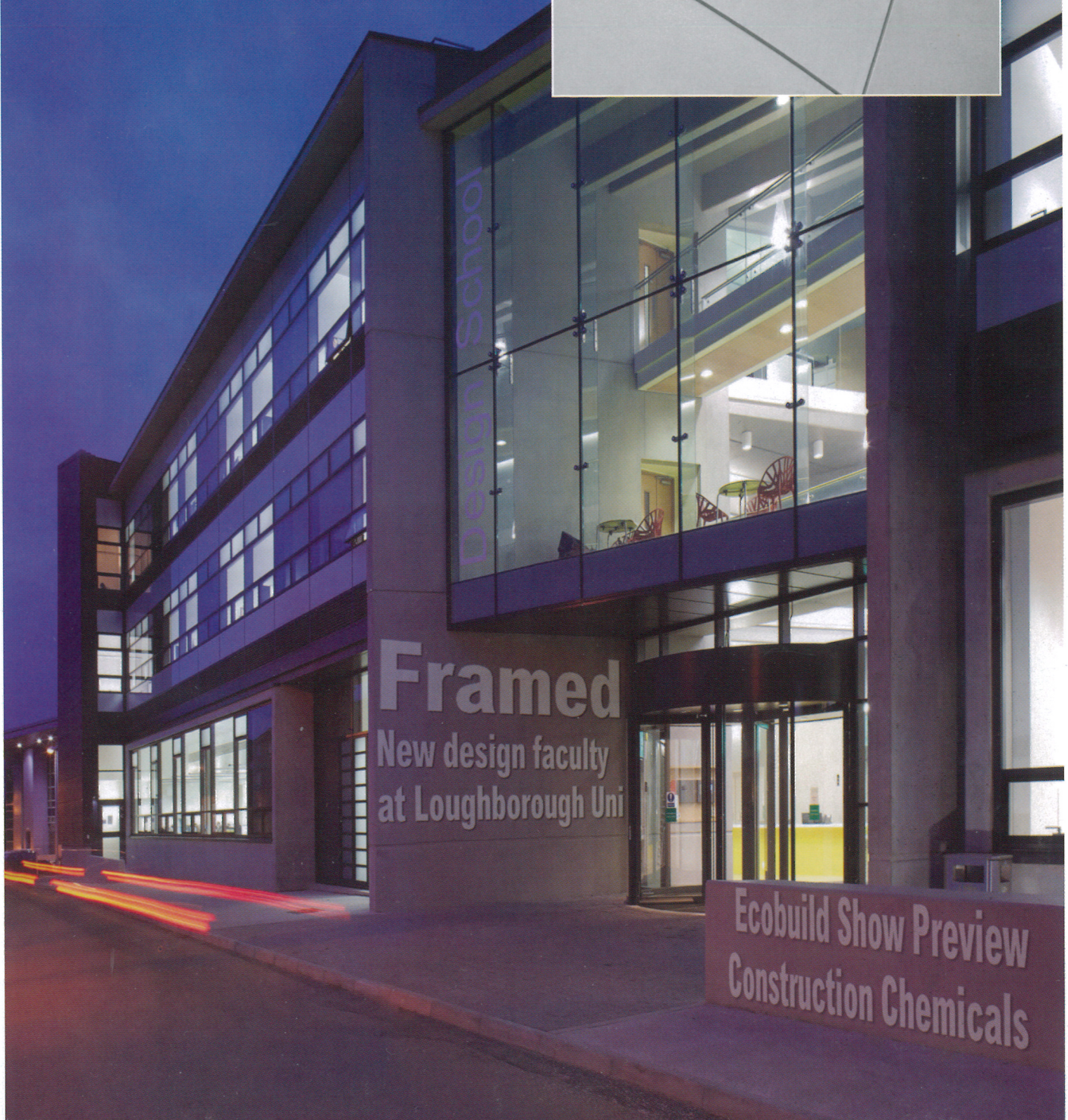


concrete

concrete

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Ecobuild Show Preview
Construction Chemicals

Crystalline admixture helps

Designers of a mixed-use development in California turned to a watertight concrete for the construction of interior and exterior exposed finishes.

Les Faure, Xypex, Vancouver, BC Canada

In the town where the ‘less is more’ approach helped conquer the technology sector, concrete often serves as a vital design element for Joseph Bellomo, principal architect and his design partner Taraneh Naddafi of Joseph Bellomo Architects, headquartered in Palo Alto, California.

One of Bellomo and Naddafi’s latest creations is 102 University Avenue – a modern, minimalist mixed-use building project designed to achieve LEED (Leadership in Energy and Environmental Design) Platinum certification. It serves as a vibrant urban entrance to Palo Alto.

