SOLETANCHE FREYSSINET

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SOLETANCHE BACHY · MENARD · TERRE ARMEE · FREYSSINET · NUVIA

SOLETANCHE FREYSSINET

2011
ACTIVITY REPORT

SOLETANCHE BACHY

MENARD

TERRE ARMEE

FREYSSINET

NUVIA

In 2011, Soletanche Freyssinet again demonstrated its momentum and the strength of its model. Revenue rose 11% from 2010 to €2.244 billion. All three business segments grew in 2011. In ground works, Soletanche Bachy was involved in large-scale projects in many different countries (France, Mexico, United States, United Kingdom, Asia) and Menard also recorded substantial growth of 18%, reflecting strong business activity in the Middle East and Poland. Terre Armée achieved a record year in Canada, Australia and the United States. In structures, Freyssinet substantially boosted its activity (+9%), notably as a result of emblematic projects in Russia and Canada. In the nuclear segment, Nuvia continued to increase its activity, achieving growth of 15%, in its two main markets, France and the United Kingdom. In 2011 we continued our external growth policy with the acquisition of a number of specialised companies: Bermingham in Canada, Zetas in Turkey, Roger Bullivant in the United Kingdom for ground works, Mndeni Structural Services and Freyssinet CS for Freyssinet and Dyanergie for nuclear works in France. These acquisitions broaden our expertise and further strengthen the Group in the international market. They also offer new opportunities for internal synergies and boost our Resonance plan across all our business segments. Indeed the theme of our upcoming convention in April in Mexico City will be Working Together, More and Better. We started 2012 with a record €2.1 billion order backlog and further expanded it in the first months of the year. The challenge for us in 2012 will be to further increase our activity while maintaining our performance level, and we have the capabilities and resources to achieve it.

"Our recent acquisitions broaden our expertise and further strengthen the Group in the international market"

BRUNO DUPETY
Chief Executive Officer
of Soletanche Freyssinet

Cover photos:
Russky Island - Russia
National Art Gallery - Singapore

Photos opposite:
Toulon tunnel - France
Decommissioning/Nuvia - France
Geoga Bridge - South Korea

PROFILE

3 business
segments and
5 brands
serving clients on
5 continents

As the world leader in ground, structural and nuclear engineering, the Soletanche Freyssinet Group brings together an unparalleled array of specialised civil engineering capabilities. Operating throughout the world, our 18,000 employees meet the needs of clients by devising and implementing solutions tailored to the specific features of each project, whatever its complexity and scale. Working on thousands of projects every year, they help design, build, maintain and repair a wide variety of structures including bridges, port facilities, transport infrastructure, shopping centres, high-rise buildings, nuclear sites, dams, stadiums, mines and tunnels. Their expertise, combined with a culture of technical excellence and strong technological creativity, helps boost the performance and durability of each structure.

TEO wastewater tunnel - Mexico.

Bruno DUPETY
Chief Executive Officer of Soletanche Freyssinet, Chairman of Soletanche Bachy

Jérôme STUBLER
Chief Executive Officer of Freyssinet and Terre Armée, Chairman of Nuvia

Marc LACAZEDIEU
Chief Executive Officer of Menard

Jean-Philippe RENARD
Area Director, Asia, Latin America, Eastern and Central Europe, Iberian Peninsula and Director, Grands Projets Division, Soletanche Bachy

ORGANISATION

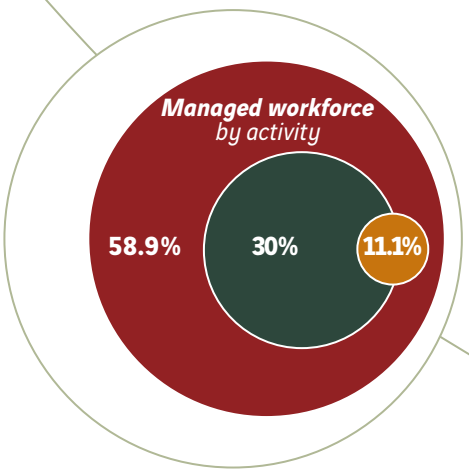
Coordination Committee

Martin PRATT
Executive Vice-President
Northern Europe, Gulf Countries,
Southern Africa, Monitoring
& Geophysics

Didier VERROUIL
Director, Eurofrance Division,
Soletanche Bachy

Pierre-Yves BIGOT
Human Resources Director,
Soletanche Freyssinet

Yann GROLIMUND
Chief Administrative and Financial Officer,
Soletanche Freyssinet



18,000 employees

80 countries of location

over **100** countries of operation

SOLETANCHE BACHY

- Special foundations and ground technologies
- 9,100 employees
- **2011 revenue:** €1,206 million (managed revenue*: 1,278 M€), i.e. +11.9% from 2010
- **2011 highlights:** Soletanche Bachy recorded strong organic growth (+25%) in the United Kingdom and a good level of activity in France, Poland (+48%) and the United States. Brisk business for the Grands Projets Division. Acquisitions in Turkey (Zetas), Canada (Bermingham) and the United Kingdom (Roger Bullivant).
- Sales and marketing successes included: El Teniente mine tunnel, Chile; Hong Kong airport; Torre Bancomer, Mexico; Subansiri dam, India; and ports (Puerto Brisa in Argentina; Muelle C in Montevideo, Uruguay; Miami, Florida). In France: Dunkirk LNG, Vélizy light rail, RTE.
- Main worksites: handover of the port of Cotonou, Benin; breakthrough of the Toulon tunnel, France; Wolf Creek dam and World Trade Center Vehicle Security Center, United States; Crossrail, Lee Tunnel and London Gateway, United Kingdom; Singapore and Hong Kong metros.
- Order intake: €1.3 billion; order backlog: €1.3 billion, i.e. 12 months of activity.

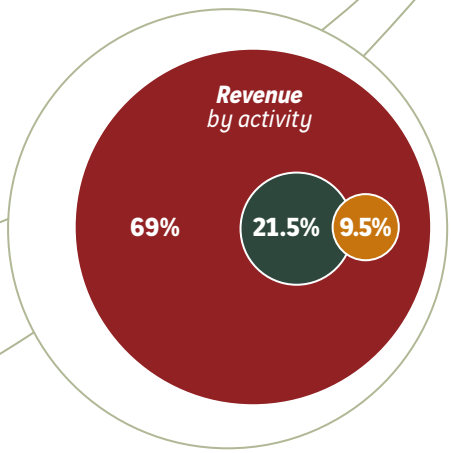
MENARD

- Ground reinforcement and improvement
- 750 employees
- **2011 revenue:** €177 million i.e. +18.3% from 2010
- **2011 highlights:** very strong growth based on export projects in Central Asia, large-scale worksites in the Middle East (+55%) and buoyant activity in Poland (+61%) and Germany (+27%). Major projects in Vietnam, Indonesia and Australia (+36%). More than 300 projects in France.
- Main worksites: new cities in Kuwait; Yanbu refinery, Saudi Arabia; Ras Az Zawr desalination plant and power plant, Saudi Arabia; Yoloten gas fields, Turkmenistan; Gdansk bypass, Poland; Barangaroo seafront redevelopment in Sydney, in partnership with Soletanche Bachy and the Port of Brisbane, Australia; and airports: Reagan National in Washington, D.C., United States, and Jakarta, Indonesia.
- Order intake: €171 million, i.e. +8%; order backlog: €63 million.

