



Success is never earned easily – it's built by overcoming challenges and adapting to change. Aon congratulates this year's Top Contractors on their resilience and innovation. We're here to help you navigate complex decisions and reshape the future. Using powerful data, we help businesses build even greater resilience. Our commitment to the industry is unwavering, and we will continue to be your advocate and partner.





WELCOME LETTER



n behalf of Aon, I am proud to sponsor the Top Contractors issue of On-Site for the fourth consecutive year. It has now been well over a year since the onset of the pandemic and the tremendous stress it has put on our society, our economy, our governments - and on us personally. No one could have predicted fifteen months ago how we would collectively respond to these challenges. Few predicated the speed of vaccine development - our generation's "moonshot." Fewer still predicted the impact on key economic factors challenging our industry right now such as supply chains disruptions and asset price inflation. The world is interconnected like never before.

Our team is here to help you navigate through the complex risks that you face and to give you advice, options and solutions to address them.

BEING READY FOR OPPORTUNITIES

The pace of volatility has changed in recent times. Two major global crises in twelve years reinforces the fact that all of us are exposed to risks not of our own doing. That said, economic downturn has also turned into opportunity as governments (again) lead us out of a global crisis with large and small investments in infrastructure. This opportunity will be tempered though by other key emerging risks such as labour shortages and input price inflation. Careful planning will be the key to capitalizing on these opportunities. Labour shortages and supply chain risks must be factored into your project strategy.

Added to this dynamic are the challenges of procurement models and often onerous risk transfer models presented by owners. Insightful risk management and risk transfer strategies will allow contractors to respond to these situations and enable sustainable growth without assuming undue and unmanageable risk.

ADVOCATING FOR THE INDUSTRY

Aon takes pride in our close partnership with industry associations such as the Canadian Construction Association (CCA). We again maintained our CCA Annual Conference sponsorship this year, and last year we worked closely with the association, the federal government and Export Development Canada (EDC) to provide input on ensuring that the construction sector had access to vital liquidity and surety credit. In addition, we have advised clients on assessing the impact of pandemic events on their operations, provided best practices associated with job shutdowns, and how to safely operate a construction site in a pandemic environment. We will continue to advocate for Canada's construction industry in tangible and actionable ways that are above and beyond our core offerings.

LOOKING FORWARD

The future is always uncertain, but with the right contractual terms, operational practices, data, technology and risk finance solutions, we can help you find opportunities for sustainable growth. I consider it an honour to partner with an industry that serves as a cornerstone of the Canadian economy and our Aon team looks forward to helping your firm – and our industry - remain resilient and well-positioned for the future. Again, a hearty congratulations to this year's Top Contractors and I wish you all our best wishes for the coming year.

On behalf of Aon's CSG Leadership team and colleagues, we thank you for the opportunity to work with you.



Kent Peters





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In a year dominated by COVID-19, contractors adapted on the fly to project-stopping lockdowns, supply chain challenges and new ways of communicating. The industry also came together, uniting behind standardized health and safety protocols, while putting aside the usual competitive attitude to share best practices and keep workers safe.

Despite facing down the global pandemic, many of Canada's Top Contractors saw their revenues climb in 2020, demonstrating how the health crisis did little to lessen demand - or stop work - throughout the industry. Procurement for a number of major projects did slow last year, and certain private owners understandably pumped the brakes on upcoming jobs, but a stabilizing economy and government stimulus spending has builders looking to 2021 and beyond with growing confidence.

The industry also saw a major merger take place in 2020. Bird Construction agreed to acquire Stuart Olson last summer, with the acquisition closing in September. Billed as a transformational deal for Bird, the purchase brings together two companies without much previous overlap. It gives the Mississauga, Ont.-based contractor new exposure to Western Canada, while adding scale and creating opportunities in new places, management says. Stuart Olson revenues listed include just the first half of the year. Its third quarter results have not been publicly released, while Bird's revenue figure tucks in Stuart Olson revenue from the final three months of 2020.

I want to thank all of the contractors that took the time to participate in our annual survey. Your valuable contributions make this research possible.

