNNELS.

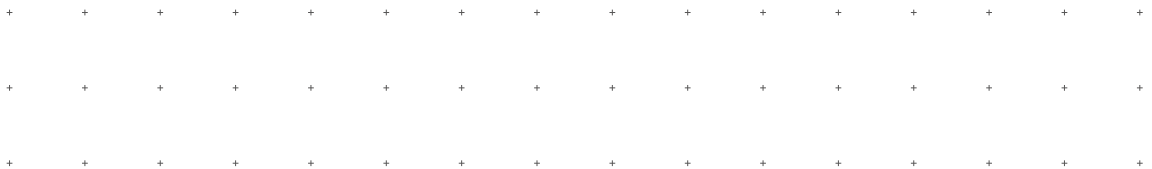
Projects completed and under way during the year included: foundations of a large wind farm in the Niagara region in Canada; replacement of a large diameter force main under Biscayne Bay in Miami, Florida in the US; Reforma 509 and Lord Byron towers in Mexico; Plaza Claro and SPIA and Boscoal terminals in the port of Buenaventura in Colombia; Escondida mine in Chile; Queen's Road West and Chelsea Barracks in the United Kingdom; port works in Sète and Reunion Island and Line 14 of the Paris metro in France; CEVA railway line in Switzerland; Riyadh metro in Saudi Arabia; second Wouri Bridge in Cameroon; Thomson Line stations and associated tunnels in Singapore; and Ikea and MyTown in Malaysia.



### ELLWOOD COMPLEX, UNITED STATES

#### WORKING UNDER LOW HEADROOM

The Ellwood Group awarded a contract to Nicholson, Soletanche Bachy's subsidiary in the United States, to refurbish its plant in the small town of Sharon, Pennsylvania, to accommodate a forge for producing locomotive and marine engine crankshafts. Nicholson carried out the client's project between March and June 2015, designing and then building a retaining structure inside an existing building. In addition to accommodating the unique geometric shape of the structure (a 16-sided polygon), the work was carried out under low headroom and within a very tight space. This required painstaking phasing and very precise coordination of the work.







## LATITUD POLANCO, MEXICO

### WORK ON HIGH-RISE BUILDINGS

Cimesa, Soletanche Bachy's subsidiary in Mexico, which is used to working on high-rise buildings, brought the full range of its expertise to bear on the Latitud Polanco project in Mexico, built on the site in the Polanco district formerly occupied by the Nestlé headquarters. Two mixed-use (residential, office and retail space) high-rise buildings with 22 and 20 storeys respectively and nine underground parking levels are currently under construction and set for handover in 2018. Cimesa won the foundation and excavation contract for this LEED (a high environmental quality label) certified project. In the first phase, the two to three underground levels and the cisterns of the old building were demolished. In the second, a 60 cm thick, 33 metre deep diaphragm wall and crown beam were built around the perimeter and the core was excavated and stabilised with five anchor beds and 85 piles drilled to a depth of 50 metres. The works were completed in June 2015.





## PORT OF SÈTE, FRANCE COMBINING TECHNIQUES

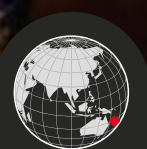
On the Mediterranean coast, the port of Sète is being transformed to accommodate container shipping demand. Soletanche Bachy France and Balineau, a specialised subsidiary of Soletanche Bachy, are building the 470 metre long, 14.5 metre deep H quay. Work got under way in September 2014 with the construction of a breakwater and continued in 2015 with vibrocompaction ground improvement work by Menard and the construction of a 530 metre long, 29.5 metre deep diaphragm wall. To retain the latter, 70 passive anchors consisting of 160 mm diameter rods – among the largest ever installed in France – were used. The work will continue in 2016 with civil engineering, earthworks, Controlled Modulus Columns, marine works and installation of equipment (bollards, sea walls and tracks). The structure is to be handed over in mid-2016, capping two years of work involving a full range of the Group's techniques.



## VINCOM LANDMARK 81 TOWER, VIETNAM

### AT THE FOOT OF THE COUNTRY'S TALLEST HIGH RISE

In the heart of Ho Chi Minh City's Vinhomes Central Park complex, Bachy Soletanche Vietnam began work on the Vincom Landmark 81 tower in 2015. When completed in 2018, the 461 metre high, 81 storey building will be the country's tallest. The foundation work for the building was awarded to Soletanche Bachy's local subsidiary. Prior to the start of work, O-Cell® load testing was performed and successfully completed, enabling work to start in June. The project involves more than 140 injected barrettes and simple barrettes with lengths ranging from 1 to 1.2 metres, 2.8 metre width and 90 metre maximum depth. The work, set to last three months, was completed two weeks ahead of schedule.



## WAITAKI DAM, NEW ZEALAND

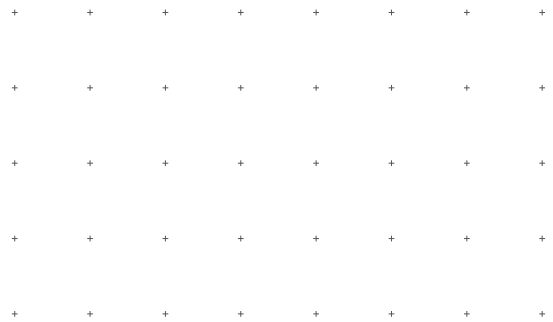
### CUSTOMISED WORK ON SOUTH ISLAND

In the 1930s, a dam was built in Otago. The last to be built by traditional methods – only shovels and picks were used – it was the site of the first hydroelectric plant on the Waitaki River. The drainage network now needed to be enhanced. The country’s leading electricity supplier, which manages the structure, awarded the contract to March Construction. Since May 2015, Soletanche Bachy’s subsidiary in New Zealand has been busy refurbishing the 75 groundwater drains and drilling 54 new ones with a maximum length of 34 metres. All work is being carried out from one of the two interior galleries – the Middle Gallery – and the outside upstream Hornell Gallery, a challenging undertaking since these galleries are at most 1.2 metres wide and 1.9 metres high. For the high-risk project, safety of personnel and the structure are carefully monitored at all times. The work is to be completed in May 2016.



## INTERVIEW WITH MARC LACAZEDIEU

**Chief Executive Officer, Menard**

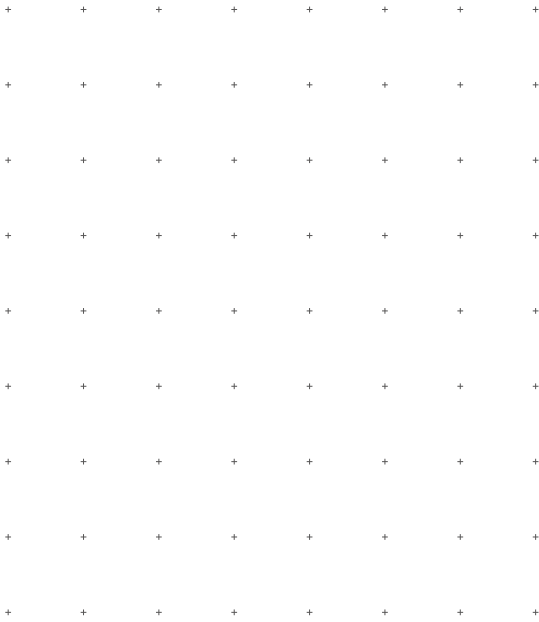


**In 2015, the Group recorded outstanding results. How do you account for this?**

*Revenue increased this year by more than 27%. Particularly brisk business in North America as well as in the Middle East and Europe were largely responsible for this excellent result. In the United States, Menard Group USA continued to support a constant increase which is the result of the steady confidence its customers have placed in the company for several years. To meet current and future needs, the subsidiary continued its effort to identify new talent and strengthen its teams.*