TERRE ARMEE

- Retaining structures and pre-cast arches for tunnels
- Over 750 employees
- **2011 revenue:** €160 million, stable from 2010, +3.1% without exchange rate impact
- **2011 highlights:** strong business activity in the United States, Canada (+12%) and Australia (+53%). Ongoing growth in India.
- Contracts signed included: North Tarrant Expressway and I-635, Texas, United States; Syncrude North Mine, Canada; Mediterranean Highway, Morocco; and the largest TechSpan® arch tunnel, in Korea.
- Main worksites: Double Track, Malaysia; Badarpur, India; Escondida mine, Chile; Port Louis Ring Road, Mauritius; Gautrain railway, South Africa; Koniambo mine, New Caledonia; UHG CHPP, Mongolia.
- Good order intake level maintained at €183 million, i.e. 12 months of activity, order backlog slightly up at €161 million.

KEY FIGURES



2.2 billion euros
revenue

2 billion euros
order backlog

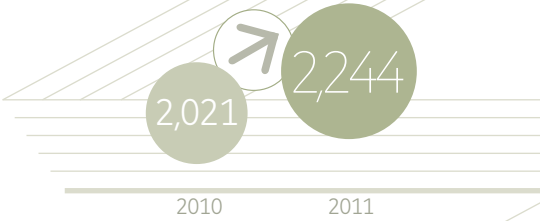
FREYSSINET

- Integrated technical solutions in new construction and repairs of structures
- Over 5,400 employees
- **2011 revenue:** €486 million (managed revenue*: €573 million), i.e. +9.2% from 2010
- **2011 highlights:** buoyant performance in Australia (+38%), France, Asia, United Kingdom, (+45%), Poland and Grands Projets. 6,000 projects during the year.
- Successful sales included: Adelaide Superway and MLC Tower, Australia; Puente Frontera, Mexico; Pannecière dam, France; Kumho-gang and Doon nam bridges, Korea.
- Main worksites: Mucem, Marseille, France; LNG tanks, China; bridges: Russky Island and Golden Horn, Russia; Wroclaw, Poland; Moulay Hassan, Morocco; Ho Chi Minh City, Vietnam; Recouvrance, France; and many bridges in Korea; Meftah cement works, Morocco; cable stayed roofs: BC Place stadium, Vancouver, Canada, and Puy du Fou, France; Soyo LNG tanks, Angola.
- High order intake at €467 million (€564 million managed) and order backlog increase to €400 million, i.e. 9.5 months of activity.

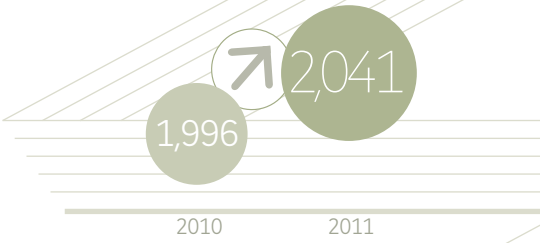
NUVIA

- Specialised expertise for the nuclear industry
- 2,000 employees
- **2011 revenue:** €215 million, i.e. +14.7% from 2010
- **2011 highlights:** very good performance in France and the United Kingdom. Growth in China. Creation of subsidiaries in Sweden and India. Acquisition of Dyanergy.
- Major contracts: in France, decommissioning of facilities and design of anti-seismic supports at the Cadarache site, radiation protection work at Dampierre, civil engineering for the fire protection maintenance programme at all EDF nuclear plants, first operating contracts for the CEA in Marcoule and Cadarache; renewal of operating and maintenance contracts (CEA Valduc, Moronvilliers PUM, Areva La Hague). Final dismantling of outdoor storage area 98 at Areva Marcoule site; in the United Kingdom, ongoing studies for the Silos Direct Encapsulation (SDP) project at Sellafield, expansion in the defence and reactor sectors.
- Good order intake of €215 million, up 13%, and stable order backlog of €159 million, i.e. 9 months of activity.

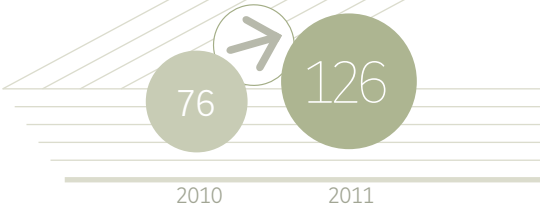
REVENUE
in € millions



ORDER BACKLOG
in € millions



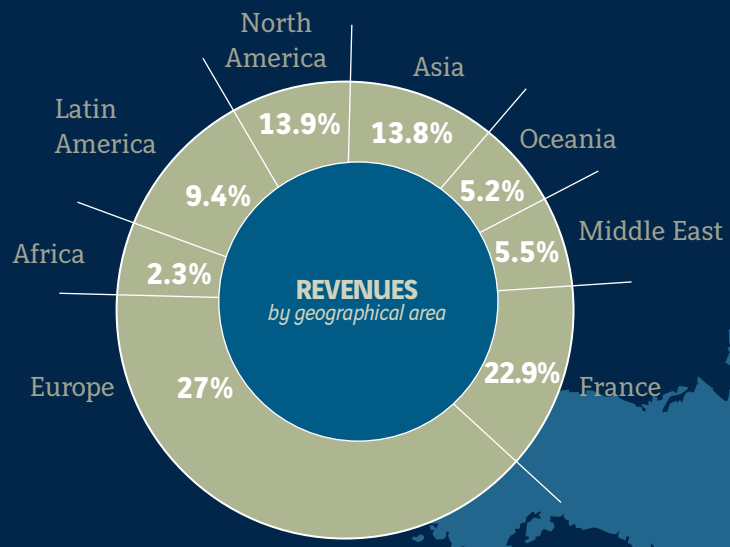
OPERATING PROFIT
from ordinary activities in € millions



STRUCTURES

NUCLEAR

** Revenue including the share held in jointly controlled companies.*



- Abu Dhabi
- Algeria
- Argentina
- Australia
- Belgium
- Botswana
- Brazil
- Bulgaria
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Czech Republic
- Dubai
- Egypt
- El Salvador
- France
- Germany
- Guadeloupe
- Guatemala
- Honduras
- Hong Kong
- Hungary
- India
- Indonesia
- Ireland
- Italy
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- Netherlands
- Nicaragua
- New Zealand
- Oman
- Pakistan
- Panama
- Philippines
- Poland
- Portugal
- Qatar
- Reunion Island
- Romania
- Russia
- Saudi Arabia
- Serbia
- Sharjah
- Singapore
- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Thailand
- Turkey
- Ukraine
- United Arab Emirates
- United Kingdom
- United States
- Uruguay
- Venezuela
- Vietnam
- Zambia

LOCATIONS

The Soletanche Freyssinet group is a global network with 18,000 employees and some 160 companies in more than 80 countries. In 2011, its teams carried out projects on the five continents.

« Soletanche Freyssinet again demonstrated its momentum and the strength of its model in 2011. »

Bruno Dupety, Chief Executive Officer of Soletanche Freyssinet

POSITION & STRATEGY 2011

RESONANCE - INNOVATION and R&D - SUSTAINABLE DEVELOPMENT

RESONANCE

Expanding our synergies to create value

INNOVATION and R&D

Invention is our business

SUSTAINABLE DEVELOPMENT

Safety, social and environmental goals

AUSTRALIA
Sydney

BARANGAROO PROJECT (Australia)

Barangaroo is one of the world's largest seafront development projects. A former 22 hectare container terminal is being transformed into a new precinct in the heart of Sydney.