DAVID KENNEDY **EDITOR**

TOP FIVE COMPANIES

UNDER 50 EMPLOYEES

Rank Company	Revenue
1 Caliber Projects Ltd.	\$77,670,846
2 JR Certus Construction Co.	\$50,100,000
3 Rosati Construction	\$45,436,496
4 CGI Constructors	\$40,853,365
5 O.N.Site Construction Inc.	\$35,776,000

TOP 40

Rank	Company	2020 Revenue
1	PCL Construction	\$7,600,000,000
2	EllisDon Corp.	\$4,296,516,000
3	Aecon Group Inc.	\$3,643,618,000
4	Ledcor Ltd.	\$3,200,000,000
5	Graham	\$3,056,697,367
6	Pomerleau	\$2,517,000,000
7	Kiewit Canada Group Inc.	\$2,478,000,000
8	Bird Construction Inc.	\$1,504,400,000
9	EBC Inc.	\$1,112,000,000
10	Flynn Group of Companies	\$1,018,000,000
11	Broccolini Construction Inc.	\$833,000,000
12	Canadian Turner Construction Co.	\$767,898,000
13	Clark Builders	\$697,000,000
14	Axiom Builders Inc.	\$543,000,000
15	Chandos Construction	\$540,000,000
16	GFL Infrastructure Group	\$535,100,000
17	Reliance Construction	\$528,000,000
18	Taggart Group of Companies	\$510,000,000
19	North American Construction Group	\$500,374,000
20	Magil Construction	\$450,000,000
21	Stuart Olson Inc.	\$445,000,000
22	Maple Reinders	\$420,000,000
23	Condrain Group	\$352,000,000
24	FWS Group of Companies	\$340,000,000
25	Dawson Wallace Construction Ltd.	\$325,000,000
26	Strike Group	\$314,206,000
27	Govan Brown & Associates Ltd.	\$301,000,000
28	Leeswood Construction	\$285,000,000
29	Buttcon Ltd.	\$220,000,000
30	NorLand Ltd.	\$205,700,000
31	Delnor Construction Ltd.	\$203,700,000
32	Marco Group Ltd.	\$202,000,000
33	Avondale Construction Ltd.	
	Matheson Construction Ltd.	\$198,000,000
34		\$182,000,000
35	Gillam Group	\$181,000,000
36	Wales McLelland Construction	\$169,000,000
37	Keller Foundations Ltd.	\$168,000,000
38	Fortis Construction Group Inc.	\$157,000,000
39	M Builds Construction	\$155,000,000
40	Bockstael Construction Ltd.	\$134,500,000



Based on responses to research conducted by On-Site, as well as publicly-available data. Some contractors chose not to participate in this research.

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MEETING PENT-UP DEMAND

Canada's Top Contractors prepare to shift out of neutral after a year focused on the pandemic

BY DAVID KENNEDY

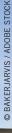
ith the vaccination rate rising, COVID-19 case counts falling and a wave of new work coming down the pike, Canada's

Top Contractors are looking ahead to the second half of 2021 – and the post-pandemic construction market – with a sense of optimism.

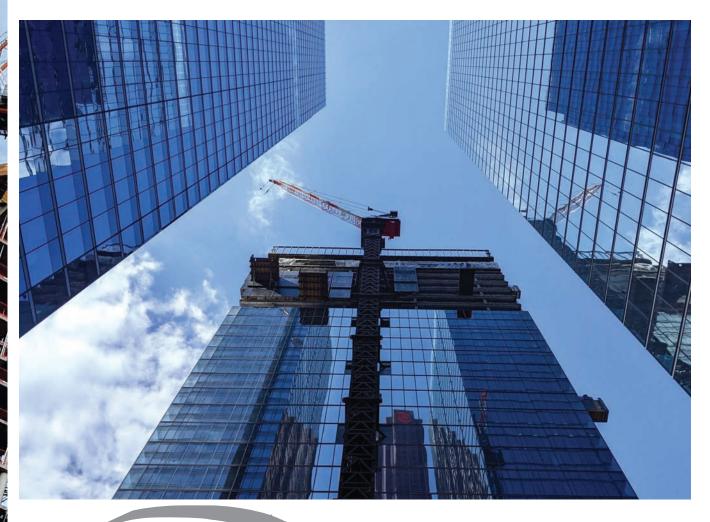
Between conventional infrastructure work, a diverse flurry of activity in major

cities and new transit projects getting on track, Mike Wieninger, COO of PCL Construction's Canadian operations, expects the industry will have its hands full as the country emerges from the pandemic.

"There's been a pent-up energy and a pent-up demand," Wieninger says. Stimulus dollars from the federal and provincial governments are one driver, he adds. Other segments of the industry restarting projects







"There's a lot of room to be optimistic with projects coming down and general spending going on in the economy."