**What were the year's successes?**

*In North America and Latin America, Menard worked on standout projects including a fertiliser plant in North Dakota, a FedEx logistics hub in New Jersey, the NoSo Railroad Bridge widening in Indiana in the United States; the Annacis Island and Tilbury wastewater treatment plants in Canada; and the Pemex refinery in Ciudad*



*“We will be broadening our range of solutions and services to include soil remediation.”*

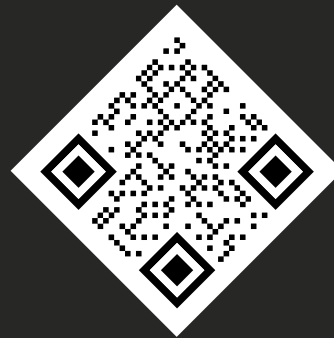
*Madero and storage tanks in the port of Coatzacoalcos in Mexico. In Europe and the Middle East, work on large projects continued and started in the United Kingdom with the Castlandhill Road as part of the Forth Replacement Crossing in Scotland; the Riviera Chablais hospital in Switzerland; the S19 expressway in Poland and the new Al Zour refinery in Kuwait; the Ruwais, Polo Residence and La Mer projects in the United Arab Emirates; and the port of Turkmenbashi in Turkmenistan. And last but not least, in Oceania, the Perth Stadium and the Kent Road projects in Australia.*

#### **What are your goals in 2016?**

*We will be working on strengthening our local roots both regionally and nationally. Building on what we have done in France and Poland, we plan to expand our regional operations in the United Kingdom and Germany to bring us closer to our clients. Meanwhile, we are planning to set up in further areas such as Central America, where we recently established a foothold, Egypt and Iran. In Asia, we will be upgrading our operations in 2016 to build an organisation ready to identify and meet the current and future challenges of the market. On the business segment side, we will be broadening our range of solutions and services to include soil remediation, provided by our specialised subsidiary Sol Environment.*

## **KEY GROUND IMPROVEMENT PROVIDER**

The Menard Group develops foundation solutions based on ground improvement and reinforcement technologies. Its treatments eliminate the need for the deep foundations traditionally used to support surface structures.



Scan this QR code to watch the video of the year's main projects.



**900**  
EMPLOYEES



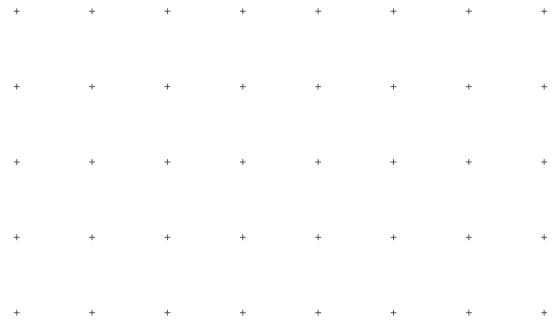
**€257 MILLION**  
REVENUE

#### **NEW ORDERS:**

- NJTA interchanges in the United States
- I-29/U.S 275/IA92 interchange in the United States
- Prologis Elizabeth Seaport warehouses in the United States
- Ras Al-khair project in Saudi Arabia
- Jakarta airport in Indonesia



# SOIL REMEDIATION



SOIL REMEDIATION IS A MAJOR INDUSTRIAL AND REGIONAL DEVELOPMENT ISSUE.

Specialising in the activity, Sol Environment has been developing state-of-the-art expertise in three areas of excellence for the past 10 years:

- remediation of polluted sites (soils and groundwater) for redevelopment projects,
- management of polluted effluents (water, soil, air) during construction works,
- treatment of industrial ponds and tanks at operating sites.

In-situ solutions are preferred since they do not require excavation; the goal is to deliver turnkey platforms ready for use.



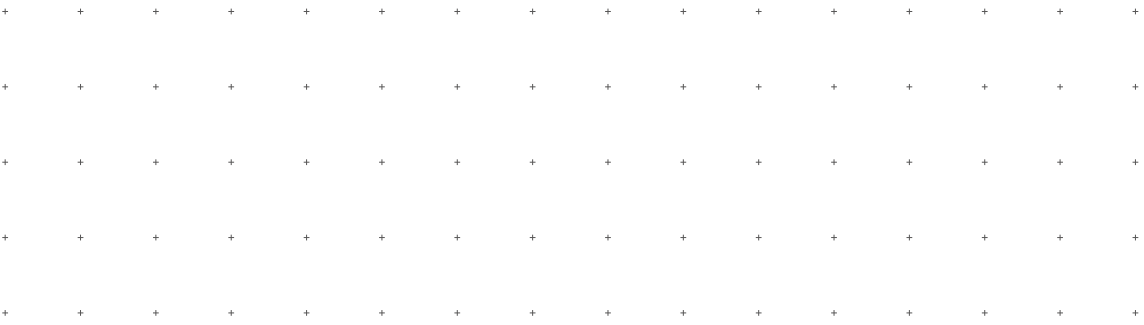
## SOLUTION ENGINEERING

Sol Environment deploys a team of multi-disciplinary engineers able to analyse the issues and to devise, test and implement the most suitable treatment strategies. Treatment solutions can include a chemical, biological or physical component to break down or neutralise the pollutant.

References:

- Remediation of a soil polluted by arsenic using the Soil Mixing technique at a nitrogen fertiliser plant in Normandy, France
- Wastewater treatment on the site of the renewal project around the railway station in Massy, France
- Water cleanup and treatment following an incinerator fire in Marseille, France





## INTERNATIONAL EXPANSION

Building on its solid reputation in France, Sol Environment successfully exports its expertise: following Qatar, it won a first contract in Warsaw, Poland, together with the Menard Polska teams to remediate, for a brownfield redevelopment project, the site of a former chemical plant. The project launches the activity in Poland and heralds further expansion in the United States, the Middle East and Oceania.

## IN-SITU TREATMENT WITHOUT EXCAVATION

This is the best solution in terms of cost and environmental impact since pollution is treated in-situ without any transfer of materials. Along with additional measures, this method retains population and activities around the sites without destabilising neighbouring buildings or underground networks.

## INNOVATION: DEGRADATION OF CHLORINATED SOLVENTS

Chlorinated solvents, which penetrate deep into groundwater down to the most impermeable layers of clay, where they concentrate, are more difficult to remediate. To remove them, Sol Environment has developed techniques tailored to the specific type of soil. The method can use Soil Mixing or grouting via *tubes-à-manchettes* of reagents such as iron particles to neutralise the solvents by oxidation-reduction.





SOILS

## FIVE PROJECTS

IN 2015, THE GROUP DID BRISK BUSINESS, ESPECIALLY IN NORTH AMERICA, EUROPE AND THE MIDDLE EAST.

The standout projects completed or under way during the year included: the Annacis Island and Tilbury wastewater treatment plants in Canada; a fertiliser plant, a FedEx warehouses and the NoSo Railroad Bridge in the United States; the Pemex refinery and the storage tanks in the port of Coatzacoalcos in Mexico; the Castlandhill Road in the United Kingdom; the Riviera Chablais hospital in Switzerland; the S19 expressway in Poland; the Ruwais, Polo Residence and La Mer projects in the United Arab Emirates; the Al Zour refinery in Kuwait and the port of Turkmenbashi in Turkmenistan; and the Perth Stadium and the Kent Road projects in Australia.



### PROLOGIS ELIZABETH SEAPORT, UNITED STATES

#### DRILLING IN HARD SOIL

Many brownfield sites are being redeveloped near the port of New York and New Jersey, the third largest port in the United States. As part of this modernisation, two warehouses covering nearly 70,000 sq. metres were planned. Between July and December 2015, Menard Group USA improved the ground under the slab and footings of the two structures. Five rigs were mobilised to install 8,900 Controlled Modulus Columns (CMCs) with 30 to 40 cm diameters. During the operations, the soil proved to be harder than expected and required the use of pre-drilling. With the collaboration of the equipment department, the site team quickly developed a plan to optimise the pre-drilling operations. After an initial learning curve, the team was able to pre-drill the majority of the job in record time, therefore ensuring that the initial schedule for installation of the CMCs would not be affected.





