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COVER STORY

22 **Shifting gears**
Not prepared to sit in neutral, vocational truck makers are implementing major enhancements

IN THIS ISSUE

- 7** **Comment**
Mapping out new opportunities
- 10** **News**
The major developments
- 20** **Construction stats**
The key figures
- 34** **A unique footbridge**
Bridging Canada's busiest road
- 45** **Beyond the clipboard**
Embracing field management technology

COLUMNS

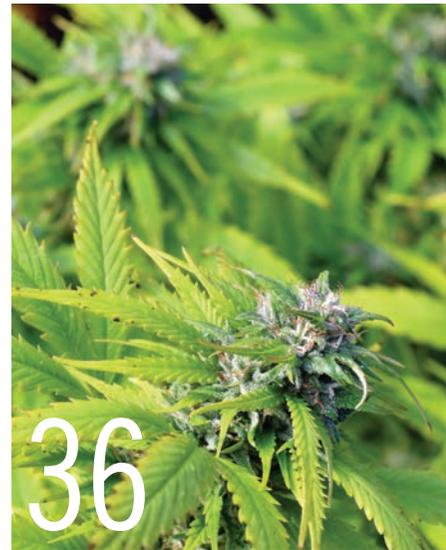
- 44** **Software**
Coordinating heavy equipment
- 46** **Risk**
Managing risk through business development
- 48** **Law**
Understanding certificates of completion



22



28



36

47
Index of Advertisers

features

28 **Steeling for a trade war**
Canada's unhealthy appetite for imported construction steel

36 **Nipping impairment in the bud**
Construction industry grapples with marijuana legalization

40 **Elevating your game**
New regulations redefining working from heights



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Taking stock of opportunities

765,917 kilometres – that’s the final tally of just how far Canada’s public road infrastructure stretches.

Cobbling together highways, arterials, collectors, local roads and even urban lane-ways, the impressive measurement would take you to the Moon and then nearly get you back, depositing you just a few thousand kilometres shy of a complete round trip.

Courtesy of a first-of-its-kind study carried out by Statistics Canada, the inaugural data dump from Canada’s Core Public Infrastructure Survey delved into the country’s roads, bridges and tunnels. In the coming months, further analysis will take stock of water, transit and other public infrastructure.

The prodigious infrastructure figures should be a point of pride for Canada’s builders, who have pioneered new ways to erect roads and bridges in some of the most challenging areas of the planet – from winding Rocky Mountain switchbacks to temperamental Arctic tundra. The study also offers a bird’s-eye view of new opportunities.

Among other notable points, the survey records a total of 47,279 bridges coast to coast. It also tallies 351 tunnels, most of which are concentrated on the Pacific and Atlantic coasts, with British Columbia and Nova Scotia each having about one-quarter of the total.

Unsurprisingly, the study shows Ontario as the leader in publicly-owned infrastructure. The province possesses just under a quarter of the country’s roads and about 30 per cent of its bridges. Still, for a province that boasts nearly 40 per cent of the population, it’s punching well below its weight class. Alberta, on the other hand, is not far behind its eastern counterpart. The province is home 181,064 kilometres of road, as well as 10,162 bridges, a respective 23.6 and 21.5 per cent of the total. Only about 12 of every 100 Canadians live in Alberta, meaning its contractors have been exceptionally busy.

Beyond the top line figures, the study digs

deeper, tracking the age and condition of the country’s infrastructure – and providing some valuable insight into which Canadian regions are going to require major work in the near future.

Quebec is the ignominious standout. Both the province’s roads and bridges are in strikingly worse condition than infrastructure in other provinces. An average of 39.4 per cent of its highways, arterials and collector roads are in poor or very poor shape. This stacks up against an average of 19.8 per cent across Canada. Its bridges fare better, but are still significantly worse off than their counterparts in other provinces.

Likewise, highways in Saskatchewan don’t measure up. While the Prairie province’s smaller streets are in relatively good repair, 30.7 per cent of its major roadways, as well as 31.2 per cent of the bridges they use, are in poor or very poor condition.