Gilles Royer, Bird

they had been forced to put a pin in last year is another.

"The pandemic is interesting because it really paused a lot of the pending work that was ready to be released," he says.

Research organization BuildForce Canada is bullish as well, forecasting a healthy construction market through much of the 2020s, with particularly strong growth between now and 2023.

Bill Ferreira, BuildForce's executive

director, says that while
the third wave of
COVID-19 and the
slower than anticipated rollout of
vaccines may push
the rebound back into
the second half of 2021,
he expects the industry to
continue to gain steam heading into 2022.

"We anticipate that the construction economy is going to be robust, particularly next year as we start to see some of the measures that were announced in the budget find their way onto the street and as consumers start to take advantage of some of those programs," Ferreira says. He points to government spending on institutional projects and conventional infrastructure as two pivotal areas.

The increase in construction material

prices, however, does pose some risk. "Obviously that's going to have an impact on supply chains," Ferreira says.

Likewise, Wieninger has concerns about the "skyrocketing" price of key inputs like lumber and glass.

"It can get to the point where the pro forma doesn't pencil, so there's a little bit of uncertainty with escalating costs causing some projects to be delayed or cancelled," he says.

Nevertheless, neither Wieninger nor Ferreira expect the higher material costs to derail the industry's trajectory.

Seeing opportunity in a diverse array of areas, including some that have seen less momentum in recent years, Gilles Royer, chief operating officer of Bird Construction, is similarly encouraged looking ahead.

"There's a lot of room to be optimistic with projects coming down and general spending going on in the economy," he





Merit National Takes the Lid off Mental Health

Merit National (Merit) is a not-for-profit association that represents the Canadian construction industry and the companies that support our members and their families. There is a perception of a stigma in male dominated industries like construction where men are less likely to ask for mental health supports. Merit is working towards lessening this stigma and recognizes that mental health supports are vital for Members, their employees, and their families.

"It's critical for company leaders to not only recognize how mental health impacts their workplace, but also to ensure that there are programs and services available that recognize the unique needs of their employees," said Malcolm D. Kirkland, President and Chief Executive Officer of Merit. "Merit's Mental Health initiative is one of the tools we are adding to our mental health toolbox. We continue to support our members, their employees, and their families by providing the resources they need, when they need them."

Working collaboratively with LifeWorks, Merit has launched an innovative initiative that includes: the Merit Mental Health First Aid Kit, the LifeWorks Wellness app, the Workplace Mental Health Leadership™ Certificate Program, Building Blocks for Positive Mental Health courses and is a champion in the "Buddy Up" campaign with the Centre for Suicide Prevention.

"If we do not focus on addressing mental health issues, learning how to recognize the signs and providing access to support, the national workforce would be compromised by what is often seen as an invisible enemy," said Mr. Kirkland. "When organizations like Merit take a strong, bold and visible stance in empowering employers and employees in support of their mental health, the resulting effect is positive across the country."





says. Along with upcoming civil work, he notes the company has growing confidence in the resource industry as higher commodity prices drive renewed interest in the sector.

In an On-Site poll of the country's largest contractors conducted this May, few builders anticipate a decline in business this year, with results skewing heavily toward growth or steady activity. A clear majority, for instance, expect to see gains in the transportation, institutional, industrial, multi-unit residential and road building markets this year. Refer to the figure below for a detailed breakdown of sentiment by project type.

With the wider economy appearing to get back on track, the haze of uncertainty created by COVID-19 is lifting, but getting to the other side of the pandemic remains a work in progress.

THE 'SOMEWHAT' BACK TO NORMAL

Across the country, through the 15- and

counting – months of the pandemic, the construction industry has remained largely operational. Contractors have adapted, as well as come together by sharing health and safety best practices to keep workers on the job and projects moving forward.

At the same time, there is a recognition that the pre-pandemic job site has likely gone through several irrevocable changes.

"As an industry, we've all learned through this that things are going to change," says Steve Chaplin, vice-president of Health, Safety & Environment (HSE) at EllisDon.

