DO YOU KNOW YOUR ABC's

ACCELERATED BUILDING CONSTRUCTION
Accelerated Building Construction (ABC) requires a paradigm shift in logic regarding project planning, procurement, and execution. When a project manager aims to minimize numerous mobility impacts that occur in traditional onsite construction they do so by elevating certain critical activities into groups and to a higher schedule priority. Interestingly, ABC does this organically by incorporating modular and prefabricated construction methods for design and construction of permanent and/or moveable facilities which addresses these critical groups of activities.

These entire systems can be used as comprehensive turnkey project delivery methods which save significant time and money over traditional site-built methods. The ‘construction’ part of the ABC process utilizes prefabricated sections which are manufactured off-site in a permanent certified facility, transported to the project where, typically, a crane sets these major components quickly, accurately and directly into place. ABC provides a streamlined approach to every project where the advantages of manufacturing in a permanent facility improves quality control and saves money for clients who need to maintain strict deadlines.

CPCI members have the tools to provide Accelerated Building Construction solutions (also known as total precast concrete systems) and can assist clients to understand the differences between traditional and accelerated building construction.

The term ‘traditional’ is often used to describe the types of linear construction, where each individual step is not only constructed entirely (or largely) on site, but also needs to be completed before the project can move on to the next phase. Modular and component construction is an off-site based construction method, during which individual components are manufactured (or ‘prefabricated’) in a factory, transported to the site entirely complete and assembled on location.

With ABC construction precast concrete manufacturers are ideally brought on board at the same time that the owner hires an architect. Although this does require planning, the benefit is that the precast concrete producer can provide feedback on the design early in the process to ensure optimal construction. The great news is this can all be done while the construction site is being prepared. Overall, prefabricated and total precast concrete building projects are making great inroads in the Canadian construction marketplace and will only increase as Accelerated Building Construction becomes acknowledged by traditional builders and general contractors.
Maple Avenue Tower is a 17-storey Condo (with a 4-storey precast concrete parking garage and a composite transfer slabs at the 5th floor) and Mixed Retail (Total Precast Building). The building features 169 residential units and 247 parking spaces. Precast construction’s added value comprises engineering design and detailing of the precast components, as well as forming, reinforcing, casting, transportation and erection. However, the best added value benefit may be the speed of installation and year-round construction.

For this project the precast concrete panel system also provides the exterior architectural finish, creating a subtle stained colour palette look with flat accent areas. An innovative framing method created by the design team allows the wall system to be staggered, providing a look that breaks up the mass of the structure and incorporates the aboveground parking structure into the overall design. The precast concrete erection took only 8 months to complete which accelerated the whole construction schedule.
St. Teresa Place facility, located in Calgary, Alberta, is a total precast concrete supportive living building. Located at 10 Redstone Place in Northeastern Calgary, this supportive living complex is four storeys in height, contains 250 units and has a gross building area of 19,000 square metres (205,000 square feet). The building was completed on a condensed installation schedule, without compromising the architectural design.

This building method facilitated a fabrication and installation schedule of mere months – starting with precast production in June, precast installation starting in August and completion by the end of November.

This aggressive schedule is very much in line with the province of Alberta’s commitment to building an inventory of 2,000 continuing care beds as soon as possible. Building these facilities with traditional construction materials would not be possible under these tight and accelerated schedules. Total precast construction provides a state-of-the-art solution for continuing care needs by delivering a safe, fast, sustainable and resilient building.
Champagne Quarry Park in Calgary is an example of what is happening in many parts of the country where former industrial lands along waterways and near city cores are being rejuvenated as self-contained communities.

The project comprises five individual four- and five-storey total precast buildings located on top of two levels of interconnected underground parking. The architecture is French provincial, which is supported with details such as natural stone and steep-pitched roof lines. It has balconies and large windows and arched detailing over the top windows.

Colour palettes, construction materials and specifications differentiate this property from any other in Alberta. Precast concrete was chosen for its Accelerated Building Construction (ABC), resilience and inherent fire resistance - all being key requirements for this property.
The interior structure and exterior detailing of this structure combine to deliver strong visual presentation. **The Belmont Trio** project consists of three apartment buildings with a shared aboveground parking garage in Kitchener, Ontario. All three Buildings are total precast concrete structures.

“Speed was the defining characteristic of a very efficient construction process. [For Building A] The precast concrete supplier began installation in March 2016, and was installing the 10th floor by the first week of June, taking a week on average to install one level of floor and walls. In addition, using set precast concrete sizes allowed for immediate installation of windows and the ability to begin finishing the interior of each floor level as construction continued.” (Kurt Ruhland, P.Eng., MTE Consultants Inc.)

“The dark colour palette of the precast concrete exterior wall panels, consisting of colour gradients of grey, contrast sharply with the stark white colouring of the boxes to give the building a strong visual presentation”. Andrew Bousfield is a principal with ABA Architects, Inc. in Waterloo, Ontario.
Point Towers, Phase 5 at The Barrel Yards in Waterloo consists of two 25-storey, 85-metre [279 feet] towers of 357 living units sitting on a two-storey podium with one level of underground parking. Total ground floor area is 41,877 square metres [450,290 square feet].

