

solutions

The Lafarge- Ductal® newsletter - No. 4 - October 2006

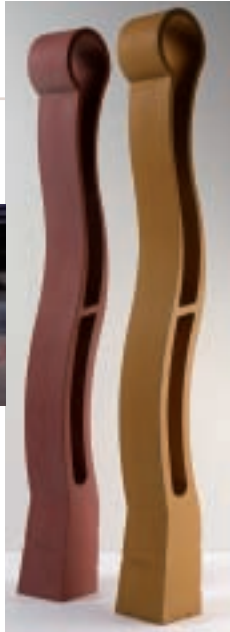
in brief

Swinging cities



“Azuly®”, a registered trademark of BMI, a company specialising in the manufacture of mineral lamp-posts for upmarket street-lighting, has launched “Swing”, a collection of street furniture designed by Studio Design Francesco Passaniti. The range of products are made from Ductal® ultra-high-performance concrete and consists of a bollard, wheel deflector, bench, planter and a litter bin -- available in 10 different colours to blend harmoniously into any urban environment. With its reassuring rounded forms and hollow designs for astonishing transparency and lightness, the entire range is inspired by movement and echoes the rhythm of the city and its residents.

Elegance aside however, the great advantages of this street furniture are its durability and ease of maintenance. Ductal® does away with the need for passive reinforcement and opens the door to a design of extraordinary purity, yet with almost the abrasion resistance of granite.



editorial

Street furniture: the new art of city living?

Cities are paying more attention than ever to their image. The quality of the setting they provide for their citizens increasingly reflects an art of city living that is elegant, comfortable and multi-purpose.

A number of artists and designers have been inspired to create lines of street furniture so distinctive as to be a matter of civic pride, carrying an instantly perceptible mark of modernity. Lines that combine safety, elegance and utility, taking advantage of all the superior qualities of ultra-high-performance concrete: strength, durability, ductility, quali-

ty of finishing and range of colours. Reinvented by active partnership between Lafarge and architect designers, this new street furniture offers local authorities what their residents want in terms of convenience and cleanliness, but also in terms of parking control or cycle-stands on cycling lanes, for a whole new approach to the art of city living in a mineral environment.

Jean-François Batoz
Vice-President, Ductal® Development

techno

Simplicity and ease of maintenance for water treatment plants

The Gold Bar wastewater treatment plant in Edmonton, AB, Canada, is the sole facility serving the city of Edmonton and its surrounding suburbs. The plant's collection tanks are located directly over the sheet-steel plate-settlers, so structural strength, durability and lightness were key requirements.

Traditional cement would have called for extra support and stainless steel

might have seemed the logical choice for this project, but the cost was prohibitive. Design consultants, Stantec, was familiar with Ductal®'s unique properties and determined that Ductal® troughs offered a viable, new solution. As a result, the physical property requirements were met and the solution generated the following advantages:

- greater structural strength, to simplify design and reduce weight,



- high resistance to the corrosive wastewater environment,
- a lighter structure, making installation easier,
- a dense, smooth surface finish to prevent water infiltration and contamination,
- easy to clean.

A final and undeniable advantage for a structure of this kind, and an argument that won the day!