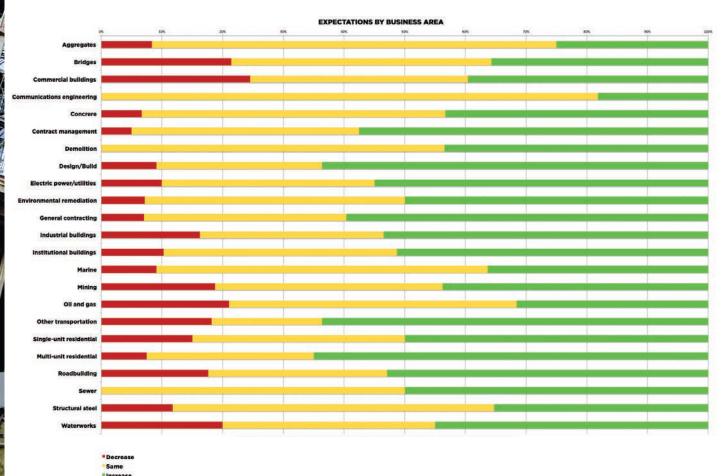
As COVID-19 began its creep into Canada last year, the HSE team at EllisDon began stockpiling supplies, such as hand sanitizer and masks, to distribute to its sites throughout the country. Like other contractors, it established a screening procedure for staff, using QR codes to link workers to a daily set of questions. As 2020 wore on, it rolled out other tools like thermal imaging cameras and rapid antigen tests.

While many pandemic response measures will likely prove temporary, Chaplin expects amped up hygiene and increased focus on washroom cleanliness will be here to stay. Despite the industry's perennial challenge with plumbing on active sites, EllisDon has also been installing wash stations and, when possible, trying to make heated water available.

"What you're going to see still is probably more standard practices just on distancing, hygiene, cleanliness," he says.

Canada's construction industry came together early on in the pandemic on health and safety, and all indications point to contractors sticking to the improved sanitation regimes in the post-COVID-19 world. Royer and Wieninger, for instance, expect to see a similar focus on hygiene on Bird and PCL sites moving forward.

"It should actually help other transmissions, even flus and anything like that," Wieninger says. "In general, I think you'll see people will be less sick." PCL is also





implementing more and more touchless technology in washrooms, on doors and in other areas to help cut down on transmissions.

In the shorter term, vaccines are poised to come into focus for employers across the country, with construction firms being no exception.

Unlike previous safety measures – thermal scans and rapid tests – the HSE team at EllisDon will be taking a different approach to vaccinations.

"People are very positional about vaccines," Chaplin says. While the company hosted a community pop-up clinic with support from Modern Niagara and Flynn Group in Ontario last month, and plans to build awareness about and strongly encourage vaccines for staff, "if a worker refuses, that's their choice," Chaplin adds.

He sees a few possible exceptions down the line, such as instances when a client like a long-term care home or hospital requires all workers to be vaccinated.



While there is still a fairly long road ahead, Chaplin is guardedly optimistic. With vaccinations, he says, the industry is heading toward a "somewhat back to normal."

CHANGING HABITS

Technology adoption is another area contractors are not anticipating a rollback to the previous norm.

As early as last April, it was clear

construction firms not already dialled into the latest technology would need to get up to speed in a hurry. In an On-Site poll this May, 86 per cent of contractors said COVID-19 prompted them to greatly or somewhat accelerate technology adoption.

"It served as quite a catalyst for technology improvement," Royer says. "The innovations I saw across our organization from a technology standpoint were pretty interesting."

The use of video conferencing tools – like Microsoft Teams or Zoom – erupted and had a clear value-add, Royer says. Where a phone call may have sufficed in the past, pulling in a third, or fourth, or fifth colleague onto a video call has been a simple way to improve collaboration while all but eliminating travel time.

"It's one thing to see technology happening in the office, but it's quite another thing to see field operations get more comfortable and adopt more technology more rapidly," Royer says.





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"As horrible as this was, it forged stronger partnerships than ever." Steve Chaplin, EllisDon

In addition to keeping on top of projects, PCL has also turned to video calls for training purposes. Wieninger expects the shift will be here to stay, at least in part.

"It won't be to the extent that we're using it today, it'll be less, but there is a nice balance between utilization of some of the video conferencing tools that are out there mixed in with the in-person," he says.

Better communication is also permeating beyond internal teams and allowing for closer contact between owners, designers, contractors and subcontractors.

Driven in part by software advancements that let separate project stakeholders work together on common platforms and better share information, Royer says the trend toward collaborative contracting is a game-changer for the industry.

