



## ARTICLE REPRINT

Concrete Construction July 2014



# INTERNATIONAL CONCRETE

Fast-setting cement solves problems around the world.



To minimize disruption to air traffic and scheduling at this heavily traveled Sydney International Airport, the crew worked only at night to repair damaged slabs. They only had six hours working time and replaced pavements needed to be strong enough by 5 a.m. to handle aircraft traffic loading.

Five international projects show how construction products play a supporting role in industries where new technology rollouts, tight timelines, and sustainable design are the new normal.

Construction personnel and products must be responsive to the needs of a wide range of industries. Constant implementation of new technologies means less standardization across industries and greater uniqueness on the jobsite. Unfamiliar workflows and logistics, unusual jobsite conditions, and untried building systems are day-to-day realities for today's construction professional.

### SWISS FACTORY SETTING

A project in Switzerland demonstrates how progress in food chemistry brought changes to factory processes that, in turn, placed demands upon construction personnel in charge of repairing the facility's floor. Food ingredient manufacturer Naturex AG required renovations at its production site in Burgdorf, Switzerland. The area needing repair was the cold spray tower, a

260-foot-high, refrigerated tower in which temperature-controlled food particles are sprayed onto surfaces at high velocity. A complete renovation of the tower was scheduled to take only three weeks. Included in the scope of work was the full-depth concrete repair of the 2,150-square-foot floor. Site logistics were so demanding that contractor SIB France performed two flooring application simulations before embarking upon the actual project to minimize the risk of unforeseen challenges.

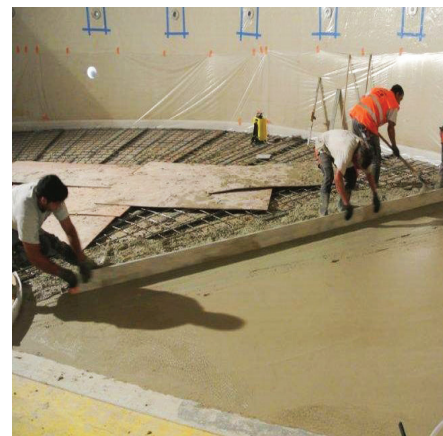
A specialty food-resistant and food-compatible polyurethane coating was specified for the finished floor, so Rapid Set Concrete Mix was used because its fast set time allowed for polyurethane application after only 16 hours. The additive Concrete Pharmacy SET Control, which slows the set time of cement, was used in the concrete mix because temperatures both inside and outside of the building were high on the day of the pour. Concrete was mixed onsite in a system that is commonly used in agricultural settings; concrete buggies transported the mix to the repair area. The entire floor repair

took five days, keeping the overall project on track for resuming factory production within three weeks. The Naturex facility was the first big construction job in Switzerland to use Rapid Set Cement.

### ISRAELI POWER PLANT

The recently completed Dorad Power Plant in Ashkelon, Israel, represents two major milestones. First, once operational, it will be the largest private power station in the country. Second, it will use purified water supplied from the nearby Ashkelon desalinization plant, which is one of the largest desalinization plants in the world. The size of the power plant and its cutting-edge power generating system made for a unique construction project.

The Dorad Power Plant will use natural gas as its primary fuel source. It is designed as a combined cycle system, which means that waste heat from its gas turbine will be captured and used to power its steam turbine, improving the system's overall efficiency and



Swiss Factory Setting: The full-depth repair of the 2,150-square-foot floor required the additive Concrete Pharmacy SET Control, which slows the set time of cement, because temperatures both inside and outside of the building were high on the day of the pour.



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ISRAELI POWER PLANT: To avoid having any weak points in the piping for the Dorad Power Plant in Ashkelon, Israel, careful attention was paid to the connection between pipes. Instead of using portland cement grouting for this application, Rapid Set Cement All was used - a high performance blend of Rapid Set Cement and specialty sand.

reducing pollution. As part of the process, water is injected into the turbine. Water used for this purpose is conducted from the desalinization plant via precast concrete pipe. To avoid having any weak points in the piping, careful attention was paid to the pipe connections. Instead of using portland cement grouting, contractor W.F. GTS used Rapid Set Cement All, a high-performance blend of Rapid Set Cement and specialty sand. Cement All provided workability, rapid strength gain, and low shrinkage, along with high durability in wet environments.

