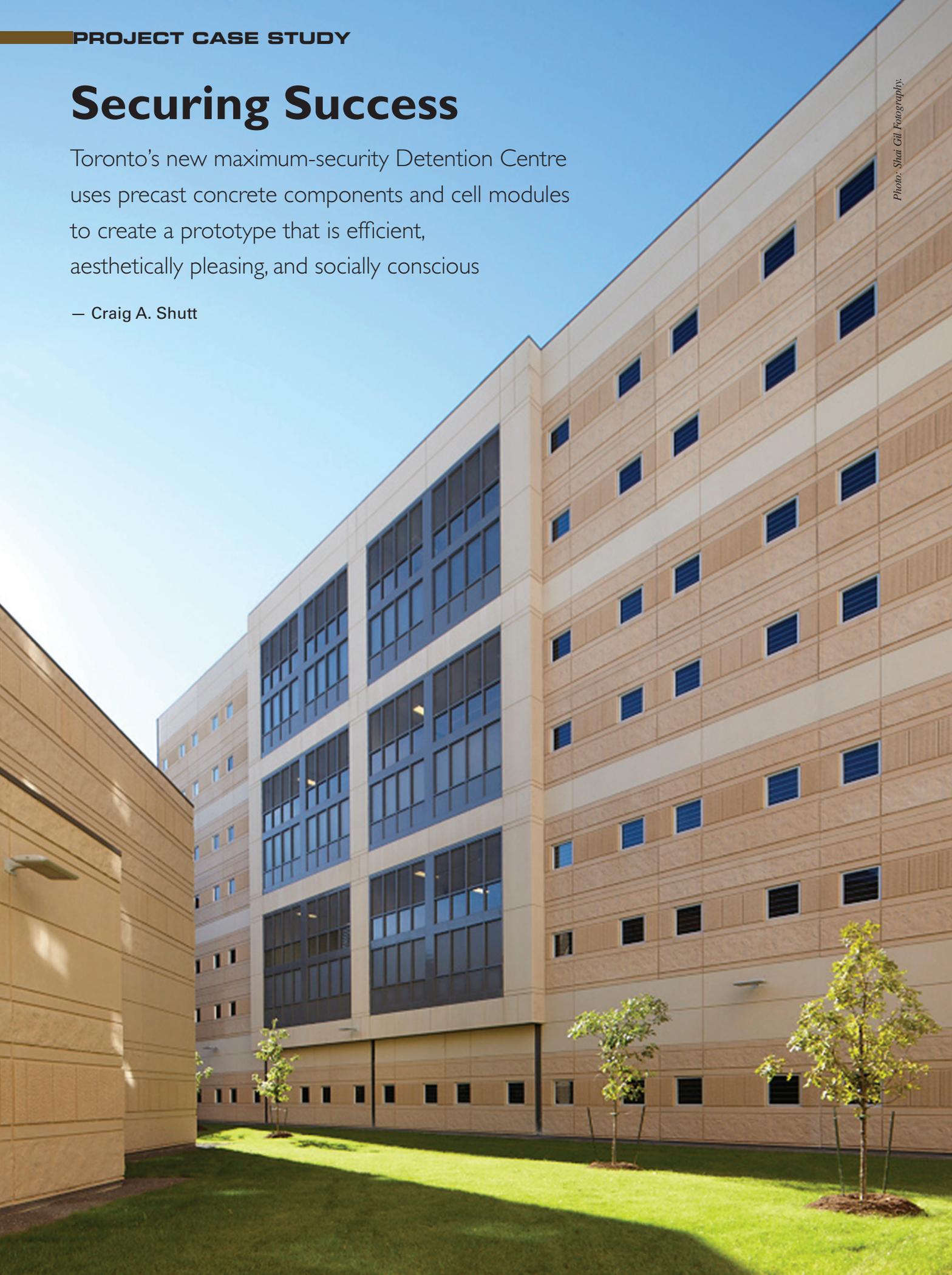


Securing Success

Toronto's new maximum-security Detention Centre uses precast concrete components and cell modules to create a prototype that is efficient, aesthetically pleasing, and socially conscious

— Craig A. Shutt



The new maximum-security South Detention Centre in Toronto, Ontario, Canada, was designed to create a socially conscious facility that reduces stigma while setting a precedent for higher-quality, more efficient construction. The first LEED-certified adult correctional facility in Ontario, it combines precast concrete structural components, architectural panels, and outfitted cell modules—their first use in Canada—to create a prototype for future designs.