RESONANCE

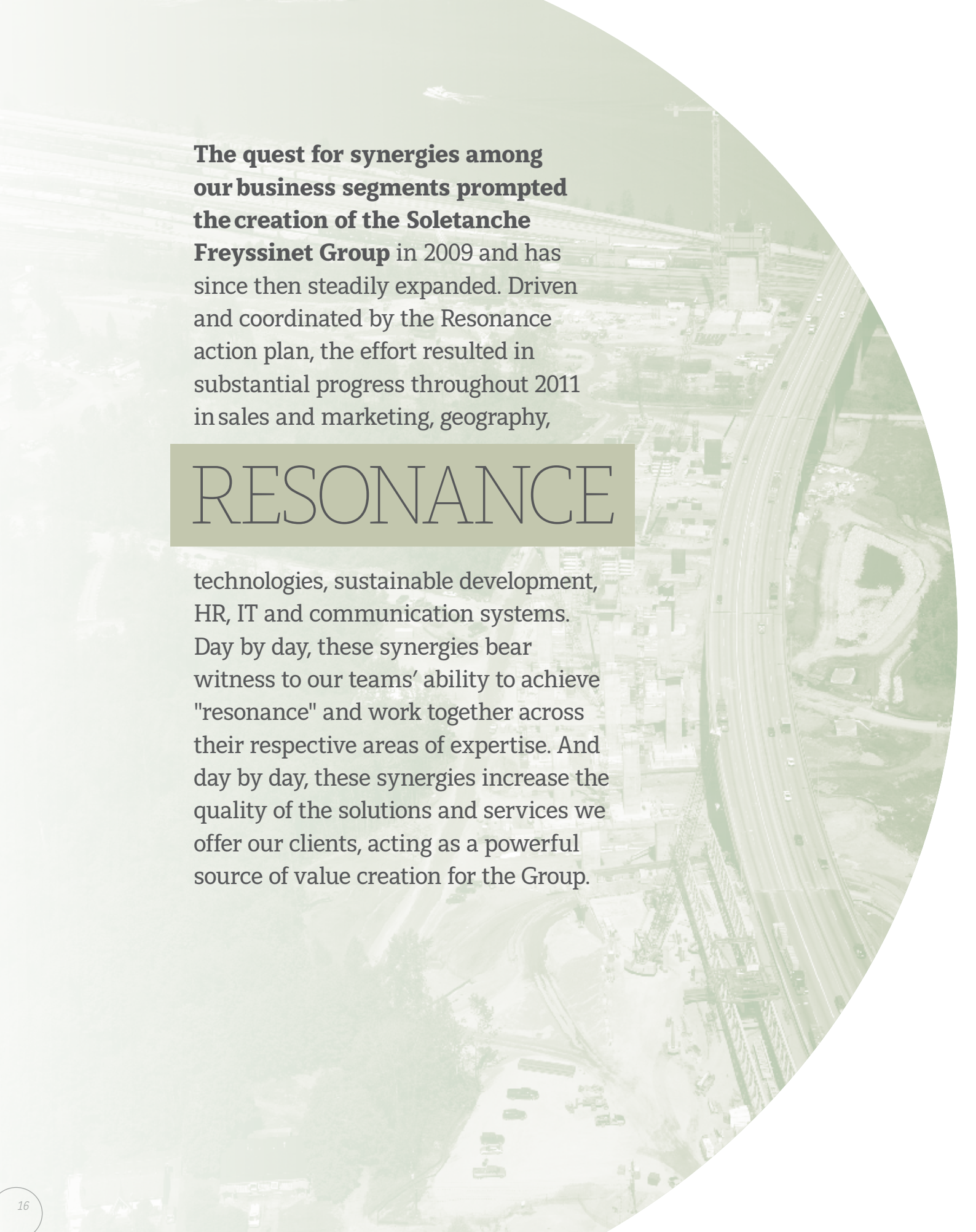
The project developer awarded the contract to design and build the peripheral basement wall to Menard Bachy. It consists of a 13,000 sq. metre diaphragm wall and 650 ground anchors. Launched in November 2011, this site also brings in Soletanche Bachy engineering teams, hence combining local experience with the global expertise of a group in its speciality area.

INNOVATION

With the support of the Soletanche Bachy design office, Menard Bachy has developed a state-of-the-art, bold and innovative design for the basement wall, overcoming a number of challenges including walls without anchors adjacent to sensitive buildings, deep excavation in sandstone using a Hydrofraise and excavation in waterlogged reclaimed land.

SUSTAINABLE DEVELOPMENT

When drawing up its submission Menard Bachy used the Prism tool developed by the Group *(see page 27)* to highlight the environmental advantages (concrete and steel savings, 38% reduction in CO_2 emissions) of its solution. Prism was subsequently used to precisely measure the performance of the concrete formula in this respect and to select the steel supplier according to exacting environmental criteria.



The quest for synergies among our business segments prompted the creation of the Soletanche Freyssinet Group in 2009 and has since then steadily expanded. Driven and coordinated by the Resonance action plan, the effort resulted in substantial progress throughout 2011 in sales and marketing, geography,

RESONANCE

technologies, sustainable development, HR, IT and communication systems. Day by day, these synergies bear witness to our teams' ability to achieve "resonance" and work together across their respective areas of expertise. And day by day, these synergies increase the quality of the solutions and services we offer our clients, acting as a powerful source of value creation for the Group.

BY SHARING THEIR EXPERTISE, resources and experience within the Resonance plan, the teams of the five Soletanche Freyssinet brands are steadily increasing the Group's ability to expand and to enhance the excellence it owes to its customers.

Penn Park university sports centre, Philadelphia, United States.

ACCELERATED SYNERGIES

Under the Resonance plan, the Group's various entities succeeded in further expanding their synergies, as exemplified in a large number of projects carried out by several of them working together. In addition to ongoing work on the Penn Park project in the U.S. city of Philadelphia involving Terre Armée, Menard and Soletanche Bachy, and the refurbishment of Port Mann Highway 1 in Vancouver involving Freyssinet and Terre Armée, the Group won a number of high-profile projects based on the pooling of its companies' expertise. In the United States, the Mullica Bridge widening project brought together Freyssinet (supply, installation and tensioning of 150 tonnes of prestressing), Terre Armée (design and supply of more than 3,700 sq. metres of walls) and Menard (1,800 controlled modulus columns). In Canada, Agra Foundations, which joined Soletanche Freyssinet in the summer of 2010, and Menard's Canadian subsidiary Geopac pooled their capabilities to propose a ground improvement solution combining the stone column and pile foundation techniques for the Ikea store project near Vancouver. Lastly, in Australia, the Barangaroo redevelopment project in Sydney, on which Menard Bachy and the Soletanche Bachy engineering teams are working together, is also emblematic of the expertise and experience value that synergies create for the benefit of clients.