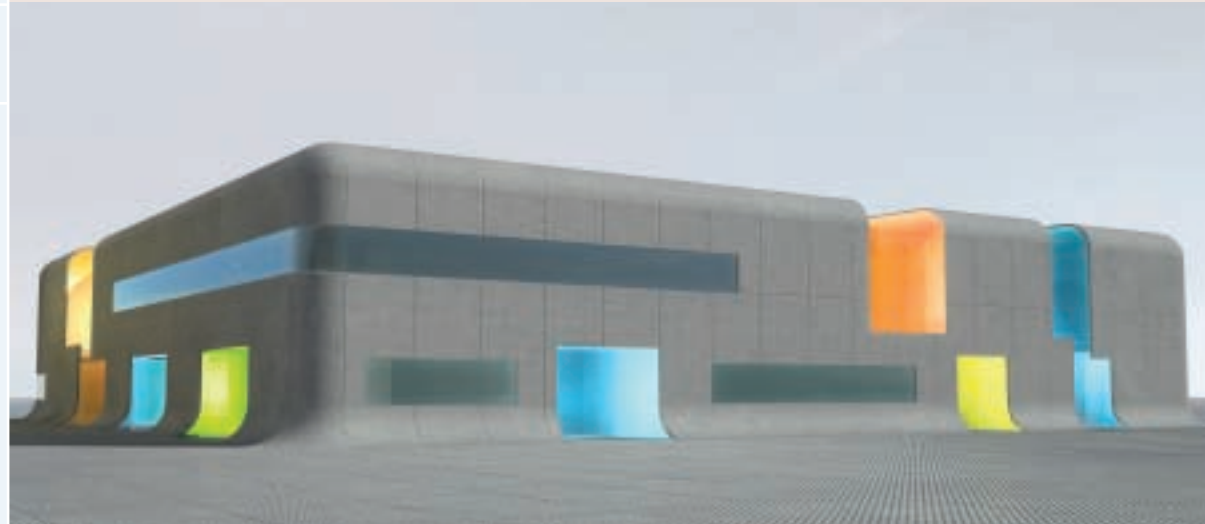


Roadways Network

June 2006

Street lighting
Make way for mineral

At the Lumiville trade show, BMI Azuly unveiled a new range of street equipment, relying heavily on mineral solutions for design and decoration. One example was its furniture made from Ductal® concrete, which allows for much slimmer structures, and opens the door to new possibilities for elegant designs in a wide variety of colours.



Artravel - April/May 2006

Astonishing concrete!

A fascinating "Concrete Home Space" display at the Paris Furniture Show featured a number of prototypes illustrating new applications for concrete, and particularly for the ultra-high-performance concretes such as Ductal®, in the world of furnishings and interiors. Concrete turned chameleon, and led the way to innovative creativity!

BTP Magazine - March 2006

UHPFRC increasingly used in building and construction?

The now widely recognized qualities of ultra-high-performance fibre reinforced concretes are attracting growing interest from designers because they offer architectural opportunities that were previously difficult to achieve or better suited to materials other than concrete.

La Tribune - September 2006

The return of the skyscraper

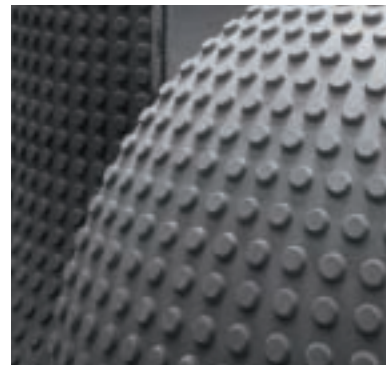
For Jacques Ferrier, designer of the Hypergreen tower, "there is a sort of natural contact between the idea of developing an environment-friendly tower and using the advantages offered by ultra-high-performance concretes such as Ductal®".



Interview with architect Dominique Marrec

A double mineral skin

The RATP administrative centre in Thiais is responsible for the traffic management of 300 buses and provision of 24-hour facilities for 800 drivers. Located in an industrial zone on the outskirts of Paris, this award-winning project, designed by agency ECDM, is an ode to the qualities of minerals. Mirroring the variety of coatings within the bus depot, a double skin first follows and then lifts the pavement. The result is a non-directive setting in which users are free to determine what they want to conceal and what they want to leave open to view.



What is the thinking behind this highly "graphic" building?

Dominique Marrec : We wanted to focus on the mineral nature of the site and propose a building that acts as a continuation of the ground surface and emerges like a deformation of that surface.

It was this approach that gave us the idea of a skin that would blur distinctions between traffic flows and building while giving the site a strong visual identity. Two implementation techniques come together here: heavy prefabrication and siding, as the 3cm thick skin provides a pavement that is partly open to traffic and rises up, sweeping away any thickness, to lose itself in the sky.