The Point Tower was originally designed as a cast-in-place concrete structure with precast concrete and window wall cladding, but during the design phase the client requested to move to a total precast building to shorten the construction schedule and reduce financing costs.

“In comparison to a similar nearby cast-in-place concrete project also under construction, the Barrel Yards precast concrete project started six months later and finished four months earlier, which greatly reduced construction and financing costs”. Steve Nonis, OAA, MRAIC, LEED AP, CanBIM BP3 is a senior associate at Turner Fleischer Architects Inc.
When Jackson McCormick Design Group Inc./Todd Jackson Architecture Inc. [JM], completed the new 380 square metre Woodland house, it was the first fully precast concrete home they had ever designed.

The decision was made early in the design process to explore the use of precast concrete panels. The quick erection time and long-term durability made it the leading choice of building system. Additionally, both the client and JM had an appreciation for the look of precast concrete. This allowed the concrete to become a major feature in the overall aesthetic.

In all, it took Eagle Builders LP just five days to erect the walls, precast concrete stairs, floor and roof. A little over a month later, the roof was completed, the windows were in and the temporary heat was on. With the exterior envelope essentially completed, trades could work in the warmth of the indoors, regardless of the weather outside.

The lower construction cost of the house compared to the cost of a custom home in Calgary, is attributed to using precast concrete construction with the concrete finish left exposed on both the interior and the exterior.
Groupe Lépine opted for precast concrete construction because of its fast construction, its durability, and for its accurate pricing made possible by the tightly controlled and relatively short production process.

Groupe Lépine selected a white hammered finish, which they use in many of their projects. The precast concrete supplier also worked on a brick form liner where a brick mould was used to simulate a brick wall, which was then stained at various locations. The illusion is quite dazzling.

A variety of finishes and colour combinations were used for the exterior precast panels, such as light sandblast, chemically retarded to expose the aggregates, as well as beige, white, grey and brown coloured concrete. Even natural stone was used in several places, with some precast panels having over three different finishes or colours.
The Sunset Blvd total precast concrete home is a residential project located in Thornbury, Ontario. It consists entirely of architecturally finished structural precast concrete.

Located on a golf course, the home is in use as a family cottage. All new construction on the property is governed by a covenant, so products to be used on the exterior facades are strictly controlled. Luckily, the precast concrete producer Tri-Krete Limited, was able to find a stone liner that was a close match to one of the natural approved stones.

The precast concrete is self-supporting and very minimal steel was required to complete the structure. The panels are finished using various formliners to achieve the desired look. Panels were installed using a 90-tonne mobile crane and tilt shores to temporarily support the precast concrete panels.

The project consisted of 836 square metres (9,000 square feet) of precast concrete panels, 3,400 of those floor slabs, and another 5,600 designed as wall panels.
ACCELERATED BUILDING CONSTRUCTION

Accelerated Building Construction (ABC) such as modular and prefabricated precast concrete components (also known as Total Precast Concrete Building Systems) are becoming a popular choice for many construction projects. Architectural and structural precast concrete elements as well as prestressed concrete components can be combined to create the entire building.

This design approach can take several forms, including precast concrete columns and beams with panelized cladding or load bearing precast concrete walls and double tee or hollowcore concrete flooring. The advantages benefit every member of the construction team – especially the owner, whose goals are always paramount.

ARCHITECT: In addition to helping to meet all the building owner's goals, total precast concrete systems provide advantages to architects, such as a wide choice of colours, textures and finishes, and design solutions that can make the design process smoother.

ENGINEER: Experienced structural engineers easily adapt to design with total precast concrete systems, and they also benefit from available industry design tools and resources that ensure designs meet building code requirements and take advantage of the material’s ease of use and efficiency. Engineering designs can also accommodate the requirements for seismic design and blast resistant structures.

CONTRACTOR: General contractors find the use of precast concrete components make their job easier at the site, ensuring a smooth process for the owner and designer in both the short and long terms. There are fewer trades to coordinate with precast concrete construction. Developers who use total precast concrete systems say precast concrete can significantly shorten the project timetable when compared with steel and even more when compared with cast-in-place or concrete masonry construction. These savings are critical in bringing a new building into a competitive marketplace or in meeting a tenant’s need for occupancy on a specific date. An Accelerated Building Construction precast system’s speed helps keep projects on track.

RAPID CONSTRUCTION – ABC
Developers who use precast concrete building systems say precast concrete plays a big role in shortening the project timetable when compared with other traditional construction methods. Saving time during construction is crucial when delivering a new building into a competitive marketplace or in meeting tight deadlines to ensure that the building is ready for occupancy as soon as possible. Precast concrete building systems can help developers achieve these goals while also providing a resilient and durable solution that can withstand harsh climates for decades to come.