A POWERFUL GROWTH DRIVER

Above and beyond its operational benefits, Resonance also accelerates the Group's international expansion by fostering geographical synergies among its five companies. The presence of one of them in a country gives the others a decisive advantage (familiarity with the local market, local contacts, pooling of premises and resources) that they can build on to set up their own agency or subsidiaries. Menard and Freyssinet took advantage of such opportunities to create subsidiaries in Mexico and Colombia respectively. Terre Armée has built on Soletanche Bachy's local roots in Chile to expand its operations in that country. Meanwhile, Menard and Soletanche Bachy joined forces to set up joint agencies in Warsaw, Poland and Preston, United Kingdom, on January 1, 2011. Formed by putting together existing entities belonging to Soletanche Bachy and Menard (Soletanche Polska and Menard Polska) in Poland and by integrating Menard France resources in Vibro Project Ltd (Soletanche Bachy) in the U.K., the two 50-50 joint ventures offer their customers expertise (design, techniques) covering the full range of ground improvement works in the two countries.

Lastly, geographical synergies among the Group's various entities were stepped up in the Middle East and in Asia, as well as in the United States, where Menard and Nicholson signed a ground improvement partnership in 2011.

Technical synergy.

Port Mann Highway, Canada.

Other technical and technological synergies were generated in 2011 with the goal of putting together new offerings based on combinations of expertise. Soletanche Bachy France for the first time installed Freyssinet anchor ties in the nuclear sector, and Nuvia worked with Freyssinet Products Company (FPC), a subsidiary of Freyssinet, to design the "Clementine", a new special machine tool, for use as a dedicated cutter in decommissioning works *(see page 23)*.

COMPLEMENTARY EXPERTISE

The momentum created by all these synergies in turn drives the Group's approach to marketing and communication. Soletanche Freyssinet offers a state-of-the-art array of specialised and complementary expertise that can be combined to take on all or part of certain structures. Cases in point are the World Roads Congress in Mexico City in September 2011, at which Terre Armée, Freyssinet and Cimesa (the Mexican subsidiary of Soletanche Bachy) had a single stand, and at the Second Bridge Conference in Penang, Malaysia, a world gathering devoted to the bridge market.

Stepping up exchanges and joint work among the entities is key to the Group's expansion. The diversity of their expertise is an asset for the Group and a value for its customers. In addition to driving innovation, these synergies also give the Group an undisputed edge in the market.

World Road Congress, Mexico City.

INNOVATION and R&D

In each of its business activities, Soletanche Freyssinet focuses on innovation. Our R&D teams devise and develop new, more efficient, more competitive and more sustainable solutions to constantly improve our ability to meet clients' needs and give them the benefit of the latest technological developments. In new construction, repairs and services alike, the development of new processes and new equipment builds on our experience in the field with the thousands of structures on which we work every year. This innovation policy, to which the Group devotes substantial resources, results in a large number of patents. Nearly 30 were filed in 2011.

Polymer muds as drilling fluids.

A HEAD START BENEFITING OUR CLIENTS

For the Soletanche Freyssinet Group, innovation is a source of development and value creation. Day by day, our companies' R&D teams devise the solutions of tomorrow that can meet our clients' technical and economic challenges.

SOLETANCHE BACHY

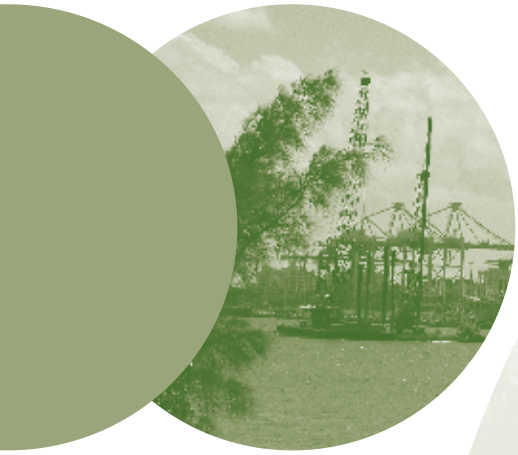
Polymer muds: a breakthrough in drilling fluids

Two years of research, during which Soletanche Bachy conducted more than one hundred tests and dozens of trials, resulted in the replacement of bentonite with polymer mud as drilling fluid.
The research made it possible to select families of polymers suited to our projects. They are easy to procure around the world, and lend themselves to the terrain and to the equipment (excavation and treatment of muds) typical of foundation works.
Their advantages are environmental (they are easily destroyed at the worksite), economic (50 to 75% less mud to be used and removed) and logistical (shorter installation time and smaller worksite footprint). Lastly and above all, they can be used in work that would be difficult to carry out with bentonite mud. It is expected that this solution, which won the Grand Prize in the VINCI 2011 Innovation Awards, will be used in 20 to 60% of projects within five to ten years.

A new compact, mobile Hydrofraise

With the HC05, the Hydrofraise range is further broadened to include a new machine that can work in low-headroom projects and is easy to transport. Its main advantage is its compact dimensions. Designed by the Soletanche Bachy teams, it can be shipped anywhere in the world in three 40-foot and three 20-foot containers. It can also be rapidly assembled and disassembled (three days). This new machine was first used on the Clichy-Batignolles noise barrier project in France and then on the Subansiri dam in India. It can drill to depths of up to 50 metres with thicknesses of 630 to 1,200 mm, with a headroom requirement of 5.30 metres.

HC05, the new small Hydrofraise machine.



MENARD

A competitive alternative CMC method

To overcome the problem of transporting the heavy machinery required to carry out small operations from one project to another over long distances in North America, Menard has developed a new tool for the construction of controlled modulus columns (CMC). The mast-like tool can be transported with its accessories on a conventional semi-trailer truck and installed on most standard excavators, which can be locally rented. This avoids the need to transport heavy drilling machines. An extension system enables the machine to accommodate three different CMC depths. The device is controlled by simple joystick from the operator cab.

CMC: new Menard tool.

FREYSSINET

First application of the 1R15 anchorage in Australia

Freyssinet used the 1R15 additional external prestressing anchorage for the first time in Australia. The anchorage, composed of a steel casting protected by a Rilsan layer, is specially designed to reinforce existing structures, and especially those made of thin elements. This first application involved 2,000 anchorages for the Burnley Viaduct, which is made up of simply supported prestressed concrete I girders. The 1R15 anchorage has many advantages compared to conventional concrete anchor blocks or fabricated steel anchorages: the performance and reliability of a mechanical anchorage, transfer of the prestressing forces to the surface of the structure, low space requirement, simple and fast installation, elimination of the need to cast concrete on site and strong competitive solution due to product industrialisation.

FNTP Trophy in the Technical Processes category.

SPRINGSOL RECOGNISED

In November 2011, Soletanche Bachy won a sixteenth FNTP (French national federation of public works) Trophy in the Technical Processes category for its Springsol process. Springsol is used to build soil-cement columns by means of an opening tool that transforms previously unusable soils into construction products and considerably reduces the environmental impact of the worksite by cutting the volume of materials to be handled and transported as well as the amount of cement consumed.

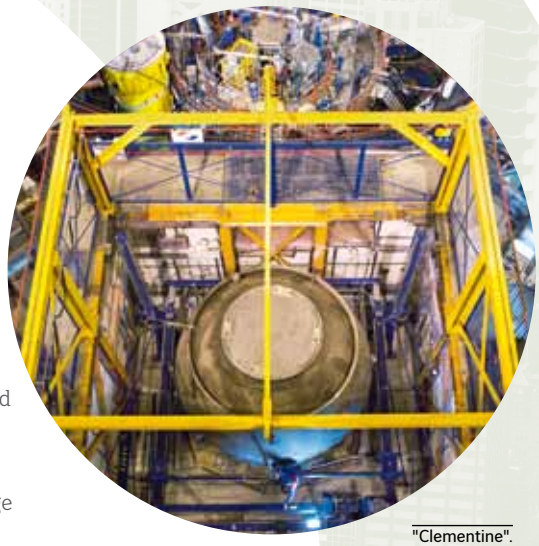
The 1R15 anchorage.

