

Impressions of Italian Concrete Technology: Precasters Peer Over the Fence

*PCI President James G. Toscas led the first annual PCI TechnoQuest technology tour to Verona, Italy, and its surrounding area from May 15–21, 2005, making a historical connection between modern concrete technology and 2000-year-old, concrete Italian structures. The 27-member group from the United States and Canada visited seven precast concrete production facilities and a construction site for the new high-speed Eurostar railroad track. The group's goals were to meet with producers and plant officials in Italy and learn about their state-of-the-art methods and materials related to the production of precast concrete. This year's tour sponsors, **JVI Inc.** of Lincolnwood, Ill., and **Simem SRL** of Minerbe, Italy, helped develop and support many of the meals and social events surrounding the maiden TechnoQuest tour. **Federico Furlani**, managing director of Simem, acted as the on-site coordinator for the plant tours.*



The 27-member group from the United States and Canada gather for a photo outside the Eurocomp plant.

PREFABBRICATI EUROCOMP & INDUSTRIES, MONTICHIARI

Eurocomp, like most of the big precast plants in the area, is part of a general contracting company that also erects the precast concrete components it manufactures.

Manufacturing a wide range of precast concrete parts—including beams, girders, floor and roof elements, double tees, and insulated architectural wall panels with colored aggregates—demands highly sophisticated concrete production methods and managed distribution of the different concrete mixtures to the casting stations. The plant's solution to ensuring proper batching of aggregate, the Concrete Tower, has a conveyor belt that transports all major aggregates from underground storage to the top of the tower and into four silos. After passing through a system of weighing and mixing the different aggregate sizes according to demand, they go into two twin-shaft mixers so two different mixtures can be produced simultaneously.

MORETTI SPA, ERBUSCO

The second destination, Moretti, was quite different from Eurocomp. Moretti builds large sports and other leisure facilities. The company is the only Italian producer of integrated systems that combine precast concrete and laminated wood girders with spans up to 50 m (160 ft) wide.

Moretti's wide range of products manufactured at Erbusco includes architectural wall and floor panels, I- and double-tee beams, girders, self-developed prestressed hollow girders up to 28 m (90 ft) long, and more unusual precast concrete items, such as climbing walls and large elements used to build wine cellars.

RIVOLI SPA, RIVOLI

When Rivoli SpA erected a 320 m (1050 ft) long and nearly 23-m-wide (75 ft) cable-stayed bridge across the Cuibà River in Brazil, it garnered attention in South America and showed Europe a new way to construct bridges with precast concrete elements. Rivoli started with conventional precast concrete beams followed by various



Moretti's specializes in a wide range of architectural precast concrete products manufactured at Erbusco.

experience producing heavy-duty prestressed concrete bridge beams that enable a top train speed of up to 320 km (200 miles) per hour.

Currently, its research and development is concentrating on sustainable production technology with the use of self-consolidating concrete and passive curing during which no additional energy is added in the curing process of the elements (called zero-energy concrete).

precast/prestressed concrete products mainly used in building public works and infrastructure projects.

Rivoli was also engaged in the planning and building of a track for the new high-speed railway, Eurostar, which gave Rivoli another chance to use its



Rivoli started with conventional precast concrete beams but has since evolved to take on more complex precast concrete products and techniques, such as sustainable production technology that uses self-consolidating concrete and passive curing.



Agglonord SRL in Caprino uses no cement or water to create colorful slabs.



AGGLONORD SRL, CAPRINO

In contrast to Rivoli's concrete made of cement, water, aggregates, and admixtures, Agglonord SRL in Caprino uses no cement and absolutely no water to create colorful slabs for interior and exterior use.

Northern Italian quarries produce colored marble aggregates with materials from around the world. Precisely ground chips, dried and combined with white pigments and polyester resin in a high-performance Simem mixer, flow into steel molds to form huge blocks. Hardening occurs under heat and vacuum to avoid air bubbles. Once a block is ready, it is cut into large slabs and polished.

IMMOBILIARE CENTRO NORD SPA, BELFIORE

The Immobiliare Centro Nord (ICN) SpA hollow-core slab plant offered some surprises. As the largest producer of hollow-core in Italy, its heavy-duty products are up to 1200 mm (4 ft) high, with spans from 18 m to 20 m (60 to 65 ft). ICN has facilities that include six 150-m-long (500 ft) beds.

The unique system ICN uses for stressing steel cables includes hydraulic devices that give additional power for stressing and release after hydration. The Italian company Nordimpianti developed a slip former that works on the unusually sized slabs. Cutting the slabs also required new technology; cutting is done both from the up side downward

and from the down side upward.

A "rolling bed" moves these large, heavy parts from the casting bed to the stockyard. Cranes do not lift them out; they are rolled out, and the beds can be used two times a day.

SIMEM SRL, MINERBE

Simem concentrates on designing and manufacturing machines and plants for concrete production and material processing.

