

STATE OF THE MARKET REPORT: PROGRESSION IN CANADIAN CONSTRUCTION

PRESENTED BY



SUPPORTED BY

informa
exhibitions



LONG-TERM PLAN INCLUDES

\$25.3

billion for **urban transportation** infrastructure

\$21.9

billion for **green** infrastructure

\$21.9

billion for **social** infrastructure

Written By
Andrew Brooks

The fortunes of the construction industry in Canada are directly affected by domestic and global economic factors, shifting demographic patterns, and changing public-sector policies and priorities. Trying to get a handle on all the variables and anticipate where the industry will be even a few short years down the road is a challenge.

But in spite of negative factors such as global economic uncertainty, the outlook for construction in Canada over the next few years could be positive. One big plus is the federal government's plan to boost infrastructure spending. Ottawa's 2016 budget included an immediate \$11.9 billion investment in infrastructure. Its "Fall Economic Statement," released a few months later, includes plans for a further \$81 billion in infrastructure spending through 2027-28, along with the establishment of the Canada Infrastructure Bank to promote investment, planning and delivery.

The long-term plan includes \$25.3 billion for urban transportation infrastructure, \$21.9 billion for green infrastructure and \$21.9 billion for social infrastructure.

Together with existing investments, the total infrastructure commitment by the government will add to more than \$180 billion.

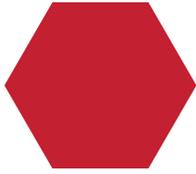
"There's large infrastructure work happening in every major city across Canada," says Mark Casaletto, president of ConstructConnect. Casaletto notes that extensive mass transit commitments have been made in major centres like the GTA, Ottawa, Montreal and Vancouver, in addition to large-scale road and highway work across the country. Bridges are also on the radar; Casaletto singles out the Champlain Bridge in Montreal and the Gordie Howe International Bridge connecting Windsor to Detroit.

In his "Global Construction Outlook" presentation at The Buildings Show 2016, Casaletto noted that despite a still sluggish Canadian economy, the cancellation of massive oil and gas projects and a persistent national trade imbalance, 2017 is expected to see a 6.8% rise in total construction starts. This will be driven mainly by an 8.9% surge in residential starts. However, civil engineering starts (5.1%) and non-residential starts (5.7%) will pull their weight too.

When it comes to major investments, Casaletto's presentation showed western Canada continuing to lead the nation, with an impressive \$225.9 billion of projects contemplated, in planning or potentially soon to be bid. This sum is largely accounted for by mining, oil, pipelines, LNG and natural gas projects, although infrastructure also plays a big role.

Atlantic Canada comes next at \$45 billion, with resources again a huge slice of the pie. Infrastructure plays a larger role in the \$19.4 billion in Ontario and \$27.4 billion in Quebec, as you'd expect where the largest population concentrations and urban centres are located.

Obviously nothing is cast in stone when you predict the future of an industry as dynamic and complex as construction. But there are enough positive factors and hard numbers, and enough optimism on the part of expert observers, to justify an upbeat forecast on Canada's construction industry over the next few years.



LONG-AWAITED CHANGES TO THE CONSTRUCTION LIEN ACT

One hot topic for Ontario's construction industry is proposed reform of the province's Construction Lien Act. An Expert Review of the Act was launched in 2015 and included consultations with over 60 stakeholder groups. It aimed to assess the effectiveness of the legislation in a number of areas, notably prompt payment and dispute resolution. The review was led by Bruce Reynolds and Sharon Vogel of Borden Ladner Gervais LLP.

Last April, Reynolds and Vogel submitted to Ontario's Ministry of the Attorney General their final report, titled "Striking the Balance: Expert Review of Ontario's Construction Lien Act." The Attorney General released the report in September.

Reynolds and Vogel observed that industry payment cycles have become elongated due to the increased size and complexity of projects, and the increased complexity of contracts and payment processes. Between 2002 and 2013 the average collection period increased from 57.3 days to 71.1 days.

Some 100 recommendations were made. One was to extend the time for the preservation of a lien under

section 31 of the Act from 45 to 60 calendar days. The time for the perfection of a lien would be extended from 45 to 90 days from the last day upon which the lien could have been preserved.