Contractors should also take note of the age of many of the nation’s bridges. Many, particularly those built for arterial, collector and local roads, are getting on in years. About 40 per cent of these structures were erected between 1940 and 1969. With the average useful life of this sort of span sitting at just over 60 years, many will soon reach end-of-life, while others are already on borrowed time.

Though there are some clear deficiencies, it’s important to note that the nationwide infrastructure survey does not bear out the common narrative that Canada’s roads and bridges are collectively falling into disrepair. Considering the age of the infrastructure, much of it is holding up quite well. Still, as time and heavy use continue to exact a toll, there’s plenty of room for significant improvement – and plenty of room for contractors zeroing in on new opportunities.

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NATE HENDLEY / Freelance writer & author

On the continued evolution of vocational trucks:

"The priorities of safety, performance and comfort may have stayed the same, but manufacturers have embraced new ways to bolster everything from air brake stopping times to headlight performance."



SAUL CHERNOS / Freelance writer

On Canada's unhealthy appetite for steel imports:

"An ongoing trade spat, which has seen the U.S. slap tariffs on a list of imports, has shone a spotlight on the Canadian construction sector's dependence on foreign steel."

JACOB STOLLER / Principal, StollerStrategies

On the role of data collection in equipment management:

"Sensors installed on on-road and off-road construction vehicles are creating a tsunami of data covering just about every aspect of equipment operation. The key is making sense of it all."



DAVID BOWCOTT / Global Director – Growth, Innovation & Insight, Global Construction and Infrastructure Group at Aon Risk Solutions

On the role of sales staff in managing risk:

"Investing in people who can create a more trusting relationship between you and your customers is perhaps the best investment your company can make."

KRISTA JOHANSON AND SIOBHAN SMALL / Borden Ladner Gervais LLP

On the purpose of and process behind certificates of completion:

"Completion certificates play an important role in any construction contract or subcontract... Invalidly-posted certificates can hurt the parties relying on them."



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INDUSTRY > NEWS

Infrastructure Bank makes first investment, loaning Montreal REM project \$1.3B

MONTREAL—The Canada Infrastructure Bank has announced its first, long awaited investment, awarding a \$1.28 billion loan to Caisse de dépôt et placement du Québec for the Réseau express métropolitain (REM) project.

Part of the federal Liberal government's infrastructure plan unveiled in 2016, the arms-length government institution is designed to coax private investors into the public works business.

The CIB said payments on the loan will start at one per cent and eventually escalate to three per cent over the 15-year term. Under the terms of the deal, CDPQ Infra Inc., a subsidiary of Caisse, will

maintain its 70 per cent equity stake in the REM project. The government of Quebec owns the remaining 30 per cent interest.

Loan in hand, the \$6.3 billion, 67-kilometre light rail project is now fully funded. Plans for the system include 26 stations and electric, fully-automated trains.

With public transit being one of the bank's priority areas, CIB president and CEO Pierre Lavallée said the rail project fits the new institution's mandate.

"Our role is to invest alongside private sector and institutional investors, and other public-sector partners to facilitate

the development of strategic projects like the REM," he said in a statement.

Construction on the project is already underway. SNC-Lavalin Inc., Dragados Canada, Inc., Aecon Group Inc., Pomerleau Inc. and EBC Inc. were all part of the winning consortium and broke ground on the project in April.

Crews are expected to ramp up work this fall, while trains are scheduled to begin running in summer 2021.

Though critics have been skeptical about the role the CIB has to play in Canada's infrastructure landscape, Lavallée says the bank will support projects that may otherwise not have been built.



PHOTO: CDPQ INFRA

With the loan secured, the \$6.3 billion, 67-kilometre light rail project is now fully funded

Kiewit wins contract to build \$180M Third Crossing Bridge in Kingston, Ont.

KINGSTON, Ont.—Early construction on a major new bridge over the Cataraqui River at Kingston, Ont. is set to get underway this fall.

The City of Kingston announced the project team for the \$180 million bridge Aug. 22. It tapped a consortium made up of Peter Kiewit Sons ULC, Hatch Ltd. and Systra International Bridge Technologies for the project, which will use an Integrated Project Delivery (IPD) model—often touted as a successor to the traditional design-build model.