The Lego-like framework we devised, as well as offering anti-slip properties, gives colour-stippling effects that break up the play of lights and mirrors from the tinted

external exterior bonded glass bays. This skin uses Ductal® not only for its structural properties but also for its visual aspect, its depth of colour and quality of finish. The marriage of this project concept with the performances of the chosen material enabled us to offer users maximum freedom of choice in their use of the space available. There was no predetermined plan for the interior layout. Instead, it was tailored to their aspirations and subsequently we came along to cut out the skin, virtually with a box-knife, to create the openings, patio and access points.

Just like the Ductal®/bonded glass facades, this project is made up of a multitude of technical details that create its overall purity of line. What were the keys to this success?



Dominique Marrec : The project is really founded on the commitment of all concerned: Philippe Isembeck of RATP, Vincent Souyri of SEDP, Dominique Stoeux of Betsinor and Léopold Lombard and Mouloud Behloul at Lafarge. As a result of all their work, we were able to come up with the unusual and innovative implementations, throughout the process of researching the project.

While the Ductal® skin provided a certain number of solutions to the problems raised by our choices, it was really because all concerned put their energies into the studies, constructing prototypes, carrying out tests, creating the moulds that would respond as fully as possible to the imperatives imposed on us by our own demanding standards of rigour and efficient use of resources.

Technical fact sheet



Ductal® Blastwalls™ for indestructible buildings

The dramatic events of recent years, whether due to terrorist threat or the erratic forces of nature, have demanded that we need to rethink the fundamental design of buildings if they are to fulfil their primary task of protecting the people who use them. What makes this need all the more pressing is that advances in technology have affected many segments of society, but building construction has remained largely on the sidelines of this move towards scaled-up protection against threats of a new order.

Protecting the inhabitants of high-risk buildings

Recent events have highlighted the vulnerability of building exterior claddings. Ductal® Blastwalls™ offers a new and highly effective solution for resistance to powerful explosions and high winds. Blastwalls™ made from Ductal®,

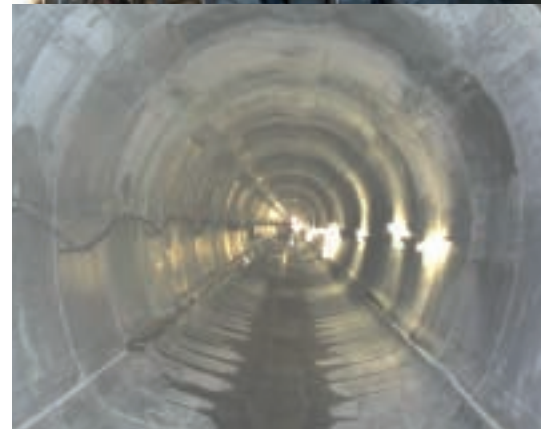
jointly developed by Lafarge and Composite Technologies of Calverton, New York, have been designed, tested and manufactured to resist extreme blast forces.

In practice, Ductal® is used either as a substrate or a finished surface to provide facades that are more resistant and/or lighter. The innovation lies in producing a façade that absorbs the force of a blast by curving or bending, and, most importantly, that does not transfer the full force of the blast to the building superstructure. Even better, the facade has the ability to absorb the impact of shells, debris and projectiles. This new application for Ductal® offers a radically innovative solution for all new or existing buildings exposed to the risk of explosion, including all buildings previously deemed to require anti-blast walls with high wind resistance, such as universities, embassies, government buildings, military installations, port facilities and, of course, chemical and petroleum plants.

The long life of aqueducts

The Shin-yahagigawa canal, built in the 1960's in Japan's Hosokawa province, was in need of complete restoration. The Regional Department of Japan's Ministry of Agriculture, Forests and Fisheries opted for a solution in 3cm thick ultra-high-performance concrete to ensure an extended lifetime for this 440m aqueduct of vital importance to the province's irrigation system.

The use of Ductal® greatly simplified the repair work since it was possible to lay a new conduit directly over the old without restricting the flow of water through the aqueduct. This repair work was orchestrated by the Japanese Ductal® license TCC.