"For us, it's been a real breath of fresh air," he says, noting Bird is involved in a

number of projects using the integrated project delivery (IPD) model, and is pursuing several that use the alliance model as well.

"There's a tremendous benefit to the owner by leveraging the trade contractor base at an earlier phase in the project," he adds. "Their experience in the development of projects is underutilized in the industry."

By integrating input from disparate teams early on, owners can head off a lot of issues that can crop up during construction, Royer says.

Similarly, Wieninger says PCL is always looking for better models to deliver projects more effectively. At the same time, he does not see more conventional building models as broken, or that IPDs or alliances will be guaranteed to translate to better-run projects.

"It's all how you approach it," he says.
"In many cases, it's not the model that
is broken – the model is absolutely fine.
The devil's in the detail in how the risk is
allocated and that in many cases is the
problem."

Still, with projects getting more and more complex, and the busy industry

putting experienced project leaders in short supply, he sees working more closely together as one component to success.

"A collaborative approach is very much a great way of understanding and developing the risks each stakeholder takes on and offers the project to move forward and deliver the project the right way and having it done so everybody's on the same page," he says.

Tested by the pandemic, relationships across much of the industry have also strengthened, Chaplin notes.

"As horrible as this was, it forged stronger partnerships than ever," he says. From a safety standpoint, he notes EllisDon has been working hand in hand with, among others, the Central Ontario Building Trades and governments of all levels, taking a united approach to addressing concerns on-site as they arise.

TACKLING NEW AND OLD ISSUES

The adjustments will not stop there.

Emerging issues, such as sustainability, are expected to continue to make their way up agendas across the industry in the near term. Just under one in four of the contractors On-Site polled said sustainability initiatives were among their top priorities, with nearly half saying the issue was in the middle of their to-do lists. On the other hand, just under 23 per cent cited sustainability as a low priority, with another seven per cent not watching the issue at all.

It is one example of a wide range of new priorities contractors are taking stock of. Modular construction is another, which itself could aid in waste and emissions reduction, as well as with the industry's long-running labour challenge.

On that front, it will be a busy few years. To match the pent-up demand and offset retirements, the industry will need to add roughly 81,000 workers between now and 2030, according to the latest figures from BuildForce. With much of the growth concentrated between now and 2025, recruitment and retention will be an immediate concern in 2021 and beyond. \square





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TOP FIVE UNDER 50 EMPLOYEES

CALIBER PROJECTS LTD.
Headquarters: Langley, B.C.
2020 Revenue: \$77,670,846
Sectors: Commercial,
residential

JR CERTUS CONSTRUCTION CO.
Headquarters: Vaughan, Ont.
2020 Revenue: \$50,100,000
Sectors: Industrial, commercial,
institutional, residential

ROSATI CONSTRUCTION
Headquarters: Windsor, Ont.
2020 Revenue: \$45,436,496
Sectors: Commercial, industrial, insitutional, residential

4 CGI CONSTRUCTORS
Headquarters: Mississauga, Ont.
2020 Revenue: \$40,853,365
Sectors: Commercial,
institutional

O.N.SITE CONSTRUCTION INC.
Headquarters: Oakville, Ont.
2020 Revenue: \$35,776,000
Sectors: Commercial

A 'SMALL GIANT' IN THE FRASER VALLEY

BY DAVID KENNEDY

ts name currently stamped on construction hoarding on two of the busiest corners in Langley, B.C., Caliber Projects Ltd. has grown over the past dozen years from a two-employee builder of single-family homes, to a "small giant" overseeing a series of increasingly complex projects in the Fraser Valley.

The fast-growing builder earned revenues of roughly \$77.7 million in 2020, with work on two high-profile projects – Latimer Heights and the Willoughby Town Centre – accounting for no small portion of its bookings. With a staff of just 45, the company also spring-boarded to the peak of On-Site's annual Top Five Under 50 for the year.

lan Baird, Caliber's director of construction, credits the company's momentum, and its ability to take on such a large amount of work with such a small team, to its focus on relationships and the company's strong sense of community. With no intention of being the biggest shop in town, Caliber has built up its team through careful mentoring.

"That's our raison d'être," Baird says.
"Building people is literally why we get up in the morning."

Allowing employees in their 20s or 30s to shoulder more and more responsibility, both on job sites and in the office, is a boon for retention and also lets the company take on more projects without adding to its headcount. Morning huddles on-site with superintendents walking teams through the daily schedule, project managers touching on budgets, and value sharing to keep all workers dialled in and appreciative of one another, add to the team's cohesion.