INNOVATION and R&D
Invention is our business

Cohestrand®: a solution for stresses in suspension bridge load-bearing cables

Used on some twenty structures around the world, Freyssinet's Cohestrand® system was again employed in the construction of a new suspension bridge in Verdun-sur-Garonne, France.
The suspension system was developed to withstand transverse clamping and longitudinal slipping forces and to thus maintain continuity of corrosion protection at the hanger collars of suspended bridge cables. The special feature of the new project is the structure's dimensions (the main span has a length of 168 metres), which required a bearing cable made up of 185 strands instead of the usual maximum number of 109, with corresponding outsized anchors and saddles. The other special feature of the project is its technically sophisticated construction involving such techniques as passive loading of the suspension by lowering in the absence of jacks to tension the cables.

Cohestrand® cross-section.



"Clementine".

NUVIA

"Clementine", the diamond wire cutting machine

To dismantle the secondary tunnels at EDFs Creys-Malville power plant, the four expansion tanks must be cut in a very delicate operation requiring painstaking attention during the design and works stages. The tank characteristics (11 metre height, 25 mm thickness, 34 tonnes of stainless steel) and the proven presence of sodium rule out the use of conventional hot cutting techniques. Against this backdrop, Nuvia France teams worked with the Freyssinet Products Company (FPC), Freyssinet's factory, to develop a special diamond wire cutting tool in 2011. Called "Clementine", it took 1,000 hours to design and won the Nuvia France Grand Innovation Prize. Following a trial run in Macedonia at the boilermaker premises and several months of qualification testing, it will perform its first cutting operations in 2012.

TERRE ARMÉE

A world first for EcoStrap™ HA® reinforcements

Terre Armée applied its EcoStrap™ Haute Adhérence® geosynthetic reinforcement for the first time ever on the Parc du Bicheret project in Chessy, France. Combined with a TerraSet®-GeoMega® solution, it met the architectural and economic requirements of the project, in which 725 sq. metres of retaining walls are being built with the use of loam recovered at the site. EcoStrap™ HA® is particularly well-suited to applications in which the backfill is potentially highly alkaline, as is the case when the material is stabilized with lime and cement, or is made up of recycled aggregates containing crushed concrete. In addition to optimising the cost of technical backfilling, EcoStrap™ HA® offers many other advantages: simplification of the construction process; durability and proprietary profile achieving higher adhesion in the backfill; and high skid resistance (higher friction capacity).

EcoStrap™ HA® reinforcements in Chessy.

SUSTAINABLE DEVELOPMENT

Soletanche Freyssinet's sustainable development policy is based on its conviction that its values and capabilities can help achieve the economic, environmental and social goals of its clients and of society at large, and that these goals represent growth opportunities for the Group. The policy focuses on three major objectives: controlling the quality, health, safety, environmental and social risks and impacts of its activities; creating value for its clients and anticipating their needs; and strengthening social and civic engagement. To implement this policy and track its execution and progress, the Group has introduced special indicators and an action plan for the period 2011-2013.

SUSTAINABLE DEVELOPMENT
Safety, social and environmental goals

IN ITS ENDEAVOUR TO MEET the environmental, economic and social goals of its clients and the wider society, Soletanche Freyssinet follows an ambitious sustainable development policy, around the world and within each of its entities.

Following publication of its sustainable development policy in 2010, Soletanche Freyssinet drew up an action plan for the period 2011-2013. The plan is shared by all Group business units and covers actions already identified as well as new actions, with special attention to quality, health, safety and environmental risk control; eco-design; added value for the Group's products and services; human resource management; and societal issues.

The plan serves as a "dashboard" for all teams and spells out the topics that are the focus of the sustainable development policy:

- environmental and social risk control;
- sales and marketing;
- social and civic engagement.

The actions described in the plan are supported by measurable concrete objectives and a management system that helps guide each entity in achieving its objectives. Throughout the year, the Group and its entities took a large number of initiatives to support the deployment of the action plan.

Health and safety

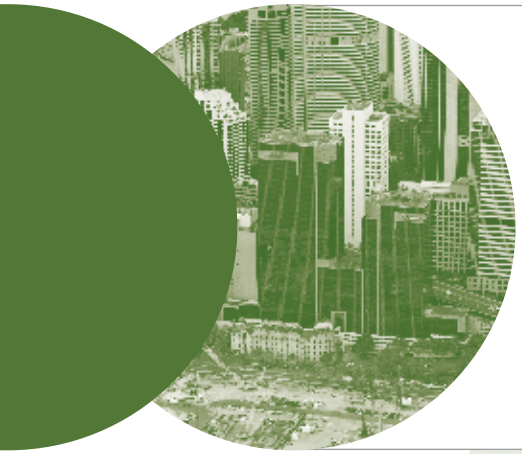
In 2011, the entire Group mobilised to enhance safety, which top management sees as a fundamental need inherent in its business activities and as an additional way to differentiate its technical offering. To achieve the Zero Accidents objective, a number of crucial decisions were taken entity by entity. Freyssinet, Nuvia and Terre Armée adopted a system comprising organisation, training, non-negotiable rules and inspections. It now applies to the entire network and dovetails with the principle of autonomy and empowerment of the subsidiaries.

At Soletanche Bachy, the safety department set up at the end of 2010 gave priority to drafting a common vision and to sharing best practices, notably by organising worksite inspections by the global network of accident prevention managers.

Among the initiatives taken are the international deployment of teaching materials, the extension of regional cooperation and the recruitment of a ▶

ENVIRONMENTAL FOCUS OF THE CLICHY-BATIGNOLLES FOUNDATION PROJECT

The project in the Paris neighbourhood of Clichy-Batignolles serves to illustrate the response the Group can provide to the ever more ambitious environmental goals of its clients and the wider society. Soletanche Bachy, which began a major foundation project in early 2011 that also comprises the construction of a noise barrier to limit the propagation of vibrations from rail traffic to the buildings to be put up at the site, has implemented two tools designed to control the environmental impact of its projects. One is Prism *(see page 27,)* which is employed at various stages of the project, and the other is a mini-wastewater treatment plant (Boussol, to treat liquid sludges from the worksite) installed at the site.



Average GHG (greenhouse gas) emissions for 2011:

83 geq* CO_2/€
of revenue
* gram equivalent

15 teq* CO_2
per person
* tonne equivalent

2011 safety indicators

10.95 Frequency Rate
Number of lost-time workplace accidents x 1,000,000 / number of hours worked

0.47 Severity Rate
Number of days of lost time for workplace accidents x 1,000 / number of hours worked

- QHSE manager for the Grands Projets division.

In France, Soletanche Bachy undertook a number of actions: safety measures for drilling machines, continuous improvement programme for temporary workers, introduction of the Dangerous Situation Rate indicator to track feedback on incidents and dangerous situations.
Lastly, to lend momentum to a common safety effort across all five of the company's regions, Menard appointed a safety coordinator in early 2011.