The success of reversing drum mixers, vertical pan mixers, twin-shaft mixers, continuous mixers, dry batching and wet mixing plants, custom-made mixing plants for the precast concrete industry, concrete recycling units, and special equipment for industrial waste and wastewater recycling was apparent at the new Simem factory.

Mixers in different stages of production gave the visitors a view of must-work devices. Visitors also learned about the principles and advantages of the twin-shaft mixing technology.



Immobiliare Centro Nord (ICN) SpA is the largest producer of hollow-core in Italy and has facilities that include six 150-m-long beds.

BETONROSSI SPA, PIACENZA, AND HIGH-SPEED RAIL BRIDGE ACROSS PO RIVER

Constructing and building the new high-speed railroad track from Torino via Bologna to Rome is one of the most ambitious infrastructure projects in Italy to date. Near the city of Piacenza, this track crosses the Po River Valley on a 5 km (3 mile) bridge built completely of precast concrete elements.

Betonrossi faced two primary challenges while working on this project: producing thousands of concrete poles and driving them 30 m (100 ft) into the ground as foundations, and casting and delivering, ontime, hundreds of precast/prestressed concrete elements with weights up to 1000 tonnes (900 ton).

A complete precast factory was erected near the construction site and includes a full-sized modular batching plant with

storage for aggregates, cement and admixture silos, and two twin-shaft mixers. About 700,000 tonnes (640,000 ton) of high-performance concrete for poles and beams were produced day and night over the course of the year-and-a-half construction project.

Moving huge parts from the plant to the construction site with cranes was impossible, so Betonrossi used a specially designed hydraulic lifting system and built a rail track from the plant to the bridge. When the project was finished, the batching plant was dismantled and erected elsewhere.

IMPRESA PIZZAROTTI & C. SPA, PARMA

Impresa Pizzarotti & C. SpA was the final stop on the tour. Annual sales of \$625 million make it the third largest construction contractor in Italy. The TechnoQuest group visited its down-

town Parma headquarters, which is located in a renovated monastery. An executive of the company described its worldwide operations, after which, the group toured the precast plant. The recently renovated plant supplies precast elements for industrial structures built by the company.

PRECAST DOWN UNDER

With their goals met, the participants of TechnoQuest I found the trip to be a success. The precast concrete producers gained knowledge of international procedures and technology while networking with their peers. A second TechnoQuest tour is scheduled for February 20, 2006, through March 3, 2006, in Australia. This tour will highlight plants in several cities, including:

- **Rescrete Industries Pty. Ltd.** produces architectural (including polished panels) and structural precast



Simem designs and manufactures machines and plants for concrete production and material processing.

concrete for high- and low-rise, commercial, residential, and industrial buildings along with bridge members, box culverts, and other components for civil works. It is also a major producer of septic tanks, street furniture, and traffic control products. Prestressed hollow-core units manufactured at Rescrete's Mulgrave factory account for much of the industrial walling and floor-

ing supplied by the company.

- **Structural Concrete Industries (Aust) Pty. Ltd.**, located one hour north of Sydney, is among the largest and most modern plants of its kind in Australia. The plant operates in the fields of building, civil, and marine infrastructure. A large part of its production comprises girders, piles, and headstocks for bridges. It has nine high-capacity prestressing



While working on the new high-speed railroad track from Torino via Bologna to Rome, Betonrossi was unable to use traditional methods for transporting large parts from its plant to the site.

beds and several precasting bays. It also manufactures floating marina systems incorporating precast concrete pontoons.

- **Precast Concrete Pty. Ltd.** produces and erects architectural precast with sandblasted, acid-etched, water-washed and polished finishes, bollards and planters, building frames, columns, and beams.
- **Westkon Precast Concrete Pty. Ltd.** produces architectural and structural wall panels, super-tee beams, hollow-core (Dycore), and sound walls.
- **Hollow Core Concrete Pty. Ltd.** produces hollow-core floor slabs, beams and columns, precast wall panels, bridge members, stadium units, mini slabs, stairs, and sound barriers. State-of-the-art European technology is employed in the manufacture of its prestressed and precast concrete products.
- **Bianco Walling Constress** is one of the largest precasters in South Australia, producing architectural and structural precast concrete. The plant has invested in advanced technology, such as European manufacturing technology and CAD/CAM equipment, computerized bar bending machinery, two computerized batching plants, and four state-of-the-art, fully programmable polishing machines.
- **SA Precast Pty. Ltd.** services the top end of the architectural precast concrete market with polished, acid-etched, sandblasted, and off-form finishes. The plant also manufactures structural and prestressed concrete products.
- **Delta Corp. Ltd.** produces architectural precast and prestressed structural building components, such as hollow-core floor and wall panels, bridge beams, railway ties, poles, and landscape products. It promotes total precast concrete structures.
- **Paragon Precast Industries Pty. Ltd.** produces architectural precast with water-washed, sandblasted, and polished finishes, along with structural precast, ultrafloor flooring system, and work panels.

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