Proposed reforms will aim to improve the prompt payment regime in both the public and private sectors. One proposal calls for payments between an owner and a contractor to take place within 28 days of the owner's receipt of the contractor's invoice and, between a contractor and a subcontractor, within seven days from the contractor's receipt of payment from the owner.

"The key thing [with this report] was to strike a balance between freedom of contract and the legislation," says Vogel. "People want to be able to enter into contracts that meet their needs and legislation that protects them."

Reynolds adds that balance was at the heart of the recommendations, especially around prompt payment. "When Sharon and I looked at payment systems from around the world, we thought that the 28-day timeframe was quite achievable," he says.

The report recommends that adjudication be used as an interim binding dispute resolution method.

Parties who decide to use adjudication will have two business days to agree upon an adjudicator

or to have one appointed within five days once a Notice of Adjudication is agreed upon. Within 30 days, the adjudicator will bring a ruling on the issue at hand after evidence has been examined, the work will be inspected and documents will be submitted.

"If someone wants to be to be paid, they can invoke this dispute resolution mechanism," Reynolds says. "If you look at the UK model, they married a payment time frame with a super-fast dispute resolution mechanism, and it can be done in 45 days. This really goes a long way to addressing the concerns of the stakeholders."

The government can expect a backlash if it decides not to move on key recommendations. But Reynolds and Vogel point out that while any changes will have a price tag, "this must be weighed against the substantial loss of revenue and increased costs that industry participants will incur if the status quo is retained."

The Ontario government says it plans to introduce new legislation in the spring. But the process of converting recommendations into legislation is complex and often contentious. Stay tuned.

BETTER PRACTICES, NEWER TECHNOLOGIES KEEP PROJECTS ON TRACK

Approximately 70% of construction projects come in late and over budget. While some factors are beyond human control, there are strategies and processes that can be implemented to improve the outcomes, from design-build delivery to project close out.

Working with a design-build firm that provides both design and construction services is one way to keep variables visible and under control, and makes communication easier. Nagy M. Baky, owner of Design Build Inc., says having a single provider can simplify a project, allowing owners to control and manage costs.

“Clients are very open to the design-build approach because they are now dealing with one entity that is handling all of the responsibilities on a project and working within the budget outlines,” Baky says.

Workloads can also be made lighter with the use of Building Information Modelling (BIM) software. BIM enables designers to dynamically create complex building designs and systems, and dynamically model the interactions between building elements, effectively “real-world” testing them in a virtual environment.

“Using BIM you can see how the real-world characteristics of an HVAC system will interact with a wall you have just modeled,” Baky says. Conflicts show up immediately. The designer will

know right away, for example, if the proposed size of the HVAC ducting won't work with the proposed building materials or the planned insulation thickness.

As Claudia Cozzitorto, BIM manager, MacLennan Jaunkalns Miller Architects and Vice Chair of Communications for buildingSMART Canada, and Eric Poirier, Vice Chair of Operations and Chair of Communications for buildingSMART Canada, described in their BIM presentation, “The Roadmap to Lifecycle BIM in the Canadian AECOO Community,” BIM can also make a huge contribution to project delivery.

Lean construction methodologies are impacting project management. They have been increasingly adopted in other countries and are making inroads in Canada. Lean construction has the potential to provide improvements across a wide band of metrics, from on-time and on-budget delivery rates to injury statistics, productivity and waste.

Benefits of BIM include:

- a reduction in project duration of seven to 19%;
- a reduction of rework by up to 95%;
- the elimination of change orders;
- a 20-28% improvement in labour productivity in the field;
- up to a 90% reduction in RFIs.