The 102 University project has been recognised as a model example in urban planning. It is part of a collaboration between public and private sectors encompassing three buildings. The concept began with a new city-owned parking structure and public plaza, which was completed in 2004. Next, two smaller adjacent buildings were removed to make way for two multi-storey buildings separated by large private/public plazas. The trilogy of buildings and plazas concludes with 102 University Avenue. The site is near transit stations and less than three miles from Stanford University.

Concrete

Why concrete? First, there is its longevity as a building material.

“I grew up in this area,” Bellomo says. “I’ve seen lots of buildings go up and then down after 30 short years. We think designing and building something with lasting value is important.”

Considering the seismic zone Palo Alto occupies, concrete’s durability counts for a lot, too.

In addition to life expectancy, this particular project boasts many other sustainable features, including: a roof garden with about 3ft (0.9m) of soil (for lemon trees and other plants), which sits atop two residential floors; two commercial floors below that; and a parking level 13ft (4m) below ground. There are three two-storey town homes accessed through a third-floor common area. Each residential unit has its own private green roof space.



Referring to the concrete’s capacity to prevent moisture penetration, Bellomo says, “The quality of the concrete was essential to the roof and for the building as a whole.”

Heating and cooling for the residential spaces is accomplished through in-floor hydronic piping.

Common concerns to architects who want to use concrete as a design element – water seepage, efflorescence and reinforcement corrosion – were avoided with a 70% slag concrete combined with Xypex Admix used for the building’s façade and for structural columns.

“The Xypex – slag combination created

the densest, most durable, waterproof concrete that we have yet been able to produce,” Bellomo says.

Waterproofing

An established green technology to waterproof, protect and repair concrete structures, Xypex Chemical Corporation’s proprietary concrete waterproofing by crystallisation is judged to be effective, efficient and economical for a variety of new and existing applications.

Bellomo offered these additional observations about the concrete used for this project: “There is no porosity and no signs

preserve concrete façade



of efflorescence in the concrete. It is ideal for indoor/outdoor façades, integrated drip edges and tight reinforcement.”

The concrete structure is completely exposed, with a smooth, warm appearance to both the interior and exterior concrete finishes.

The waterproofing by crystalline technology uses concrete’s inherent water permeability to deliver crystalline chemicals that plug the material’s pores and bridge micro-cracks that occur as the concrete dries and shrinks.

The crystalline waterproofing chemistry can be easily introduced into new con-

crete as an admixture, a dry-shake product, or a surface-applied coating. For existing (i.e. cured) concrete, surface-applied coatings are used.

As concrete is permeable to liquids and gases, porous conditions can create multiple problems within a building or other structure due to moisture penetration. The infiltrating water, and harmful chemicals dissolved within, can also compromise the concrete.

This technology uses water in the capillary tracts as a diffusing medium to carry waterproofing chemicals into the concrete. The chemicals migrate through the water-

Main picture: 102 University Avenue, Palo Alto.

Above: The roof garden.



Internal aspects of the building.



Above and left: Main entrance façade.

Right: Night-time photo of the building.



ways of the saturated pore network, where they react and grow non-soluble, needle-like crystals that plug the pores. Within a few weeks of crystal growth, liquids can no longer pass through and the transmission of gases is significantly restricted.

The effect is permanent. In fact, the technology will even self-seal new micro-cracks if and when they occur years after the original application.

Crystalline waterproofing also protects against carbonation, a process in which carbon dioxide reduces the alkalinity of the concrete, eventually leading to corrosion of the reinforcing steel. In the same way, crystalline waterproofing also protects concrete

against sulfate and chloride attack.

The Xypex crystalline waterproofing technology is non-toxic, contains no VOCs (volatile organic compounds) and is NSF/ANSI-61⁽¹⁾ approved for potable water by NSF International, a widely accepted independent source of public health and safety Standards around the world. It also makes the construction process greener by eliminating the need for membranes manufactured with plastics, asphalt, polymer resins, solvents, aromatics and other materials with high energy manufacturing costs.

Waterproofing concrete by crystallisation is used for a variety of applications, including building design and construction, water

and wastewater treatment, below-grade structures, tunnels, bridges and marine structures. ■

Reference

1. NATIONAL SANITATION FOUNDATION INTERNATIONAL/AMERICAN NATIONAL STANDARDS INSTITUTE, NSF/ANSI Standard 61. *Drinking Water System Components – Health Effects*. NSF International, Ann Arbor, Michigan, USA, 2011.