## PUERTO CANCÚN, MEXICO

### FIRST USE OF DYNAMIC REPLACEMENT

Menard México used the dynamic replacement method for the first time in Mexico. Menard's Mexican subsidiary, set up in 2012, succeeded in making a convincing case for using the technique on the Puerto Cancún project. As part of the residential development programme, the ground had to be improved to carry the 1.7 km road of Unit 14. In an alternative to the construction of deep foundations based on prefabricated piles and a reinforced concrete structure, Menard México proposed to treat the peaty soil with dynamic replacement, installing 1,300 pillars with a unit diameter of two metres. Completed in April 2015, the work will control settling during road construction and limit differential settling over time.



## N-S HIGHWAY, POLAND

### RESPONDING TO GROUND VARIABILITY

In Silesia, the N-S highway, set for completion in 2020, will link the two major arteries on either side of the city of Ruda Śląska: the DTŚ expressway in the north and the A4 motorway in the south. Between August and September 2015, Menard Polska, Menard's local subsidiary, worked on the fill of both sections of the highway, improving 33,000 sq. metres of soil to a depth of four metres. Rapid impact compaction was used for the first time in Poland. It was recommended following a ground survey campaign that revealed highly variable terrain in terms of both the nature and the density of the materials – coal, clay, sandstone, etc. – making it up. Overall, some 3,500 prints were executed to obtain a degree of compaction of 0.6 above the prints and 0.4 between them.

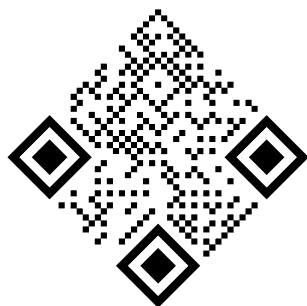




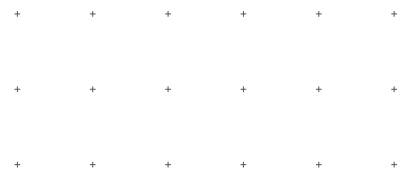
## LA MER, DUBAI – UNITED ARAB EMIRATES

### IN-DEPTH TREATMENT

September 2015 – February 2016: for six months, Menard Vibro, the local Menard subsidiary, worked alongside the general contractor on the La Mer project. The project, which includes a beach, a recreational and entertainment area and residential areas, calls for the construction of three peninsulas: North Peninsula, South Peninsula and Headland. In preparation, deep compaction was carried out. Nearly seven million cu. metres of land were treated by vibrocompaction to depths of between 12 and 16 metres. Following this operation, the site was excavated and filled to establish the final platform at +4.5 metres DMD (reference level in Dubai) and then a surface area of about 470,000 sq. metres was compacted using the high-energy dynamic compaction method.



Scan this QR code to find out more about the project.



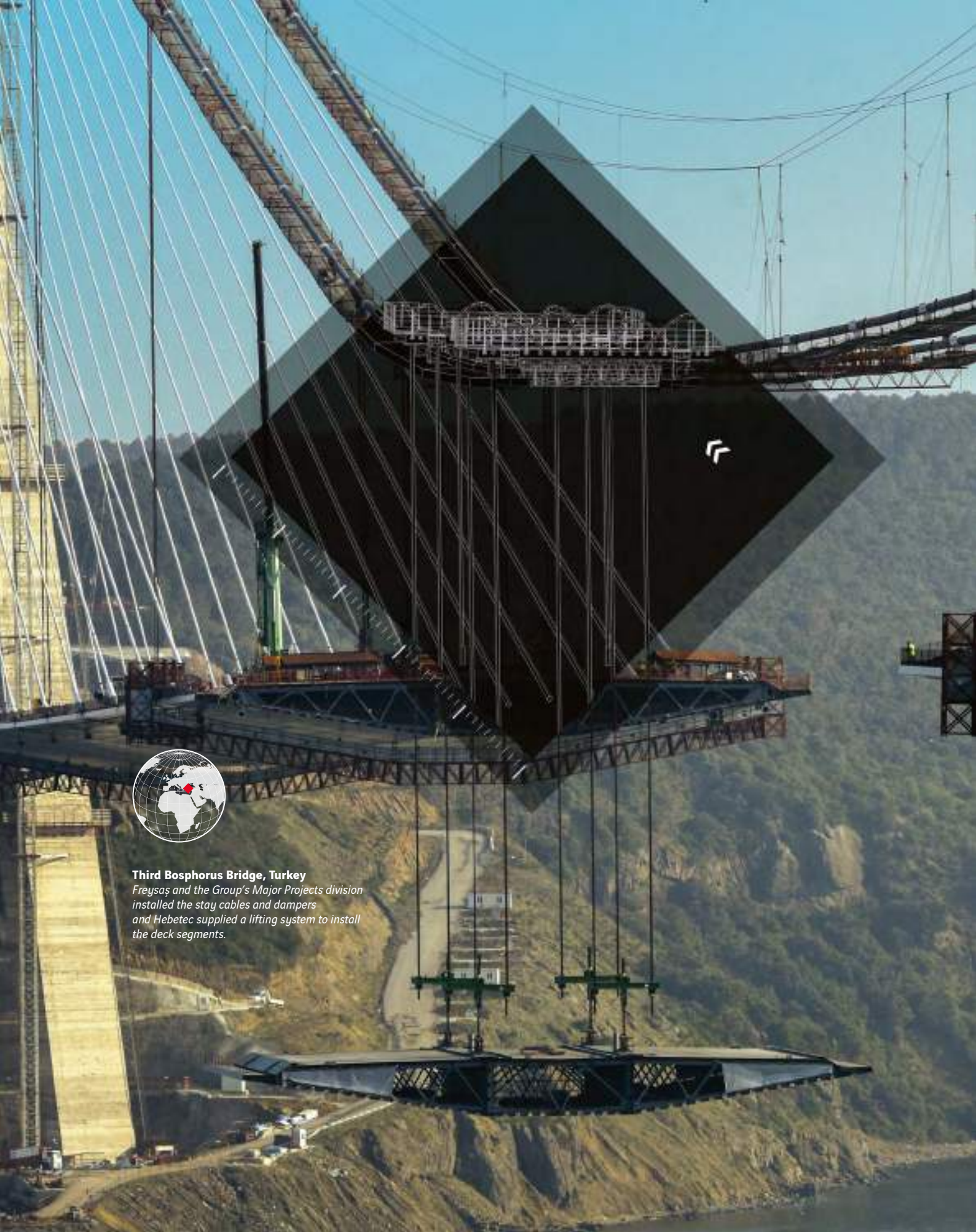


## PERTH STADIUM, AUSTRALIA

### SITE CONVERSION

A stadium is rising from the ground on the Burswood Peninsula in Perth. A multipurpose stadium at the heart of a vast zone to be dedicated to leisure and recreation will be completed in 2018 on the brownfield site, where a wastewater treatment plant, a cement works and then a landfill and waste treatment centre were previously located. Menard Oceania, in a joint venture with Soletanche Bachy's local subsidiary GFWA, worked to improve the ground across the entire area surrounding the stadium and address the past use of the site. By mid-January 2015, they had installed 2,700 sq. metres of sheet piling to prevent pollutants from flowing into the neighbouring Swan River. Between May and June, an area of more than 20,000 sq. metres was treated by dynamic compaction to collapse the cavities formed by the presence of car bodies and other obstructions in the upper layer of fill. Between January and August, more than 6,600 Controlled Modulus Columns were then installed to control future settling in the area around the stadium. Solutions proposed by Menard Oceania reduced construction time by more than six months.