Photo:
Nagy Baky at The Buildings Show

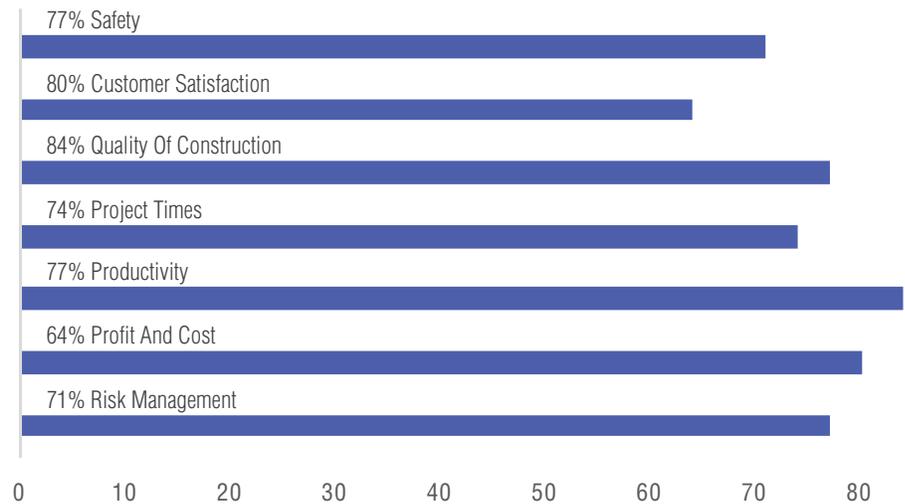


Kathleen Lausman, co-chair of the Lean Construction Institute - Canada (LCI-C), a special committee of the Canadian Construction Association established in 2015, addressed attendees on “Bringing Lean Construction to Canada: What Lean Can Mean for the Canadian Building Industry.”

Lausman said that Lean principles as applied to the Construction industry focus on:

- waste reduction/elimination;
- work flow efficiency between owners, designers and constructors – and through the supply chain;
- teamwork and collaboration through the project delivery process;
- lean thinking and behaviours at every project phase;
- lean methodology and tools;
- continuous improvement/learning.

The benefits have been validated in practice by owners, designers and builders. Practitioners report midrange to high improvement in the following areas:



As a project nears completion, the practice of “beginning with the end in mind” proves its worth. Tim Meana, Senior Project Manager at Walsh Canada, focused on a project’s early stages in his presentation on “Best Practices in Effective Construction Close Out.” To prevent the last 3% of a project from absorbing as much as 15% of the total effort, he said, it’s vital to secure agreement and cooperation on the details early on, and maintain good communication over a project’s lifecycle.

“It starts with the project’s contract,” Meana says. “Understanding the contract is important. On a Triple-P project, the list of deliverables and items to be done can be up to 2,000, from how you write a letter to how change orders are to be done. You need to know these things and who oversees them in order to meet the contractual obligations of the project.”

Sound project management is at the core of new thinking about project delivery in the construction industry. A solid back-to-basics approach, using new ideas and coupled with the intelligent application of state-of-the-art information technology, can mean the difference between a poorly executed project and one that gets top marks for budget, timeline, forward-thinking design and customer satisfaction.



ENERGY-SMART BUILDINGS

Energy efficiency continues to be a priority for architects and designers, builders, owners and tenants. This year, The Buildings Show offered attendees a chance to learn about a wide range of energy-efficiency topics, from energy-efficient design to the emergence of smart buildings.

One significant way to stem energy loss, especially in a cold climate like Canada's, is by reducing thermal bridging. Thermal bridges are elements that have a higher heat transfer rate than surrounding elements and thus reduce the effectiveness of the building's insulation.

Better design is one element that helps in cutting thermal bridging in a building structure. The roof-to-wall interface can be designed so that insulation is carried up between the precast wall that forms a parapet above the roof line and the roof deck, tying it into the roof insulation system. The thermal bridging at the window-to-wall interface can be reduced if designers improve the alignment of insulation with the windows.

Stephen Foster, Managing Director of Information, Communication, Automation and Technology for EllisDon Corporation, cites canopy supports as a leading cause of thermal bridging. These canopies

generally require steel beams or structural supports that penetrate the building envelope and compromise the insulation.

But balconies are undoubtedly the number one offenders when it comes to thermal bridging. In most designs, the balcony is continuous with the interior floor slab of the building, continuing through the building's thermal barrier and conducting interior heat directly outside.

“The heat loss can be extensive, but you would need to do an analysis on a case-by-case basis,” Foster says. While thermal bridging solutions are available, “the systems... are expensive and do in many cases need to be analyzed on a per-case basis to determine the net payback period for capital expense versus energy savings.”