The 1,650-bed facility contains an Intermittent Centre to accommodate an additional 320 short-term inmates. The 853,522-square-foot complex houses admitting and discharge functions, health services, educational and life-skills facilities, counseling and recreational programs, video visitation, direct supervision, housing units, and material management. All activities are overseen by a state-of-the-art security and central-control system.

New Philosophical Approach

Although typical in its activities, the detention center's design takes a different philosophical approach, focusing on rehabilitation rather than punishment, explains Fisher Li, project manager for Stephenson Engineering Ltd. "Providing a place for inmates to rehabilitate, learn, and heal emotionally contributes to greater success for the society at large."

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Adds Alan Munn, senior partner at Zeidler Partnership Architects, "Among the goals was to accommodate diverse cultural groups, such as Aboriginals, provide excellent facilities for staff, and create a welcoming, open feeling for the general public and the families of the detainees."

That philosophical change "had a significant impact on design details and thereby perception of the

designed space," says Li. "The project led to numerous building practices and designs that had not been tried before this point."

For instance, more space was allotted to prisoners and visitor spaces, with larger windows for increased daylight. In the previous overcrowded facilities, which the new building replaces, two-person cells had an average of 81 square feet with 4.3-square-foot windows. The new facility offers 99 square feet per cell with 6.8 square feet for windows. An enclosed courtyard and outdoor sweat lodge were provided for Aboriginal detainees.

With a local bus stop at the facility's front entrance, the entry was designed to fit into the surrounding streetscape, with indigenous plantings and grasses used in the landscaping. The main entrance features a glazed pavilion that leads to a three-story building that houses reception, visitor's center, a history and education wall, and administrative spaces. Behind this low-entrance façade, three seven-story inmate towers were designed to reduce their visual massing. Floor to ceiling glazing in the lobby is accented with dark wood and benches. Glazed and solid partitioning defines the progression from public to private space.

"Carefully designing massing, material, and the latest security technologies resulted in a public façade that looks like a community building rather than a detention center," Li says. Security for the surrounding community was critical, but it also had to be low-profile in this busy downtown location. A fence borders the rear of the compound with security cameras covering all areas. To minimize the visual impact of these devices, security and communication systems were designed to be seamless and invisible, replacing the more traditional razor wire, which was used only where no other options were available.

Precast Provided Benefits

Precast concrete was chosen for parts of the structural frame, the architectural façade, and the cells for a number of reasons, according to the design team. "Controlled factory manufacturing produced a quality and consistency that was superior to any site-built construction," says Li. Speed was also a factor, notes Munn. The cells could be set into

place as a unit rather than requiring walls to be built up on site. "They also were able to continue installation through a broader range of weather conditions." PSI in Windsor, Ontario, Canada, supplied the precast concrete components, while Tindall Corp. in Spartanburg, S.C., fabricated the modular prison cells, as well as some columns and beams for the modules' support.

"This was a very complicated and complex project," says David Britt, vice president of sales at Tindall. The company previously had worked on a correctional facility in North Carolina with EllisDon Corp., the general contractor, which led EllisDon to contact Tindall for this project. "Modular cells had never been used in Ontario before, but this seemed like an opportunity to introduce them to the concept."

'They considered every system several times to ensure they were creating the most cost-effective system.'

Tindall helped EllisDon set up its bid, and after they were selected as the general contractor, Tindall rebid the project to secure the work, Britt notes. "They considered every system several times to ensure they were creating the most cost-effective system." Tindall declined to work as the single-source supplier for all precast concrete components, he notes, due to the shipping distance involved. "We've shipped modules to 40 states, so that wasn't a problem, but shipping so many other pieces wasn't efficient." The cells had to pass through customs, he notes, but it went smoothly and later shipments moved through smoother as the process was refined.

Monolithic Cells Cast

The 996 cells were cast as a five-sided cube to create monolithic designs that offered no joints or weak points, Britt says. Floors were connected once each cell was cast, and other connections were hidden. "We worked with the precaster during the design process to develop numerous concealed connections

Photo: Shtai Gii Photography.



Photo: Tindall Corp.



PROJECT SPOTLIGHT

Toronto South Detention Centre

Location: Toronto, Ontario, Canada

Project Type: Correctional facility

Size: 853,522 square feet

Cost: \$45 million (Canadian)

Designer: Zeidler Partnership Architects, Toronto, Ontario, Canada

Owner: Ministry of Community Safety and Correctional Services, Toronto, Ontario, Canada, through an Alternate Finance Project relationship

Structural Engineer: Stephenson Engineering Ltd., Toronto, Ontario, Canada

Contractor: EllisDon Corp., Mississauga, Ontario, Canada

PCI-Certified Precaster: Tindall Corp., Spartanburg, S.C.