Port of Cotonou, Benin.

Quality, environment

The Quality, Safety, Environment department of Freyssinet, Nuvia and Terre Armée published a set of environmental recommendations at the end of 2011, covering offices, workshops and worksites respectively, to disseminate knowledge of best practices within these activities. Extending its *Environmental and Energy Policy*, Nuvia Ltd introduced detailed tracking of greenhouse gas emissions so as to comply with the *Carbon Reduction Commitment* requirements. Bachy Soletanche Ltd is also participating in this reporting system.

Meanwhile, Soletanche Bachy France produced a video for operating personnel covering the main worksite environmental risks and organised an in-house training session on water management issues.

Eco-design

Following its launch at the beginning of the year, and the training of some 50 users, Prism, the life cycle analysis tool developed by Soletanche Bachy, which can be used to quantify a project's environmental footprint from bid to execution, has demonstrated its operational effectiveness. It was used in 14 bids (simple environmental balance or comparison of alternative solutions), seven worksite environmental footprint calculations and various environmental comparisons as part of R&D work to characterise the company's new techniques and compare them with more conventional solutions. It was used on major projects such as Barangaroo, for which the environmental benefits of the alternative solution proposed were highlighted: reduction of the project's environmental footprint by about 27%, and

PORT OF COTONOU: A GLOBAL, ENVIRONMENTAL AND SOCIAL ACTION PLAN

The construction of a 546 metre long quay for a future container terminal in the Port of Cotonou, Benin gave Soletanche Bachy an opportunity to implement a large-scale sustainable development action plan. To conserve the marine and land ecosystem at the site, it was necessary to take forceful measures regarding waste management, soil pollution, air quality and wastewater treatment. Social and societal goals were also introduced to cover health and safety, with special attention to an STD awareness raising campaign and the hiring of workers from local communities.

SUSTAINABLE DEVELOPMENT
Safety, social and environmental goals

Training

50 people trained in eco-design

1,124 hours of environmental training

232 hours of diversity and equal opportunities training

Women employed

14.2% women in management positions

more specifically reduction of greenhouse gas emissions by about 38%. Meanwhile, on the MLC Tower project, Freyssinet Australia offered a new type of cathodic protection for concrete that supports environmental optimisation of repair operations.

Prism

Environmental quality of products and services

Striving to constantly improve its ability to meet the current and future needs of its clients, Soletanche Bachy drew up a standard environmental document for Eurofrance that enables its contract managers to systematise and better highlight the environmental approach taken in their bids. It can be tailored to each project to sum up the environmental action taken by the company and spell out the resources used to limit the environmental risks of the worksite, with a focus on waste management. It also contains a section on the eco-design aspects of the bid, highlighting the environmental benefits of the techniques proposed.

Sustainable development services and techniques

Soletanche Freyssinet steadily consolidates its range of products and services by carrying out R&D to further develop them:

- techniques and processes that save raw materials and have lower environmental impact, such as soil mixing, grooved piles, the Biocalcis process, and the FreyssiWind offering;

- services and technologies that benefit the environment such as energy generation (geothermal energy and thermoactive foundations), soil remediation, management of natural and industrial risks and environmental impact modelling.

Soldata Acoustic, for example, offers a method, EAR-is, that models noise and vibration levels generated by a site and tracks them in real time. The results, which can be accessed on a website, are displayed in a colour-coded system that provides a clear presentation and facilitates discussion with stakeholders. This method was recently employed on the Odéon Tower project in Monaco and the Dublin metro.

Partnerships and working groups

The company participates in several outside environmental commissions and working groups focusing on the civil engineering sector (safety, carbon calculators, life cycle analysis databases, eco-design, waste management, etc.).

Essor - operational logistics team at Dampierre, Cruas and Penly, France.

Human resources

A large number of human resource objectives covering training, equal opportunities and diversity have been introduced. For example, the entire HR network received training in the Group's diversity policy. Meanwhile, Freyssinet introduced a policy aimed at integrating people with disabilities and Soletanche Bachy has conducted an audit of its employees on the same topic.

« In our three activities, our companies have distinguished themselves on large-scale projects in a large number of countries. »

Bruno Dupety, Chief Executive Officer of Soletanche Freyssinet

ACTIVITIES 2011

SOILS - STRUCTURES - NUCLEAR

SOILS

SOLETANCHE BACHY MENARD TERRE ARMEE

Through its three networks of world-renowned companies, Soletanche Bachy, Menard and Terre Armée, the Soletanche Freyssinet Group has acquired very broad expertise in foundations, ground improvement and retaining structures.

SOFE, soil mixing project, Vietnam.

GEMALINK, construction of the CMIT container port, Vietnam.

SOLETANCHE BACHY

Soletanche Bachy provides the full range of geotechnical processes, special foundations, underground works, and ground improvement and soil remediation. The company offers integrated capabilities on major infrastructure projects under varying types of contract.

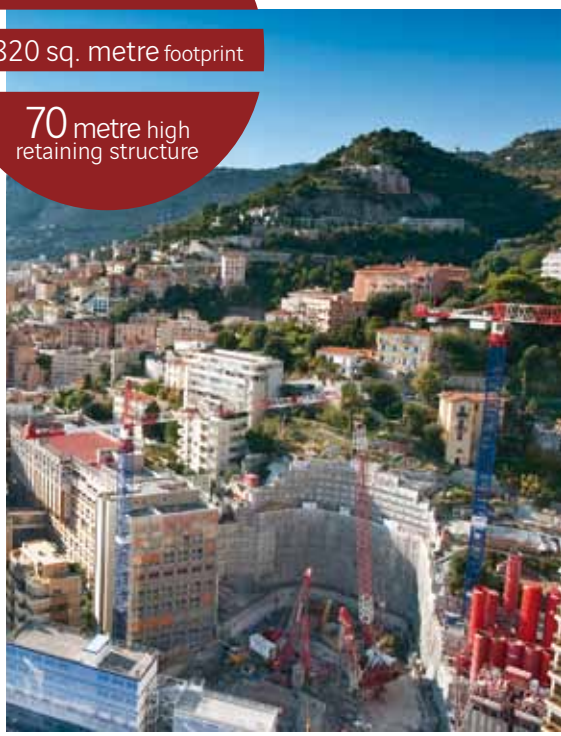
ODÉON TOWER (Monaco)

Exceptional foundations

160 metre building height

2,820 sq. metre footprint

70 metre high retaining structure



Rising between the sea and the sky, the Odéon Tower will be the tallest building in the Principality of Monaco at 160 metres, with 48 storeys and 10 underground levels. Spectacular and complex in equal measure, the 56-month project includes the construction of outsized retaining structures and foundations. To accommodate the dimensions and the weight of the building, the configuration of the site (grade difference of over 30 metres) and seismic constraints, it was necessary to build a 70 metre high retaining structure that combines several techniques: micro-Berlin wall, Berlin wall, anchor ties and 55 metre deep diaphragm walls.