"Our team is so tight that there's noth-

ing they won't do to achieve success," Baird says.

Jerry Pol, business development manager at Caliber, says the focus on people has been a core part of the company since day one. The familial atmosphere, fostered by Caliber's founder and CEO Justin Bontkes, helps keep values aligned and the team working toward common goals, Pol says.

"We're all high performers. We don't believe in laziness. We're always crushing it," he adds, a nod to the company's mantra – own it, crush it, love it. Though it's not a written principle of the business, Pol says faith also underpins the company's code of ethics.

Between the drive to do more with less, and initiatives such as "full-throttle" Fridays,



Caliber points to its careful mentoring of junior staff as one of keys to its success.



An overview of Caliber's ongoing work on the Latimer Heights project in Langley.



Caliber is known for its fast pace and quality. Crew members own their mistakes and aren't satisfied with second-rate work, Pol says.

They're also rewarded for it. Caliber implemented an employee profit sharing program last fall. Modelled on *The Great Game of Business*, it gives all staff visibility into how the company operates and earns money, as well as the ability to take an ownership mindset. The profit sharing initiative is a way to incentivize running slim as well.

"We all know how we can impact that number," Pol says. "Speeding up the schedule, being more efficient with materials, being more efficient with our time. All these things."

As with all general contractors, relationships with clients and subtrades are another focus for Caliber.

Baird says cold-calling and knocking on doors aren't necessary as the company has established its track record. Most of the

company's recent business has come from referrals or bolt-on contracts from existing clients, he says – a clear endorsement of Caliber's ability to deliver. The company's initial contract for two parcels of Vesta Properties' Latimer Heights project, for instance, came from a referral, despite Caliber not having tackled a "monstrous" multi-phased project like it before.

When it comes to subcontractors, Caliber views its trade partners as its "life-line."

"For us, it's all about the relationships that we have with them," Baird says. "We make sure that we pay them on time, we make sure that we advocate for them at the change order table when their change orders are fair and reasonable, we make sure that we don't produce a schedule that they can't achieve."

The internal sense of community also extends to Caliber's subtrades, Pol adds, but the company's high set of standards applies as well.

"We are some of the softest construc-

tion guys you'll ever meet," Pol says. "But we also hold people to a higher standard than they may be used to. We care, and we also demand excellence."

Caliber anticipates strong growth to continue in the years ahead. It's currently working through several concurrent stages of the 74-acre Latimer Heights project, for which it's building condos, mixed-use commercial and concrete office towers. It started excavation for the first portion of the job in 2019 and expects work to wrap up on the mixed-use series of projects by spring 2024.

A host of other opportunities await. The company has a committed pipeline worth approximately \$350 million it expects to work through over the next three years. Meanwhile, it plans to stay relatively small. Pol acknowledges that while its headcount may creep a bit over 50, Caliber intends to bind itself to its "small giant" goal, and building in its own Fraser Valley backyard.







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ACTIVITIE

The following letter codes are used to indicate areas of activity for the contractors in the listings on these pages.

- A Aggregates
- **B** Bridges
- C Commercial Buildings
- D Communication Engineering
- E Concrete F Contract Management
- **G** Demolition
- H Design/Build
- J Electric Power/Utilities
 K Environmental Remediation
- M General Contracting
- N Industrial BuldingsO Institutional Buildings
- Q Marine-Related
- R Mining-Related
- S Oil and Gas-Related
 T Other Transportation Construction
- U Residential Houses
- Residential Multi-Unit
- **W** Roadbuilding
- **X** Sewer
- Structural Steel
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Chandos Construction

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Clark Builders

4703 52 Ave. Edmonton AB T6B 3R6 T: 780.395.3311 www.clarkbuilders.com C, E, F, H, J, M, N, O, T, V







Clobracon Construction Inc.

2535 — 1 Halpern Rd. Saint-Laurent. QC H4S 1N9 T: 514-731-0035 www.clobracon.com C, E, G, M, O, V, Y

ConDrain Group, The

30 Floral Parkway Concord, ON L4K 4R1 T: 905-669-5400 www.condrain.com A, B, C, M, N, O, W, X, Z



Dalren Ltd.