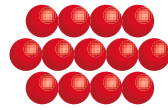


**Third Bosphorus Bridge, Turkey**  
*Freysaş and the Group's Major Projects division installed the stay cables and dampers and Hebetec supplied a lifting system to install the deck segments.*



A large suspension bridge is under construction over a body of water. The bridge's steel framework, including the main girders and numerous vertical hangers, is visible. In the background, there are green, hilly mountains under a clear sky. The word "STRUCTURES" is written in a white, serif font across the center of the image, with a white diamond shape behind the letters. The overall scene is one of industrial engineering in a natural setting.

# *STRUCTURES*

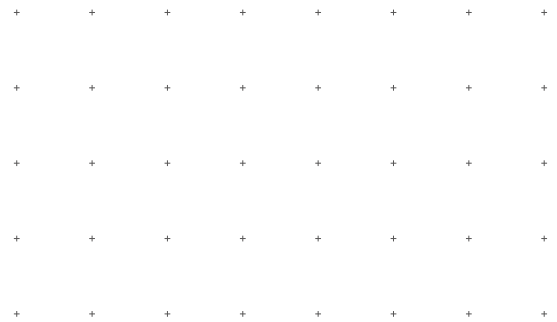


**TERRE ARMÉE**



## INTERVIEW WITH ROGER BLOOMFIELD

**Chief Executive Officer, Terre Armée**



**In 2015, the Group experienced a kind of upturn. Could you tell us more about this?**

*This year, Terre Armée generated revenue of €183 million. We had previously moved to diversify our activity, with the goal of extending the use of Reinforced Earth® walls beyond the motorway market. We also expanded our business development teams and the two moves began to bear fruit in 2015. Our new orders are up 30% compared to the previous year, bringing our current backlog to more than €230 million.*

**What were the year's successes?**

*In 2015 we continued to expand the use of GeoTrel™, a soil reinforcement technique that uses synthetic strips in lieu of the conventional galvanised steel reinforcements. It was used, for example, on the Cerro Verde mine project in Peru. With our precast TechSpan® segments, we completed Phase 1 of the major Italian Quadrilatero project in Umbria and we are now nearing the end of Phase 2. The project covers 2,250 linear metres of segments and 20,000 sq. metres of Reinforced Earth®*

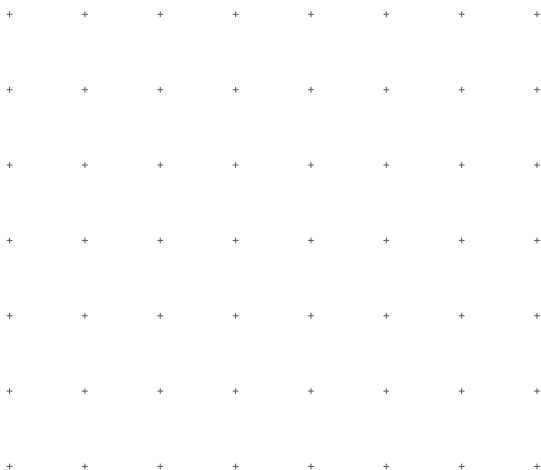


*“This diversification move began to bear fruit.”*

*retaining walls. In Brazil, we are completing a four-year project in Rio de Janeiro for the 2016 Olympic Games. We supplied the Reinforced Earth® retaining walls for the access ramps to the Transolímpica expressway, the new artery connecting several Olympic sites. In the United States, our subsidiary The Reinforced Earth Company signed its largest contract to date, covering a 290,000 sq. metre motorway widening project in Orlando, Florida.*

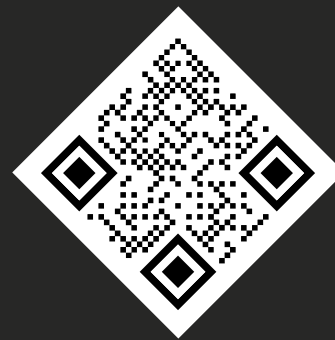
**What are your goals in 2016?**

*We hope to return to substantial revenue growth thanks to the orders we have booked. We also expect to continue our penetration in the risk control market, notably coastal protection, avalanche barriers and rockfall protection systems. We will continue to extend our geographical reach in order to win new contracts.*



## WORLD LEADER IN RETAINING STRUCTURES

The Terre Armée Group, which invented the Reinforced Earth® technique, offers unparalleled experience in reinforced backfill and soil-structure interaction. Its techniques are applied across a wide range of sectors such as roads and motorways, railways, industry, environmental engineering and water engineering.



Scan this QR code to watch the video of the year's main projects.



**800**  
EMPLOYEES



**€183 MILLION**  
REVENUE

**NEW ORDERS:**

- Turcot interchange in Canada
- Regina Bypass in Canada
- Interstate 4 in the United States



# DIVERSIFICATION

ON THE STRENGTH OF ITS LONG HISTORY, HIGH LEVEL OF TECHNICAL EXPERTISE AND STRONG LOCAL ROOTS, TERRE ARMÉE HAS BEEN THE WORLD LEADER IN ITS FIELD FOR MORE THAN 50 YEARS.

To maintain its lead, the Group has defined a diversification strategy based on the strengths that account for its success. The strategy has a three-part focus: new applications, technical innovation and range of solutions.

## THREE-PART FOCUS



◆ Eagle project, United States

### NEW APPLICATIONS

Reinforced Earth®, traditionally applied in the motorway market, is also relevant to other sectors. The Eagle project, completed in 2015 in Denver, Colorado, is a good example. For the elevated light rail connecting Denver International Airport with the city centre, scheduled to open in early 2016, nearly 50,000 sq. metres of Reinforced Earth® walls were installed. The use of the technique in this project confirms its applicability to transport infrastructure of all kinds.

## TECHNICAL INNOVATION

Terre Armée’s subsidiary in India addressed erosion issues in 2015. The outcome of the effort is the TechRevetment® system designed by Reinforced Earth India. The system, consisting of a geosynthetic mattress injected with concrete, can be installed in the embankment of a water reservoir without emptying it. The system was applied for the first time to 10,000 sq. metres of embankment at the Ukkadam reservoir in Coimbatore to provide comprehensive erosion protection.

## RANGE OF SOLUTIONS

As a supplier of a wide range of solutions, Terre Armée meets a wide variety of needs. TerraLink™ walls are applied to an existing structure and connected to it by means of metal or geosynthetic reinforcements. This system is well suited to narrow spaces and can be used on road widening projects when there is not enough room to build conventional reinforced earth walls.



## FIVE PROJECTS

IN 2015, THE GROUP'S ACTIVITY DECLINED SLIGHTLY. THE CONTRACTION IN THE UNITED STATES, DUE TO WEATHER CONDITIONS, WAS ONLY PARTLY OFFSET BY REVENUE GENERATED IN SOUTH AFRICA AND AUSTRALIA.

+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
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### BAYONNE BRIDGE, UNITED STATES

#### RAISING A BRIDGE

In the United States, the New York and New Jersey port authority carried out a project designed to modify the historic Bayonne Bridge built in 1931. The goal was to raise the bridge 18 metres to provide clearance for large container ships. The Group's U.S. subsidiary, The Reinforced Earth Company (RECo), won the contract to design and build the access ramps. RECo supplied about 3,800 sq. metres of Reinforced Earth® walls (including 1,200 sq. metres of temporary walls) for the project. On this project, the walls were designed to support the gantry crane that will be used to erect the bridge structure. In addition to design-build works, RECo is also providing technical support at the site. The bridge is scheduled to reopen in 2017.