Designers can eliminate thermal bridging by separating the balcony from the interior wall, constructing them as separate elements and adding a thermal buffer in between. Or the balcony can be attached to the building with connection systems that have low heat conductivity. Another method is to use insulation on the balcony to reduce the amount of heat that travels from the interior floor out to the balcony.

Energy efficiency can be as straightforward as adding extra insulation or installing triple-glazed windows. Designers can use windows that generate solar power, a technology that has been available for a few years. While it comes at about a 20% premium to regular windows, it can offset that by helping to power a building's AC and heating systems. The sunlight-absorbing properties also help to lower solar overheating in the summer months.

Glass wall systems are becoming more popular, as Peter Adams and Steve Murray, Principals of Morrison Hershfield Architects, emphasized in a presentation titled “Glass Wall Systems: Meeting Challenges and Maximizing Performance.” Customers like to have great views and lots of daylight, and designers favour glass wall systems for cost, ease of construction, durability and quality control reasons.

But thermal performance is still a challenge. “Although there has been significant improvement to some glass wall systems in the past few years, common systems still have thermal resistances approximately 8 to 10 times less than an average insulated opaque wall system,” Adams says. “Some of the best glazing systems available have thermal resistances approximately two to three times less than an average insulated opaque wall.”

Triple glazing is effective at reducing heat transfer directly through the glass itself, though it comes at a cost. Better frame design and the use of non-conductive materials to improve the performance of thermal breaks will reduce heat loss through the non-glass elements of glass wall systems, and are less expensive.

But sometimes a high degree of energy efficiency can have surprising – and unwanted – results. Adams and Murray cited one case study of a high-performance glass wall system on a high-rise building in a coastal North American city. The reduction of heat transfer through the glass in this case allowed condensation on the glass exterior to freeze in cold weather, forming ice that then broke away and fell several hundred feet to street level when temperatures rose.

“Typically there’s enough heat loss through glass systems to prevent ice formation on the glass exterior,” Adams says. “We need to continue to strive for much better thermal performance from our glazing systems, but attempts should be made to identify

unintended consequences of these improvements during design.”

Which brings us back to sound project management, a theme Adams and Murray used to wrap up their presentation. Using good quality systems and understanding the performance limits is fundamental, they said. In addition, build “thinking time” into the early project stages to prevent hasty decisions, test thermal performance in advance using mock-ups of the window systems that are going to be installed, and make sure to do adequate field review. This is a logical approach for any project.

One emerging trend that’s getting a lot of attention for its energy-saving potential is the emergence of ‘smart buildings’ – structures that leverage information technology to intelligently monitor the internal environment and make real-time changes to lighting, heating and air conditioning, and other systems.

Thano Lambrinos, Director of Business Development, Energy and Digital Services at EllisDon, says that lighting, security and heating have traditionally been treated as independent, discrete systems, but are increasingly being connected and automated. An intelligent building management system that manages these subsystems can make real-time adjustments automatically to save energy.

“Imagine going into a building, and the building knowing that on December 26 there will not be a lot of people inside, and then adjusting heating accordingly,” says Lambrinos. “There’s no need for human intervention. The goal is to have the building make its own

decisions and to squeeze all the energy savings it can.”

A smart building can detect when people are in certain rooms or zones, using that information to regulate heating, cooling, airflow and other systems. “Sensing technology is more and more vital now,” says Bill MacGowan, Director, Smart connected Real Estate for Cisco Canada. MacGowan delivered a presentation titled “How is Technology, Automation and Innovation Transforming Buildings?”

“Motion sensors are one of the best-known technologies. But you can also record key swipes as people enter the building or enter a zone within the building. Sensors can count people coming into rooms, sensors can pick up body temperature to determine if somebody is sitting in a specific location, and there are even sensors showing up in office furniture.”

There’s a decidedly futuristic aspect to some cutting-edge energy efficiency systems and the concept of smart buildings, but while many of these technologies have yet to hit the market in volume, the evidence is already in that they can be remarkably effective at saving energy, improving the process of building construction and making building management easier and much more efficient.

As always, it takes a few pioneers to validate new, game-changing concepts in real life. And the construction industry has shown that it’s quick to catch on to a good thing.