Decorative Roadways

A single span, 55-metre, pedestrian bridge will soon stretch across 8 busy lanes of traffic, in Calgary, Alberta, Canada. This prototype bridge, called the "GE5" represents a "first" to utilize its innovative design as part of an ongoing program for the City of Calgary. Approaching motorists will be treated to the amazing sight of 144 unique Ductal® fish, installed along an attractive precast retaining wall - also built by Lafarge. Artists Violet Costello and Bob Thomasson created a concept including precast concrete walls with waves, in two different colors to simulate the sky and water -- populated with colored trout jumping above the water and non-colored trout swimming in the water. Each fish is approximately 4.5 m x 1.2 m, 25mm to 65 mm thick and weighs less than 400 kilograms.

Inauguration of the first Ductal® highway bridge in North America

America's first Ductal® highway bridge, in Iowa's Wapello Country, is the result of five years of collaborative research and development between the Federal Highway Administration (FHWA), the Iowa Department of Transportation, Iowa State University and Lafarge North America. The bridge was officially opened (May 5/06) by Vic Perry, Vice President and General Manager, Ductal®, Lafarge North America, and Brian Moore, Wapello County Engineer and Zoning Administrator. With a single-span, three-beam cross section, the bridge has three 33m Ductal® girders with no rebar for shear stirrups - a significant step towards "The Bridge of the Future". The girders were produced by Lafarge's precast operations in Winnipeg, Manitoba and delivered to the site in Iowa for installation by local contractor, Bloomfield Bridge and Culvert. Ductal® achieved a compressive strength for this application of 2,100kg/cm² and a flexural strength of 421kg/cm².

Shawnessy Station in Calgary wins international awards

The unique 24 ultra-thin, off-white Ductal® canopies, that form the station's eye-catching, shelters was recently selected to receive a prestigious "fib Award (fédération internationale du béton/International Federation for Structural Concrete) for Outstanding Concrete Structures. A variety of projects were submitted from 14 different countries. To date, the project has also received:

- the CERF 2006 Award for Innovation (Civil Engineering Research Foundation)
- two 2005 PCI Design Awards (Precast/Prestressed Concrete Institute)
- the 2005 ACI Award of Excellence for design and construction in concrete (American Concrete Institute)
- The 2005 APEGGA (Association of Professional Engineers, Geologists and Geophysicists of Alberta) Project Achievement Award.

Special report

The Bordeaux tram system: anti-slip and safety issues

Tramway safety is primarily a matter of ensuring clear marking and signage to designate the areas of public roadway this form of public transport will occupy as opposed to vehicles and pedestrians. The designers entrusted with this task, the BLP/Signes/EDP consortium, came up with a fish scale-shaped aluminium track alternating every 10m -- with an insulating track made from Ductal® to prevent stray current propagation.

"In practice," explains Pascal Monteil of Bonna Sabla, which was responsible for the project, "the surface wear caused by vehicle traffic at junctions made the alu-

minium very slippery. The Ductal® track, produced with an orange-peel and rice-grain finish, offers a particle distribution highly conducive to anti-slip properties. Its slip coefficient was unaffected by wear and the anti-slip effect was longer lasting."

A total length of 2,000 metres is to be laid by the end of the first half of the year. "One important aspect of the project is the elegance achieved by using different shades of grey in the materials," adds Mr. Monteil, "so the added advantage of Ductal® is that it blends in perfectly with the colour harmonies devised by the architects and landscape designers."



Lafarge Young Architects Competition : and the winner is... the H2O agency

As part of its policy of supporting young talent, Lafarge has instituted a competition for architects under the age of 40, with a goal to create innovative street furniture. The jury prize was awarded to the H2O agency which entered a comprehensive range of benches and chairs making the most of all Ductal®'s superior properties

including strength, ductility and colour options. Fun and appealing, with rounded lines and a medley of colours, the range designed by Charlotte and Jean-Jacques Hubert gives a new slant to the shapes and forms that city authorities traditionally provide for their residents.



If you would like to receive news about Ductal® solutions directly, simply sign up on the

www.ductal-lafarge.com website