## TRANSOLÍMPICA, BRAZIL

### 50,000 SQ. METRES OF REINFORCED EARTH® FOR SUCCESSFUL GAMES

The Transolímpica project is part of Rio de Janeiro's public transport development programme for the 2016 Olympic Games. The new artery will include separated lanes for buses and cars. During the games, it will link a number of Olympic sites and the athletes' village. For the large-scale project, Terra Armada designed nearly 50,000 sq. metres of Reinforced Earth® walls using TerraClass® facing panels and more than 700 tonnes of high-adhesion galvanised steel reinforcements. The Group's Brazilian subsidiary also supplied materials and full-time technical support at the site. The 26 km Transolímpica with 18 stations will serve some 70,000 people and 50,000 vehicles per day.





## CERRO VERDE MINE, PERU RECORD HEIGHT

Cerro Verde is an open-pit copper and molybdenum mine lying at an altitude of 2,700 metres near the city of Arequipa in Peru. Major works were undertaken to support expansion and increase production. As part of the project, Tierra Armada Perú, the Group's Peruvian subsidiary, designed 34 metre high walls for two primary crushers to facilitate the movement of dumpers weighing about 700 tonnes. An additional wall was then built to link the two crushers. At the end of 2015, the company erected 4,400 sq. metres of Reinforced Earth® GeoTrel™ walls with GeoStrap® reinforcements and biaxial geogrids. Tierra Armada Perú also provided technical support and supplied materials. The project sets a new record for Terre Armée with the Group's highest uninterrupted vertical walls erected with geosynthetic strips and welded wire mesh panels.



## NORTHERN SPEED TANGENT, BULGARIA

### OPTIMISING TRAFFIC FLOW AROUND SOFIA

The motorway bypass designed to reduce road traffic in the city of Sofia is currently nearing completion. Terre Armée France designed and supplied the materials for the Reinforced Earth® access ramps at eight bridges along a section of the Northern Speed Tangent. Construction of the first ramp began in July 2015 and the last was completed at the end of the year. 20,000 sq. metres of Reinforced Earth® walls with TerraPlus® facing panels and EcoStrap® reinforcements were built along the 13 km motorway section.



## CHAFFEY DAM, AUSTRALIA

### RAISING A DAM

The Chaffey Dam is located on the Peel River in New South Wales some 400 km north of Sydney. Its purpose is to regulate and store water for irrigation, industrial use and city water supply and to control flooding. Major works were carried out to upgrade the dam to current standards and increase its storage capacity to 100 Gl. As part of this project, The Reinforced Earth Company, the Group's subsidiary in Australia, designed and built 7,200 sq. metres of Reinforced Earth® walls in back-to-back configuration as well as a 1.8 metre parapet.

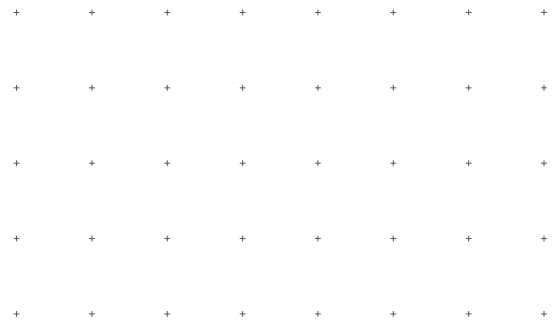


# FREYSSINET



## INTERVIEW WITH MANUEL PELTIER

**Chief Executive Officer, Freyssinet**

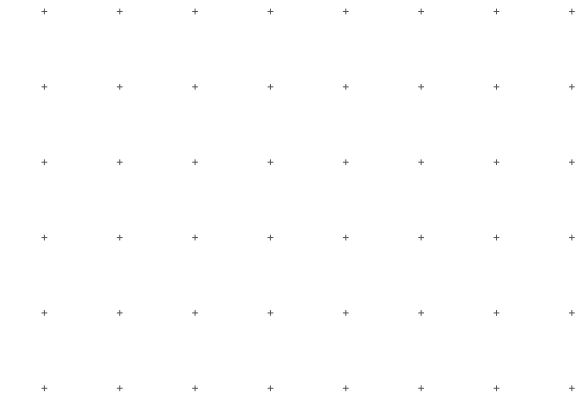


### **What is your impression of 2015 as a whole?**

*Following on from 2014, Freyssinet had a good year in 2015. Revenue came in at nearly €800 million and earnings jumped 20%. Order intake remained strong and we signed a number of large contracts, both in construction and in repair. The new-build market was driven by the emerging countries, which are growing at a fast pace, and the repair market increased sharply.*

### **What were the main projects of the year?**

*There was the Third Bosphorus Bridge in Turkey, of course, for which Freyssinet designed, supplied and installed the stay cables. The bridge's 1,408 metre span sets a new world record. In the United Kingdom, we finalised repair work on the Hammersmith Flyover, an exciting project that we completed with flying colours. In the Philippines, Freyssinet repaired the Ayala Bridge in Manila and upgraded it to seismic standards. In Hong Kong, we continued construction work on the Lian Tang 3 bridge and the TMCLK viaduct. In Canada, we are*

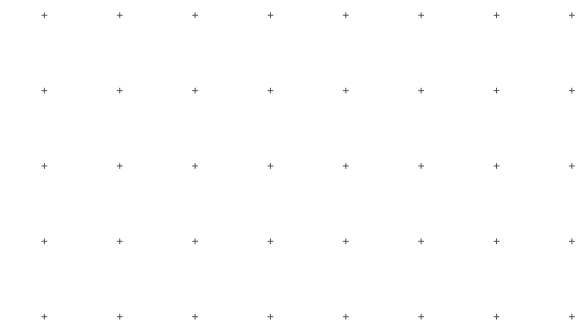


*“Around the world, in all market segments, the name Freyssinet must stand for excellence.”*

*installing post-tensioning on the concrete gravity structure at the Hebron oil platform in Newfoundland. In Siberia, we installed post-tensioning for the Yamal LNG tanks. Lastly, I would also mention the repair work on the Halle Freyssinet in Paris, a building constructed by our founder in which we see a record of his outstanding innovations. The project formed a link between the techniques employed in his day and those we use now.*

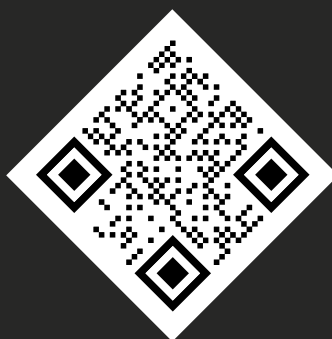
**What are your goals for 2016?**

*Freyssinet will maintain its momentum. We have major projects under way and exciting challenges to meet in both the construction and repair sectors. Around the world, in all market segments, the name Freyssinet must stand for excellence.*



## WORLD BENCHMARK IN CONSTRUCTION AND REPAIR OF STRUCTURES

In prestressing, cable structures, construction methods, structure equipment, repair, reinforcement and maintenance, the Freyssinet Group makes its specialised expertise available to build and repair structures ranging from bridges to buildings, skyscrapers, industrial facilities and transport and sports infrastructure.



Scan this QR code to watch the video of the year's main projects.



**7,500**  
EMPLOYEES



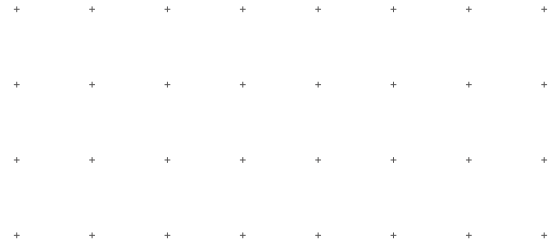
**€765 MILLION**  
REVENUE

**€797 MILLION**  
MANAGED REVENUE  
Revenue including the share of revenue in jointly controlled companies

**NEW ORDERS:**

- Prestressing and cathodic protection for the New Coastal Highway on Reunion Island
- Reinforcement and repair of tunnels for the Glasgow metro in the United Kingdom
- Reinforcement and repair of the Webb Dock terminal in Melbourne, Australia





## REPAIR

A STUDY\* PUBLISHED BY AMERICAN ROAD AND TRANSPORTATION BUILDERS SHOWS THAT IN THE UNITED STATES, ONE IN TEN BRIDGES (MORE THAN 63,000 TOTAL) IS IN NEED OF URGENT REPAIR. THESE STRUCTURES, "USED MORE THAN 250 MILLION TIMES A DAY", NO LONGER MEET THE REQUIRED SAFETY STANDARDS.