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### TIGHT AUSTRALIAN & GERMAN TIMELINES

At the Sydney International Airport in Australia, a taxiway and runway that had been in service for more than 40 years were showing signs of deterioration. In 2012, the airport's development and construction team undertook a project to replace damaged pavement slabs. But to minimize disruption to air traffic and scheduling at this heavily traveled airport, the crew worked only at night. They only had six hours working time and replaced pavements needed to be strong enough by 5 a.m. to handle aircraft traffic loading.

To ensure that there was no delay in the availability of concrete and to control the concrete's set time, contractor Antoun Civil Engineering batched Rapid Set Cement onsite with its mobile mixing plant. The fast



*Cement All provided workability, rapid strength gain, and low shrinkage, along with high durability in wet environments.*

strength gain of Rapid Set hydraulic cement supported traffic loading within hours and all 12 of the damaged slabs were replaced within 10 working days.

Similarly, the Köln Arcaden shopping mall in Nutzung, Cologne, Germany, required replacing an 18,300-square-foot area of existing stone tile floor. Rapid Set TRU Self-Leveling was chosen to resurface the floor because it provides a high quality, decorative surface in a short time frame. Retailers wished to minimize the amount of time the mall would be closed; the project was scheduled to take a total of seven days for



ISRAELI POWER PLANT: Cement All was used on connections between pipes.





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work that included preparation of the sub-base, priming, TRU installation, grinding, and maintenance. In fact, the contractor, Günter Schlag GmbH, was ahead of schedule and had the mall ready for reopening within four days.

To improve adhesion between the substrate and the TRU floor topping, TXP TRU, a moisture and alkali insensitive interior/exterior epoxy primer, was applied. Batches of TRU Self Leveling were mixed with varying concentrations of gray pigment to achieve different hues in the finished floor. The surface was ground, polished, and sealed.

The firm chose TRU Self-Leveling because by using this material, they were able to achieve seamless joints and incorporate multiple colors in swirled patterns across the floor's surface. In addition to the integral colors, stone aggregate was mixed into each pour. The stone used was locally quarried, supporting the architect's goal of contrasting new technologies with local materials. As a hydraulic cement-based material, TRU grinds and polishes well compared to polymer modified materials, so the finished floor is a strong element in the overall building design.

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## CHINESE SUSTAINABILITY

When the Chinese government constructed a high-rise building in Suzhou, a major city in Eastern China, they wanted to positively influence international perceptions by building sustainably. At the same time, the approximately 170,000-square-foot multi-use building—which consists of offices and residences on its upper levels and shopping and a library on its first five floors—needed to showcase high-end design in its public areas.

Architect Copetti Design Ltd. built the project using a design-build contract and was looking for a floor material that would contribute to the aesthetic appeal of the shops and library.



KÖLN ARCADEN SHOPPING MALL: Required replacing an 18,300-square-foot area of existing stone tile floor. Rapid Set TRU Self-Leveling was chosen to resurface the floor because it provides a high quality, decorative surface in a short time frame.



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It also was cheaper than natural stone and provided building owners with a durable, low-maintenance surface.

The Rapid Set Cement in TRU Self Leveling is a very green cement; its production results in 32% less carbon dioxide than traditional cement. This is primarily because the kiln used to produce Rapid Set Cement requires less fuel than kilns used to fire portland cement. But because the mix relies on less limestone than portland cement, the material breakdown that happens during production also contributes to the lessening of carbon dioxide. Furthermore, Rapid Set Cement contains recycled materials, contributing to its sustainability.

About the author: *Frank Senatore is Vice President, Packaged Products, CTS Cement Mfg. Corp.*

CTS Cement Manufacturing Corp. is the leading manufacturer of advanced calcium sulfoaluminate (CSA) cement technology in the United States. Our Komponent® and Rapid Set® product lines are renowned for proven performance, high quality, and exceptional service life. Contact CTS Cement for support on your next project. Call 1-800-929-3030

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SUZHOU, EASTERN CHINA: The approximately 170,000-square-foot multi-use building needed to showcase high-end design in its public areas.



SUZHOU, EASTERN CHINA: By using TRU Self-Leveling they were able to achieve seamless joints and incorporate multiple colors in swirled patterns across the floor's surface.