7,400 metres of tunnels

30,000 cu. metres of excavation

930 Springsol columns

METRO CONTRACT C903 (Singapore)

A world first in the Singapore underground

As part of the construction of the Singapore metro, Soletanche Bachy is carrying out contract C903 of the Downtown Line that serves the Marina Bay business district. After completing the concrete work at the Bugis station and its associated tunnels in 2010, the teams worked on three tunnel sections in 2011, including one, with a length of 80 metres, which runs under the existing Bugis station. The work required preliminary ground treatment underneath the station, which combined two ground improvement methods: Springsol and glass fibre reinforced nailing. The horizontal application of Springsol – a world first – proved highly effective in stabilising the marine clay prior to complete opening of the diaphragm walls.

LEE TUNNEL (United Kingdom)

The country's largest shafts

Bachy Soletanche Ltd is taking part in the construction of the Lee Tunnel, 10 km east of the London City. Starting in 2015, the outfall – a major project in terms of its size and its environmental importance – will reduce the volume of untreated wastewater and rainwater annually discharged to the Thames by 16 million cu. metres. The Lee Tunnel is made up of four monumental shafts with 1.80 metre thick diaphragm walls linked by a network of tunnels bored at a depth ranging from 55 to 75 metres. The 100 metre deep shafts are the largest ever built in the United Kingdom.

TORRE REFORMA (Mexico City)

At the top of Mexico City

Cimesa, Soletanche Bachy's Mexican subsidiary, is building all the special foundations and the underground car park for the Torre Reforma building currently under construction in Mexico City, to be completed in 2014. The 57-storey building will be Mexico City's tallest and architecturally most futuristic structure. Its innovative design will enable it to be the first high-rise building in Latin America to receive LEED® Platinum environmental certification. Working in a demanding environment, Cimesa had to cope with a variety of technical challenges such as the displacement of a landmark building at the site and the construction of thick (1.20 metre) diaphragm walls to depths of 52 and 60 metres, depending on the zone.

VEHICLE SECURITY CENTER (United States)

World Trade Center, an ongoing project

Nicholson, Soletanche Bachy's U.S. subsidiary, has been taking part in the reconstruction of the World Trade Center site since just after September 11, 2011. Nicholson has been engaged in a variety of works at the emblematic and emotionally charged site. The latest works were for the Vehicle Security Center, a 50-space parking facility for tourist buses that will meet safety standards and cope with the expected additional influx of visitors. Following a first contract in 2009-2010, the company carried out an additional project consisting of placing 1,000 sq. metres of secant piling, 75 anchor ties, 15 micropiles and 122 jet grouting columns.

MENARD

From design to construction, Menard proposes and implements foundation solutions using ground improvement and reinforcement techniques that make it possible to build on land otherwise unsuited for the purpose. These techniques are global benchmarks.

YOLOTEN (Turkmenistan)

Express project in the desert

In the South Yoloten Gas Field, one of the world's largest gas fields in the desert dunes of southeastern Turkmenistan, Menard's teams carried out a project to prepare construction of a gas treatment plant for Petrofac. To ensure the stability of the installations, they performed dynamic compaction over a surface area of 1,150,000 sq. metres in just under 12 weeks, using 8 machines.

« 1.15 million sq. metres compacted in 12 weeks of work. »

REAGAN NATIONAL AIRPORT IN WASHINGTON, D.C. (United States)

Night work

To accommodate larger aircraft and improve safety, the main runway at Reagan National Airport is being extended. For the Menard teams, installing the controlled modulus columns (CMC) designed to reinforce the ground under the new runway and taxiways, the project was a challenge in terms of both construction and logistics. Airport activity limited their working hours to between midnight and six a.m., and they were forced to produce the concrete themselves in concrete plants installed at the site, since the usual supplier does not deliver at night. Despite these restrictions, the project was carried out between July and November 2011, with the teams working six days a week, and completed on schedule.

« Working only between midnight and 6 a.m. was a major restriction. »

PORT OF BRISBANE (Australia)

Soil consolidation by Vacuum depressurisation

In response to booming business activity in the Australian state of Queensland, the Port of Brisbane decided to expand its facilities by reclaiming land from the sea by filling over highly compressible clay terrain with a thickness of over 30 metres in places. Following a conclusive experimental project in 2007-2008, the Port of Brisbane entrusted to Menard Bachy the consolidation of a 9 hectare area using the Menard Vacuum consolidation process, which consists of producing an atmospheric pressure on previously drained soil by evacuating air under an airtight impervious membrane laid over it. The solution, applied for the first time on this scale in Australia, offers numerous environmental advantages: backfill savings (since the negative pressure replaces a major part of the overload normally used to compress the soil), reduction in the worksite carbon footprint, energy and time savings.

TERRE ARMÉE

Terre Armée is a world leader in mechanically stabilized earth walls and a specialist in precast arch segments for cut-and-cover tunnels.

DOUBLE TRACK (Malaysia)

A railway line with nearly 110,000 sq. metres of Terre Armée® walls

« Terre Armée's largest contract in Malaysia. »

As part of the construction of a 330 km double track electrified railway line between the cities of Ipoh and Padang Besar for the Malaysian Railways, Terre Armée subsidiary Reinforced Earth Malaysia is taking part in a major project that got under way in February 2009. In addition to Terre Armée® retaining walls and abutments for a large number of bridges across rivers and motorways, the company is building large wall surfaces for the railway bridges that will replace level crossings. Overall, Terre Armée is supplying 109,425 sq. metres of walls, making this the company's largest contract ever in Malaysia. With the project nearing completion, only 12,190 sq. metres remain to be built.

NORTH TARRANT EXPRESS (United States)

140,000 sq. metres of Terre Armée® walls in Texas

The Reinforced Earth Company (RECo) won the contract to design and supply more than 140,000 sq. metres of Terre Armée® retaining walls for the design-build North Tarrant Express (NTE) roadworks project in Texas. The project, a milestone in the history of RECo, is the company's largest ever. It includes the installation of over 30,000 linear metres of prefabricated elements. The panels, cornices and connector parts will be manufactured at the RECo plant in Waco, Texas.

« A world first: the use of Composite Earth®. »

ESCONDIDA MINE (Chile)

21 Terre Armée® walls in the world's largest copper mine

Freyssinet Tierra Armada Chile is building 21 Terre Armée® walls in the world's largest copper mine. Located at an altitude of 3,100 metres 1,000 km north of Santiago in the arid and earthquake-prone Atacama desert region, the Escondida mine has been constantly expanded since it began operating in the 1990s. Of the 21 walls built, 17 were to create a new 720-tonne truck unloading platform. In a world first, seven of these used the Composite Earth® technique. The project involved exemplary international cooperation among the various Terre Armée teams. Participating companies were Freyssinet Tierra Armada Chile in Santiago, the Terre Armée division of Freyssinet Middle East, Reinforced Earth USA and the technical and scientific department of Terre Armée Internationale for the design of the structures. Three Chilean employees and an expert seconded by Reinforced Earth UK provided on-site support seven days a week for 160 consecutive days.

8,000 sq. metres of Terre Armée® walls

27 metre maximum wall height

STRUCTURES

FREYSSINET

Freyssinet builds on 70 years of technological innovation to offer an unparalleled array of specialised civil engineering capabilities. The company implements high added value solutions in both new construction and repair projects.

RECOUVRANCE BRIDGE, repair using Foreva® solutions, France.

BC PLACE STADIUM, the world's largest cable-stayed roof, in Vancouver, Canada.

FREYSSINET

As world leader in specialised civil engineering, Freyssinet contributes to many major projects on five continents in its speciality areas: prestressing; construction methods; cable-stayed structures; bridge and tunnel equipment; and structural repair, reinforcement and maintenance.