A structure lives, ages and changes over time. Repairing it is always a complex operation; repair requires as much attention as new construction. Now more than ever, Freyssinet's expertise addresses the increasing need for this type of project.

*\* One in ten U.S. bridges in urgent need of repair: report. Reuters Washington, 24 April 2014*

## EXPERIENCE

### THE RIGHT SOLUTION

Teams of Freyssinet specialists support each client in analysing the structure to determine the most suitable technical solution: concrete repair, protection of concrete reinforcements, structural reinforcement or protective coatings. These techniques are brought together in the FOREVA® brand.



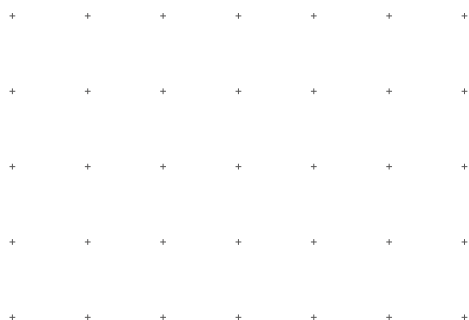
## LIMITED IMPACT

For repair work of this type, Freyssinet selects or devises innovative methods to limit the impact of the works on users and local residents. For example, the employees of the MLC Tower in Sydney, Australia, were able to continue to work in peace and quiet during the repair works, traffic in the Puymorens tunnel in France was restored during the winter and the Agigea bridge in Romania was repaired without a major interruption of traffic flow.



## PROJECT REFERENCES

The Group has given a number of structures a new lease on life. Examples are the Hammersmith Flyover in London, United Kingdom; numerous historic landmarks such as the Halle Freyssinet in France; and several quays at the Webb Dock terminal in Melbourne, Australia. Every day, the teams work to successfully carry out projects that satisfy clients, pooling their efforts to extend the service life of structures and ensure the safety of their users.



• Dong Siri offshore platform, Denmark

## FIVE PROJECTS

IN 2015, THE GROUP'S ACTIVITY INCREASED SIGNIFICANTLY, PARTICULARLY IN THE MIDDLE EAST, ASIA AND AUSTRALIA.

Projects completed or under way included: replacement of the prestressing on the Hammersmith Flyover in London, United Kingdom; upgrade to fire standards of the Puymorens tunnel in the Pyrenees in France; replacement of the stay cables on the Ewijk bridge in the Netherlands; and construction of 12 km of decks on Line 1 of the Ho Chi Minh City metro in Vietnam.



### PUYMORENS TUNNEL, FRANCE

#### IMPROVING SAFETY

A major compliance upgrade was carried out on the Puymorens tunnel near the French-Spanish border. The full panoply of fire protection systems – thermal protection, emergency shelters, evacuation gallery – were installed, overseen by Freyssinet, which was in charge of the design-build safety upgrade programme in the tunnel. The contract notably included the construction of nine emergency shelters, modification of two existing shelters, creation of an escape gallery (installation of a prefabricated concrete wall), installation of thermal protection and construction of tunnel extensions at each end of the structure. Soletanche Bachy Tunnels, a specialised subsidiary of Soletanche Bachy, and Tierra Armada, a subsidiary of Terre Armée, also took part in the large-scale project. The programme got under way in April 2013 and was carried out in several stages. Following a phase during which traffic flow was completely interrupted, the tunnel reopened every winter when the alternative route (over the Puymorens gap at an altitude of 1,900 metres) is difficult to navigate due to snow. The tunnel was permanently reopened to traffic in November 2015.





## BIRTOUTA-ZERALDA RAILWAY LINE, ALGERIA

### FACILITATING TRAVEL IN THE ALGIERS REGION

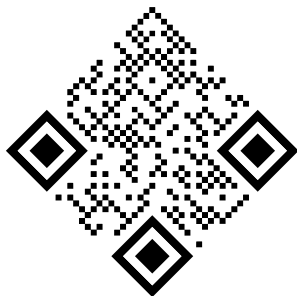
In 2015, Freyssinet finished building and installing the decks of three major viaducts along the railway line under construction between the cities of Birtouta and Zeralda in the Algiers region, scheduled for completion in 2017. For the prestressed concrete structures with a combined length of nearly two kilometres, the teams designed the decks and then supplied and installed the prestressing and special railway infrastructure equipment. As the viaducts are located in an earthquake zone, ISOSISM<sup>®</sup> anti-seismic systems developed and produced by Freyssinet were installed. The new line will provide access to the coastal cities in the Greater Algiers area. It is part of a railway development project in the region that will offer an alternative transport system to relieve road traffic congestion.





### THIRD BOSPHORUS BRIDGE, TURKEY FACILITATING TRAFFIC BETWEEN EUROPE AND ASIA

Freyssinet took less than three months to install the full complement of stay cables on the Yavuz Sultan Selim bridge currently under construction. The bridge has an innovative design comprising a 1,408 metre central span and a 58 metre wide deck that will accommodate 2 x 4 traffic lanes and two railway tracks in the centre. The deck, made of prestressed concrete in the end spans and steel in the central span, is held in place by a hybrid suspension system made up of 176 stay cables and two suspension cables to which 34 pairs of vertical cables are attached to support the central part of the deck. The segments were installed by means of a lifting system designed and supplied by Hebetec, a specialised Group subsidiary. The bridge is part of the North Marmara Motorway, which will cross the Bosphorus to the north of Istanbul, bypassing the city and relieving traffic in the city centre and on the two existing suspension bridges further south. The bypass also includes construction of a large number of road viaducts, including three built by Freyssinet subsidiary Freysaş.



Scan this QR code to find out more about the project.



## HO CHI MINH CITY METRO, VIETNAM

### **BUILDING THE FIRST METRO LINE**

Freyssinet is handling prefabrication, transport and installation of the segments as well as the prestressing for the 12 km of viaducts that make up the Ben Thanh-Suoi Tien Line of the Ho Chi Minh City metro. Construction calls for a total of 4,565 segments and 361 spans. At the end of November 2015, the teams precast the 1,300<sup>th</sup> segment and installed the 70<sup>th</sup> span. Ho Chi Minh City, which lies in the Mekong Delta, is Vietnam's most densely populated city with more than eight million people. The Ben Thanh-Suoi Tien Line is its first metro line. Set to open in 2020, it will connect the north-eastern districts with the city centre and comprise 11 elevated stations and five special bridges across rivers and major road arteries.