"Today is another significant step in moving this project forward," said Kingston Mayor Bryan Paterson. "This is the largest infrastructure project our city will undertake for years to come, employing hundreds of people over several years."

Kiewit and its partners will be responsible for the design and construction of the new 1.2-kilometre bridge.

The span will become the third to cross the Cataraqui at Kingston. Supplementing the century-old Lasalle Causeway and the bridge that carries Highway 401

over the river north of downtown, planners say the Third Crossing will support continued growth, as well as better connect the eastern and western segments of the city.

Funded by equal contributions from the municipal, provincial and federal governments, the city said the bridge will be the first in North America to use the IPD construction model.

Site preparation work and design validation are scheduled to get underway this fall. Crews are expected to begin full-scale construction work next summer.



PHOTOS: CITY OF KINGSTON

The span will become the third to cross the Cataraqui River at Kingston. The builders will deliver the 1.2-kilometre bridge through an IPD model



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PHOTO: ALBERTA HEALTH SERVICES



With the exterior of the hospital essentially complete and the interior about 75 per cent finished, work on the project came to an abrupt standstill

With job nearly complete, Graham out as builder of Grande Prairie hospital

EDMONTON—A major spat over a long-delayed, over budget hospital project in Grande Prairie, Alta. has prompted the provincial government and contractor Graham Construction to go their separate ways.

Alberta Infrastructure Minister Sandra Jansen said Sept. 10. the province is looking for a new construction manager to take over the build after it terminated its contract with Graham.

The government had issued an ultimatum last month, demanding the Calgary-based contractor put together a plan to get the project back on course, or else. It said the company submitted a plan, but it did “not provide the certainty that was needed.”

Graham tells a very different story. In a statement released Sept. 10, the company said it issued a notice to terminate the contract with the government weeks before. The company cited Alberta’s failure to meet its contractual obligations in a legal notice issued to the province Aug. 17. Prior to handing in the notice, Graham had defended its record on the project, accusing the government of poor planning and continual scope changes that led to added costs and delays.

The contractor said the move to terminate the contract was “the culmination of Graham’s continued advice to Infrastructure that the project was underfunded to

build the project as designed by Alberta Infrastructure’s designer.”

Work on the hospital is at a standstill until further notice. The facility’s exterior is already done, while the interior is about 75 per cent finished.

The dramatic split follows weeks of finger pointing.

Last month, Graham argued the project’s \$763 million budget was inadequate to complete the work. It had requested \$120 million more, including a \$35 million contingency fund, blaming hundreds of change orders, as well as dozens of design and scope changes. The province, meanwhile, claimed the contractor’s requests for further funding and more time were unjustifiable.

“This was not a decision that was made easily. I have been clear that this project is a government priority and that’s why we are taking action to construct this hospital as quickly as possible,” Jansen said, adding that ending the deal with Graham will provide greater clarity when work resumes.

Along with announcing the 11th-hour termination of the contract with Graham, the province said it aims to hire a new construction manager for the project by the end of October. It issued a request for proposal Sept. 10 and hopes to have crews back on-site by early November.

Graham said it will be seeking damages from the province.



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The Buildings Show returns to downtown Toronto

Tens of thousands of building industry professionals are set to converge on Toronto this November for the 30th anniversary of The Buildings Show.

The three-day annual event brings together a diverse crowd from the design, architecture, construction and real estate industries. The show will include some 1,500 exhibitors, featuring a range of products and services, as well as numerous educational workshops.

About 30,500 professionals walk the floor and network with colleagues at the event each year.

This year's show caters to five distinct market sectors. It includes the World of Concrete Toronto Pavilion, Construct Canada, the HomeBuilder & Renovator Expo, STONEX Canada and PM Expo. It will cover both the north and south buildings of the Metro Toronto Convention Centre.

Contractors can expect to see a wide range of new building products in all sections of the show and gain access to the latest industry know-how at dozens of learning sessions. At the World of Concrete Toronto Pavilion, for instance, experts will discuss topics such as modular construction, precast concrete systems and green construction. Case studies of ambitious tilt-up projects and seismic retrofits are also on the schedule.