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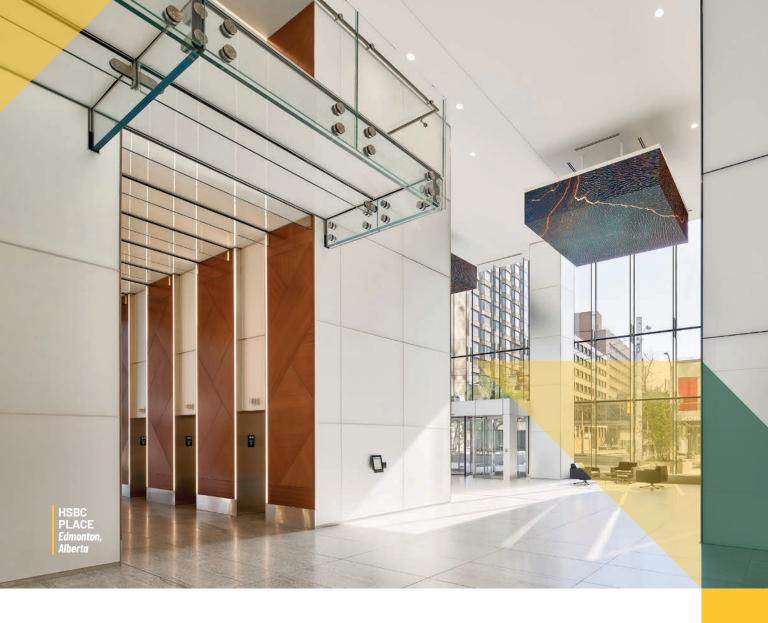
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A better way to build, together.





Influx of data gives construction firms the chance to take control of their pain points

BY DAVID KENNEDY

hether you're generating data the traditional way through clipboard-wielding workers, or the emerging route using job site sensors and other tech tools, accurate and timely information can make or break a construction project.

Material price increases, labour shortages, defective workmanship and ineffective communication between project stakeholders are just a few in a long list of risks David Bowcott, the global director of Growth, Innovation & Insight within the Global Construction and Infrastructure Group at Aon, put front and centre in a panel discussion hosted by On-Site last month. Few risks, if any, can't be managed by making better use of data, giving contractors more control over risk mitigation than ever before.

"When we're looking at these risks, let's be conscious that there are opportunities as a result of them, and seizing those, I think, are the things that make good companies great," Bowcott says.

In the past, construction data has been available, but was far more limited.

Neil Banerjee, senior vice-president of Operations with Matheson Constructors, has watched the evolution over a nearly 30-year career. Starting as a field engineer in Thunder Bay, Ont., he cut his teeth tracking concrete strengths, often by simply dropping thermostats under curing tarps overnight.

"We'd come by in the morning and see," he says. "It would track the low-point and the high-point of the temperature, so we could see if we had a problem or not. But we would discover that problem at seven in the morning."

Tracked on paper and rarely actionable, this old way of collecting information has been made obsolete by modern sensors and

A FEW OF CONSTRUCTION'S **TOP RISKS:**

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- Cash flow
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- Commodity prices
- Climate change
- Cyber threat
- Increasing competition

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- Defective workmanship
- Worker injuries
- Design performance



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"When you're building a residential condo and you're nearly finished and you have a major leak, it can cost millions and delay the project. Having insurance isn't enough because... there are homeowners that are expecting to move in and that disruption damages our brand and the owner's brand." Chris Gower, PCL

software, Banerjee says. Mobile devices, the cloud and tools like BIM (building information modelling) have rewired job sites, with much of the transition taking place in the past decade.

"Things are very exciting right now if you look at what's on the horizon and what the technology and the data can actually do for us," he says.

BETTER INFORMATION ON-SITE

The evolution of concrete data is just one example. Relying on Internet of Things (IoT) sensors, Chris Gower, chief operating officer for PCL Construction's Buildings division, says the contractor is able to eliminate the guesswork and speed construction schedules.

"You don't have to break cylinders anymore," he says. "You can get real-time data when concrete is cured, which means you can strip falsework earlier and you can do it with certainty, knowing it's safe."

Water leaks, Gower says, are another devastating risk on projects.

"When you're building a residential condo and you're nearly finished and you have a major leak, it can cost millions and

delay the project. Having insurance isn't enough because... there are homeowners that are expecting to move in and that disruption damages our brand and the owner's brand," he says.