## WEBB DOCK TERMINAL, AUSTRALIA

### **LARGE SCALE REFURBISHMENT**

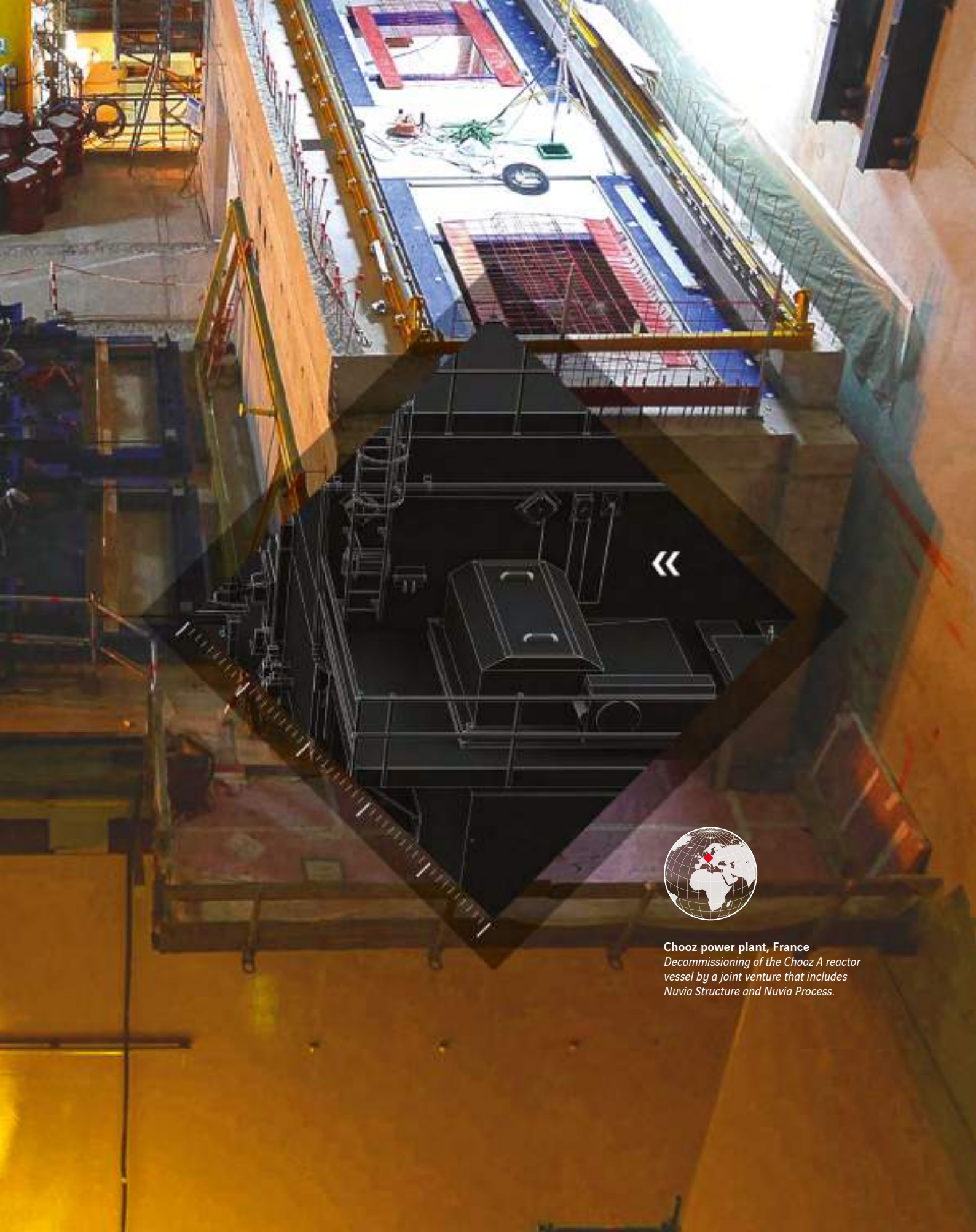
As part of the major port development programme in Melbourne, Freyssinet is in charge of repairing and reinforcing several quays at the Webb Dock terminal. The objective is to reconfigure the Webb Dock in order to increase its handling capacity. The new facility is designed to handle a minimum of one million containers per year. This is the largest quay refurbishment project ever undertaken in Australia. Freyssinet's assignment notably includes: concrete repair, repair of the steel piles and installation and continuous monitoring of impressed current cathodic protection systems. The teams are out in force on the site to meet the very strict delivery schedule. A special submersible access platform has been designed and implemented for the project. It contains an innovative confinement to prevent pollution of the water surrounding the project. Work got under way in January 2015 and should be completed by the summer of 2016.





*NUCLEAR*





**Chooz power plant, France**  
*Decommissioning of the Chooz A reactor vessel by a joint venture that includes Nuvia Structure and Nuvia Process.*





## INTERVIEW WITH BRUNO LANCIA

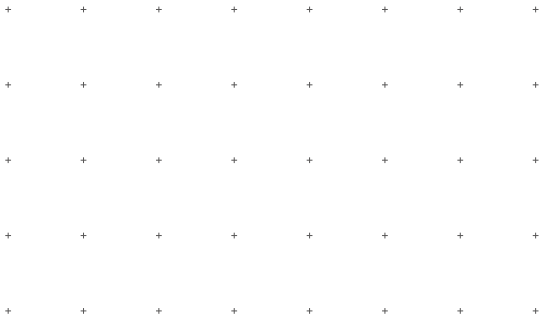
**Chief Executive Officer, Nuvia**

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### **How was the Group positioned in 2015?**

*After years of strong growth, Nuvia continued to expand in 2015. The full-year impact of the 2014 acquisition of German companies SEA and MED, which specialise in hand-held radiation protection and nuclear medicine equipment, was a contributing factor. Ongoing growth of our activities, especially in the Czech Republic and in France, offset a downturn in the United Kingdom and Northern Europe.*

*Order intake again accelerated and came in at nearly €500 million at the end of the year, an all-time high. The main orders were for the Epure project in France, the European research centre at the Ispra site in Italy and the FGMSP (First Generation Magnox Storage Pond) project at the Sellafield site in the United Kingdom. I should point out, however, that these major contracts, which offer extremely promising prospects, are spread across a number of years and have uneven impact from one company to another.*



*“We will continue to promote our two product lines, NUVIA Tech Instruments and NUVIA Tech Protection.”*

*The safety of our people is our central concern. Our results are improving but we must continue to work on safety at all levels, in all areas, on the sites, in our offices and in our workshops.*

#### **What is your roadmap for 2016?**

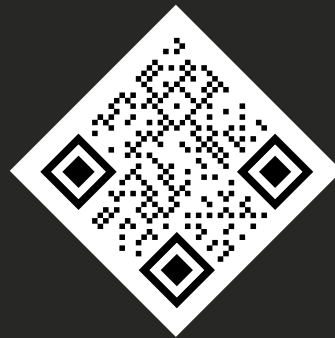
*We face quite a few challenges in 2016, particularly in carrying out several major projects involving maintenance (retubing condensers at the Cattenom power plant in France), decommissioning (Chooz A reactor in France) and EPC (Engineering, Procurement and Construction) at the Sellafield site in the United Kingdom, the Epure site in France and the “hot cell transport system” for the French Atomic Energy Commission’s Jules Horowitz reactor at Cadarache in France.*

*In terms of expansion, we will continue to promote our two product lines – NUVIA Tech Instruments for nuclear measurement and NUVIA Tech Protection for facility protection – around the world, with new prospects in the Asian market.*

*Meanwhile, we are launching two new business activities: Nuvia Coating, which applies special coatings, and Nuvia Access, which installs scaffolding and access systems. These two new services round out our positioning in sensitive industrial facility logistics and maintenance.*

## **NUCLEAR SPECIALIST**

The Nuvia Group works throughout the life cycle of nuclear facilities, from construction to operation, maintenance and decommissioning, and covers three areas of activity: engineering, services and works, and products. Its activities comprise civil engineering, mechanical engineering, waste management and radiation protection, including nuclear measurement, and fire and flood protection.



Scan this QR code to watch the video of the year’s main projects.