MOULAY HASSAN BRIDGE (Morocco)

A new prestressed concrete bridge

Completed in March 2011, the new Moulay Hassan bridge across the Bouregreg Valley enables the Moroccan capital's light rail system to serve the city of Salé. For this project, Freyssinet's Moroccan subsidiary Freyssima, responsible for construction methods and technical support, opted to prefabricate the elements on the ground to avoid working in difficult terrain. The elements placed, the largest of which weighed 270 tonnes, were attached by spacers. Freyssima also supplied and installed 500 tonnes of prestressing.

BC PLACE STADIUM IN VANCOUVER (Canada)

A 20,000 tonne cable-stayed crown

To replace the roof of Vancouver's largest stadium, the client awarded the contract to Freyssinet to supply and install a retractable roof supported by a cable-stayed structure anchored by 36 peripheral masts with a height of 50 metres. The construction of this roof with its spectacular design, which weighs twice as much as the Eiffel Tower, required the use of a very rigorous method for phasing the installation of the various elements.

RUSSKY ISLAND AND GOLDEN HORN BRIDGES (Russia)

Russia opens up to the east with two giant bridges

To host the 2012 annual APEC (Asia Pacific Economic Cooperation) forum in Vladivostok, Russia launched a large number of high-profile projects, including the construction of two large-scale bridges. Built by two different contractors, they are both equipped with Freyssinet parallel strand cable stays manufactured in Freyssinet's factories and assembled on the spot by its specialised teams (using 450 tonnes of equipment). The Russky Island bridge *(shown opposite)* now has the world's longest cable-stayed span, and the Golden Horn Bridge is one of the top ten.

« The Russky Island Bridge: world's longest cable-stayed span. »

AMECA BRIDGE (Mexico)

A race against the clock

Only 90 days! Freyssinet de Mexico and Soletanche Bachy subsidiary Cimesa took only that amount of time to rebuild the bridge over the Ameca River, a key structure in the Mexican motorway network that had partly collapsed in August 2010. To meet the deadline set by the Ministry of Transport, which was keen to restore traffic as quickly as possible, it was decided to replace the two existing concrete spans with a single 200-tonne metal span resting on two piers on either side of the river. The ensuing race against the clock was won thanks to the hard work done by the teams of the two companies, who took turns to work 24 hours a day, seven days a week.

RECOUVRANCE LIFT BRIDGE (France)

The right techniques

Linking the Brest city centre with the Recouvrance neighbourhood, the Recouvrance lift bridge, which opened in 1954, underwent a major refurbishment as part of the construction of the urban area's first light rail system. To complete the complex project, which among other things called for replacement of the lift deck and the consolidation of the fixed spans, Freyssinet used a wide variety of techniques: Foreva® TFC carbon reinforcement, shotcrete, prestressing, pavement joints, cantilevered structures, superstructure renovation and micropiles.

NUCLEAR

NUVIA

Nuvia is able to work throughout the life cycle of nuclear installations, thanks to its varied and complementary expertise.

Remote operation Areva La Hague, Salvarem team, France.

CADARACHE, installation of the 100th anti-seismic bearing for the ITER reactor.

NUVIA

Through its entities Essor, Mecatiss, Millennium, NTS (Nuvia Travaux Spéciaux,) Salvarem and Vraco in France, Nuvia Ltd. in the United Kingdom, Nuvia Nordic in Sweden, Nuvia Canada and Nuvia India, Nuvia covers a broad range of capabilities in the nuclear sector such as decommissioning, decontamination, radiation protection, engineering, construction, waste management, civil engineering, fire protection, waterproofing and radiological protection.

Vraco fire protection valves at EDF power plants

Vraco worked to renovate the DVF smoke venting circuits at the 24 units of EDF's 900 MWe plants (accounting for half of France's nuclear plant fleet). The project, which is continuing in 2012, covers design, supply and installation of earthquake and fire qualified smoke extraction valves and dampers specially developed by Vraco.

NTS installing nearly 500 anti-seismic bearings in Cadarache

The 100th bearing was installed by NTS teams on 3 November 2011 at the ITER *(International Thermonuclear Experimental Reactor)* site in Cadarache. As in the RJG (Jules Horowitz Reactor) project, NTS is providing the anti-seismic protection for the reactor using 493 fretted elastomer supports. The project is an excellent demonstration of NTS's range of expertise and capabilities. An integrated NTS / FPC (Freyssinet Products Company) team first oversaw the manufacture of the anti-seismic supports in Romania; the Lyon-based Studies and Methods team then took over to design the operating methods and carefully prepare the machines and equipment. Installation will take place in two stages: a pre-assembly phase in the workshop at the Tournus staging base, followed by an installation and adjustment phase at the Cadarache site. The international project, which combines design, industrialisation, manufacturing oversight and works, opens up further prospects for participation in export construction projects.

Salvarem, first framework operating contracts

As Salvarem continued to expand its operations in southern France, it won its first framework operating contracts at the CEA's Cadarache and Marcoule sites. At Cadarache, the five-year framework agreement covers destructive inspection of waste from the CHICADE installation. At Marcoule, the Salvarem teams won the multi-year contract to operate the brand-new Alpha Waste Conditioning Unit. The two contracts exemplify Salvarem's capabilities as an industrial operator for the CEA and are based on its one-of-a-kind expertise in remote glovebox operations.

Silos Direct encapsulation Project

Silos Direct encapsulation Plant (SDP), the largest civil nuclear project in the UK, undertaken by Nuvia Limited as the nuclear engineering contractor to Sellafield Limited.
SDP is being built to process waste retrieved from the Magnox Swarf Storage Silos (MSSS) which is one of the high hazard decommissioning projects on the Sellafield Site dating back to the 1960s. Intermediate Level Waste mainly comprising Magnox fuel cladding was stored under water in the twenty two individual compartments within the facility.

EDF Nuclear Generation Limited - Provision of Support to Graphite Core Project Team

This support work began in July 2011 and was performed for Hinkley Point B and Hunterston B Power Stations.
It involved reviewing the existing safety case strategy for the graphite cores at the Stations. The aim was to review and consolidate developments and scope of work required for the ongoing programme to demonstrate the continued safe operation of the graphite cores at each Station.

Technical overview reports were produced covering each of the six legs of the safety case for the cores; Damage Tolerance Assessment, Condition Assessment of the graphite core and restraint system, Core Inspection, Core Monitoring, Consequences Assessment of reactor shutdown capability following failure of control rods and ALARP Assessment of plant modifications.

New worksite support contract for Essor

Following the Cruas and Dampierre sites, Essor won a new contract to provide global worksite support at the EDF power plant in Penly, France. This confirms the extension of its area of operations. Working with NTS, which is coordinating and managing the project, Essor offers a broad array of activities ranging from coordination and execution of logistics activities to storage, radiation protection and waste management.

Director of publication: Bruno Dupety. **Editor in Chief:** Marine d'Anterroches. **Design and production:** Idé Édition.
Editor: Antoine Masson. **Photos:** Luc Benevello-VINCI photo library, Gontran Hounsounou, Cedric Helsly, MVB, Yann Geoffray, Jean-Marie Huron, Michæl Liew, Francis Vigouroux, Soletanche Freyssinet photo library.

Printed on CONDAT SILK from sustainably managed forests.