Concrete and leak detection sensors are two tools in a suite of technologies PCL is using on its sites. Sensors to track humidity to prevent the delamination of millwork, sensors on heaters to ensure they aren't running low on fuel, and sensors on hoarding to detect if it's come loose are a few others. In all areas, Gower says, sensors let its teams take action in real-time, mitigating risks and streamlining the construction process.

Between sensors and the shift to the cloud, job sites and offices are also better connected than ever before, Banerjee says.

"We can sort of see where we're at and identify some of those schedule risks and also financial risks," he says, adding that on jobs that have a lot of outstanding changes, up-to-date financial data is vital. The improved information flow helps boost quality control, letting the company catch issues early and avoid litigation down the road.



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"We can sort of see where we're at and identify some of those schedule risks and also financial risks... You're talking about millions and millions of dollars of lost revenue if something goes wrong afterwards... this technology is really a way to mitigate some of these risks." Neil Banerjee,

"You're talking about millions and millions of dollars of lost revenue if something goes wrong afterwards... this technology is really a way to mitigate some of these risks," Banerjee says

STARTING DOWN THE PATH

Building good data architecture and a strong data strategy are two of the key steps to combating risk and taking advantage of the opportunities timely information offers. And getting started does not necessarily have to be a daunting task.

"Ultimately, you know where you're suffering," Bowcott says, adding that contractors can use data to suss out the areas they need to improve. "Use it to identify where the biggest problems are and then apply other technologies to solve for those problems and operational practices and contractual changes."

Likewise, Gower encourages contractors to start with the basics - such as job site sensors - and then work toward a longerterm, broader data strategy. It takes both leadership and engagement across all

departments, however.

"If you're not prepared to make an investment in technology knowing that you'll benefit later through efficiencies, it won't happen," he says. "That's a top-down leadership decision at the very highest level of the organization."

With a commitment from management, individual departments – from estimating to operations and safety - need to get involved, Banerjee says.

Meanwhile, contractors can't do it alone, meaning building partnerships with technology and data analytics experts will be integral to charting the path forward, particularly when it comes to emerging opportunities with artificial intelligence.

THE AI VALUE PROPOSITION

Even for the big players in the Canadian construction industry, it's early days for Al applications. PCL, for instance, has only begun to test the waters, applying it in just a few scenarios, such as crawling through photographs with AI to identify safety infractions. Still, Gower anticipates

Matheson

the broader set of technologies to advance rapidly and that AI will be in regular use on job sites within the next couple of years.

"I think, frankly, it's going to revolutionize the business, as it has many, many others, and it's coming," he says, adding that the company is also doing its due diligence to be ready to put it to use. "The more you're ready for it to come, the more your data is organized well, the more that you use tech so that you can have more data to analyze, you're in a better place to leverage it."

The eventual aim will be to use AI to both minimize risk and boost productivity by identifying trends.

"It's going to identify potential issues that otherwise we'd have to go searching for," Banerjee says. Picking out these outliers could be as simple as an algorithm identifying what time of day work injuries are highest, allowing safety teams to take corrective action. More advanced applications abound, from Al-powered scheduling

to predictive risk management.

"It's already coming together," Bowcott says, pointing to data alliances within construction that are amalgamating data from both the construction and insurance industries.

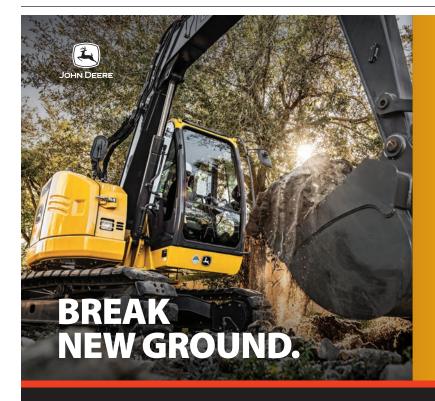
"Imagine you get all these data points before [an incident] happened?" he says. "What the machine learning does is it looks for, 'Hey, is there something in this data that could have predicted that thing happening? That's where it's getting."

As construction companies refine their data collection protocols and build out their data history, Al's ability to sift through the information will improve, offering significant payback to contractors that have dedicated the resources to building out their data strategies early.

"The speed at which we can get that information to the eyes and ears... of the person doing the work and making the decisions, is going to be one of the tricks," Bowcott says.



"Imagine you get all these data points before [an incident] happened? What the machine learning does is it looks for, 'Hey, is there something in this data that could have predicted that thing happening? That's where it's getting." David Bowcott, Aon



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