**2,600**  
EMPLOYEES

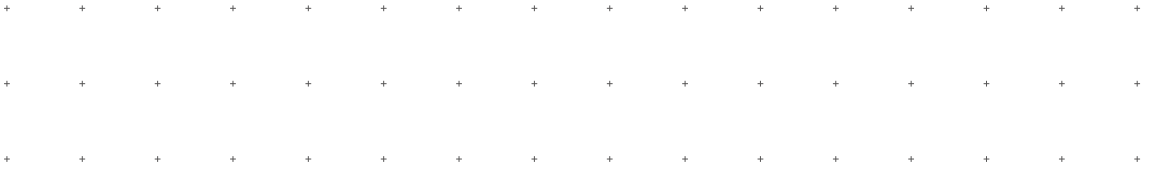


**€358 MILLION**  
REVENUE

#### **NEW ORDERS:**

- FGMSP project at the Sellafield site in the United Kingdom
- Epure project in France
- European research centre at the Ispra site in Italy

## A LOOK BACK AT 2015



### NUVIA SUPPORT



In 2015, Nuvia Support continued its expansion in logistics support for maintenance operations at nuclear sites and site operators. The company expanded its scope in these fields after winning a new contract at EDF's Saint Laurent des Eaux site in France (reactor A). It developed and implemented innovative technical solutions to substantially reduce the dose impact, notably by means of a new mobile fuel pool filtration unit. Meanwhile, it continued to expand radiation protection and health and safety activities for EDF, CEA and Areva.

## NUVIA STRUCTURE



In 2015, nuclear operator engineering departments renewed their confidence in Nuvia Structure, which took part in designing the modifications and justifying technological innovations to protect equipment from external hazards. After two years of testing, Nuvia Structure was selected to supply the 382 anti-seismic bearings that will isolate the EDF emergency genset buildings under construction as part of the post-Fukushima requirements. During the year, work began on the new construction projects in which Nuvia Structure was also positioned in design-build operations. The longstanding prestressing activity expanded with the Jules Horowitz reactor and the Vercors mock-up in France. Work to apply special coatings to the reactor building intrados and supply and install steel lined tubes also began in 2015. Mechanical engineering and heavy equipment handling work increased, particularly for Areva and as part of EDF's "Grand Carénage" overhaul.

## NUVIA PROCESS



Nuvia Process continued its expansion in decommissioning works in 2015, with the development of new mechanical processes. During the year, the final phase of work to dismantle the Plutonium Purification Laboratory at the CEA site in Cadarache, France, was completed. The company developed new equipment for confining the cutting process. On the ATTILA pit investigation project at the CEA centre in Fontenay aux Roses, France, Nuvia Process put its experience feedback to use and carried out 3D modelling, hot tapping and sampling in the vessels, again making use of its radioactive facility remote sampling expertise. At the CEA site in Marcoule, France, Nuvia Process began the remote-controlled thermal cutting of three of the 46 G1 fuel baskets in 2015. At the same site, Nuvia Process remote operators began dismantling the equipment and pipework in cell 414 of the APM pilot reprocessing facility using MAESTRO, a highly innovative slave arm manipulator developed by the CEA.





## NUVIA PROTECTION

In 2015, Nuvia Protection booked substantial orders in France and in the world market, confirming its leadership with orders for the Fire Risk Management contract to supply and install penetration fire protection systems at 22 units of the French nuclear fleet over a period of seven years. Its expertise was confirmed in the new-build market with the implementation of fire protection seals at the Flamanville 3 EPR and the qualification of its entire range of products under the new-generation nuclear reactor technology standard. In China, Nuvia Protection won all passive fire protection projects for the two EPR units at Taishan. Deliveries will be spread over the coming three years. Nuvia Protection also operates in the Korean, Indian, Japanese, North American and European markets.



## MILLENNIUM

In 2015, major projects started previously continued apace: Epure (with Nuvia and VINCI Construction France) for the British Ministry of Defence; Cigéo (with POMA, Airbus and Ligeron) for Andra; ARCHADE (with Sogea) for the Normandy region; and CROZON (with Airbus) for the CEA at Marcoule in France. During the year, substantial expertise was also brought with high value-added projects such as the neutron / criticality studies for the re-racking project in Chinese power plants, the mechanical engineering studies for particularly strategic packaging for a European client, culminating in participation of the criticality entity's experts in a world congress in the United States. Having reinforced its human resources and organisation, Millennium now delivers one of the most comprehensive ranges of risk management solutions and services.

## NUVIA UK



In 2015, Nuvia UK received a RoSPA award. The Royal Society for the Prevention of Accidents presented the prestigious award for the 18<sup>th</sup> consecutive year to Nuvia's British subsidiary, which has now worked 6.5 million hours since its last accident.



The EPC team in Sellafield achieved the objectives of the B38 VOSL (Vacuum Operated Slug Lift) project with the design, supply and installation of a lifting unit to be used in removing waste under optimum safety conditions. It received the maximum contract bonus for completing the work ahead of schedule.

The Nuvia UK teams also took part in designing a facility for transferring sludges in transport containers to a reprocessing centre, where they will be encapsulated for storage. The work was completed on schedule and on budget.



The Nuvia UK radiation protection department won nearly 50% of the British Nuclear Decommissioning Authority contract. It notably provides for rollout of NuWM HiRAM equipment at a number of Magnox sites.

In Bulgaria, Nuvia UK's project management contract for decommissioning the Kozloduy nuclear power plant was extended.

In new reactor construction, Nuvia UK won contracts covering consultancy and engineering for future nuclear operators.

On the ITER project, Nuvia UK handed over work on the gas detritiation system.



SEA AND MED



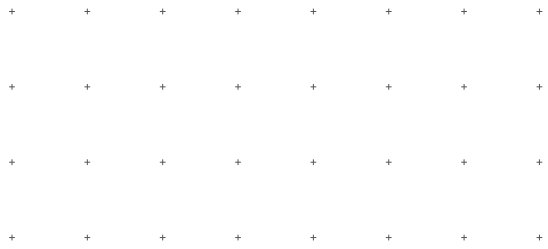
In Germany, the civil defence authorities work with partners such as SEA, which specialises in radiation protection equipment and nuclear measurement. In 2015, they renewed the contract with SEA and their confidence in the company's effective equipment, ordering more than 1,000 units of the NuHF COMO. In addition, the state of Baden Württemberg selected SEA to supply 22 portable radiation inspection systems. MED continued to expand in the design and production of radiation monitoring systems used in the nuclear medicine sector.

NUVIA CZ



HELCZA (High Energy Load Czech Assembly) is a one-of-a-kind experimental device designed to perform high heat flux cyclic loading of plasmafacing components of thermonuclear reactors. It is to be used in full-scale testing of the modules of the first interior wall of the ITER containment at Cadarache, France, as well as the inner vertical targets and the screens of the radiofrequency antenna (with a surface of up to 2.2 sq. metres). The project was developed by the Research Centrum Řež at the Pilsen experimental centre in the Czech Republic. Nuvia CZ, which offers widely respected EPC capabilities, won the contract. The one and a half year project was completed in December 2015.





## NUVIA NORDIC

2015 was a transitional year for Nuvia Nordic. It broadened its range of solutions and services beyond its traditional radiation protection activity. The company carried out a major decommissioning operation on the reactors at the Svafo site in Studsvik, Sweden. Working with Areva and EBS, Nuvia Nordic dismantled, cut and prepared the waste from the two research reactors to prepare it for final storage. The decommissioning operation took place in three stages: segmentation of the reactors and emptying of the reactor ponds; deconstruction of the radioactive parts of the reactor pond and biological loop; dismantling of remaining installations and structures. Before proceeding to final cutting, Nuvia Nordic characterised the waste.



## PICO ENVIROTEC

In Canada, Pico Envirotec completed the development of the SIRIS remote radiation detection system. The equipment can be used around the world to ensure safety and is designed for both military and civil defence purposes. Based on Pico Envirotec's geolocation and nuclear measurement expertise, SIRIS notably supports directional radiation detection, isotope identification, neutron detection and high dose identification. In the geophysical field, the company also delivered an airborne gamma ray spectrometry system for environmental monitoring to the Vietnamese government.





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