CPCI-Certified Precaster: PSI, Windsor, Ontario, Canada

Precast Components: 448 modular cells completed outfitted, plus columns and beams. Local suppliers provided additional structural and architectural components.



The prison modules were stacked into three towers surrounding a central courtyard, creating seven-story buildings. Photo: Tindall Corp.

to ensure no connections were apparent between precast elements at areas where inmates would frequent," says Li.

The cells were cast to incorporate electrical, plumbing, and mechanical systems, allowing immediate hookup once they were set into place at the site. The cells were painted and furnishings were installed at the plant. These included supports for two bunk beds, desk, stools, toilet, wash basin, metal shelving, mirror, HVAC vents, window, door, and lighting.

The beds were attached to interior walls due to the cold climate, but the cells were also insulated between the structural interior wythe and the architectural exterior wythe with rigid insulation achieving an R-21 value. Fiberglass connectors were used to connect the two concrete wythes to prevent any thermal bridges.

"It's become standard to install fittings prior to shipping modules," says Britt. This approach saved approximately six to eight months in the construction schedule. "It costs the owners about \$500,000 per month to not have the facility open, so supplying finished units was a big time and cost saver."

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Li agrees. "The modular system resulted in a much higher level of fit and finish than standard construction. This type of assembly reduced costs and waste while expediting build time. As a result, the construction schedule was significantly improved, allowing the team to offer the client earlier occupancy. This also had the benefit of reducing site costs significantly."

The modules were stacked two-abreast on top of each other into three towers surrounding a central courtyard. Floors were set every other level, with a mezzanine platform provided along the perimeter at intervening levels. "This format was a program requirement that provided for the proper balance of program and common space to the number of residents in each pod," Munn explains. "It also created a double-circulation system that separated

inmates and staff, providing better security for both."

Aesthetically Pleasing Exterior

Due to the downtown location, designers wanted the cell units to fit into the neighborhood environment, and they were designed with an architectural facing panel. "We used precast concrete panels for the cell façades to accelerate the construction time line, but they also provided opportunities to enrich the exterior design at little cost," Li says. "We were able to customize colors of concrete as well as formliners to achieve the non-oppressive grand civic presence our client requested, which would otherwise have challenged the budget."

The design features two colors, replicating limestone and terracotta, plus two formliners that replicate stone and create tight vertical reveals that produce a washboard effect. In some cases, all options were cast into one panel. The 9- by 15-foot back wall was the only portion that needed to be cast with this detail, and it was then attached to the structural cell module. No applied finishes were used except for sealers to minimize maintenance and refinishing, notes Munn.

The cells supplied by Tindall were lifted into place by mobile-tracked cranes and connected to structural and architectural components supplied by local producer PSI. Construction moved smoothly even through one of the worst winters in Toronto's history. "Completing cells off-site eliminated a number of on-site challenges, such as weather, vandalism, and theft," says Li.

New Standards Set

LEED certification was a major goal for the project. "Our goal was to raise the bar in being responsible to both the public and the environment by using sustainable strategies that result in long-term savings in operating costs," says Li. Designers included a stormwater management system, geothermal heat exchangers, daylight harvesting, and other strategies. Water usage will be reduced by 25% over traditional facilities while natural-gas usage will be reduced by 40%.

Precast concrete aided this goal by allowing the manufacture of the modules within 500 miles (Tindall used its Atlanta, Ga., plant to achieve



A variety of textures were used in the architectural panels attached to the exterior of the modular cells. Photo: Tindall Corp.

this), using recycled materials, providing light colors to mitigate the heat-island effect, using rail cars for transportation, and providing a highly durable composition that will require little maintenance. Although designers aimed for Silver LEED certification, they now say they have enough points to reach Gold LEED.

The facility also sets a new standard by operating through a Public-Private Partnership sponsored by Infrastructure Ontario, in what is called an Alternate Finance Project. The 30-year program consists of designing, building, financing, and maintaining the facility, after which it will be turned over to the Ministry of Community Safety and Correctional Services, which operates it. The team, known as Integrated Design Solutions, consisted of EllisDon, Zeidler, and Fengate Capital.

The first use of modular precast concrete cells in Ontario has been a success, all agree. "Modular construction has long been an elusive method for the industry in Canada," says Li. "That this facility was able to incorporate the units so effectively on so many levels should be instructive for other projects and for other building types as well. No other solution could have provided such a high-quality structure under the limited schedule demand. The speed, flexibility, and high quality of precast concrete significantly contributed to the success of the project." 

For more information on these or other projects, visit www.pci.org/ascent.