Exhibits will be open between 10 a.m. and 5 p.m. Nov. 28 and 29, as well as between 9 a.m. and 1 p.m. Nov. 30. Those looking to take in a seminar will need to attend Nov. 28 or 29, as workshops are only scheduled during the first two days of the show.



PHOTOS: THE BUILDINGS SHOW

A burnt bridge? Not for Aecon as contractor cleared to rejoin Gordie Howe project

WINDSOR—A month after the construction group it withdrew from was tapped to build the new Gordie Howe bridge, Aecon Group Inc. has been cleared to rejoin the consortium.

The Canadian contractor that was nearly swallowed by China's CCCC International Holding Ltd. in a highly controversial acquisition, said Aug. 15 the crown corporation responsible for building the new Windsor-Detroit span has signed off on the reunion.

Aecon will reunite with ACS Infrastructure Canada Inc., Dragados Canada Inc. and Fluor Canada as part of the Bridging North America consortium. The group was picked as the preferred proponent to construct the 2.5-kilometre cable-stayed bridge in July.

"This is an important project for Canada and the United States," said John Beck, Aecon's president and CEO. "The Gordie Howe International Bridge project fits well into Aecon's existing portfolio of projects. Given Aecon's current resources, extensive involvement in the development of the proposal prior to its withdrawal and review of the final proposal, Aecon is pleased to be a part of the team to deliver this critical infrastructure project for the benefit of all stakeholders."

The Toronto-based company had taken itself out of the running in May citing commercial reasons. Though Aecon would not elaborate on the decision, its pending takeover by the state-owned Chinese firm was widely speculated to be involved.

Ottawa ultimately quashed the \$1.5 billion acquisition deal on national security grounds.

Back among its erstwhile partners, Aecon will work with the Windsor-Detroit Bridge Authority on finalizing the contract and construction plans. Financial close is expected shortly.

Construction, meanwhile, is already ramping up. It will begin in earnest once the public and private partners firm up the deal.



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Feds, B.C. pony up \$3B to extend Vancouver's SkyTrain underground, kick-start Surrey LRT construction

VANCOUVER—The federal and provincial governments have jointly committed more than \$3 billion to expand a transit line in Metro Vancouver and construct the city's first light rail transit system.

Prime Minister Justin Trudeau and Premier John Horgan announced the funding Sept. 4 in Surrey, B.C., contributing \$1.4 billion and \$1.8 billion, respectively.

TransLink, the City of Vancouver and the City of Surrey will pony up an additional \$1.2 billion.

Mayor Gregor Robertson said the investment in the Millennium Line Broadway Extension "has been a long time coming." The project will take SkyTrain underground with an added 5.7 kilometres and six stations along the Broadway Corridor, currently serviced by a bus route.

Part of the city's Transportation 2040 plan, the expansion is intended to reduce traffic and congestion along the corridor –

increasing the system's carrying capacity threefold.

Construction is expected to begin in 2020 and be complete by 2025.

Meanwhile, the Surrey-Newton-Guildford LRT will include 11 new stations along 10.5 kilometres of street level track. It's the first of two phases in the South of Fraser Rapid Transit Network.

The project's second phase, the Surrey-Langley line, will include 16 kilometres of mostly street level, two-way track, eight LRT stops and a short, elevated segment over the Langley Bypass and Canadian Pacific Rail Corridor.

Federal and provincial funding for these projects is part of a funding agreement signed in the spring of 2018 under the Investing in Canada infrastructure plan that will see \$3.917 billion in federal dollars invested in B.C. infrastructure over 10 years.

Ottawa finalizes infrastructure deal with Newfoundland and Labrador, opens spigot on \$555M in funding

ST. JOHN'S—And then there was one.

Leaving just Saskatchewan on the outside looking in, Ottawa announced a new long-term infrastructure deal with Newfoundland and Labrador Sept. 10.

The \$555 million agreement is the 12th inked under the Investing in Canada plan and will free up funds for a range of road, wastewater, green building and transit infrastructure projects in the Atlantic province. It follows an accord signed with Prince Edward Island last month and 10 others reached with Canada's other provinces and territories.

"This funding will make a real difference to Newfoundland and Labrador communities. Residents will enjoy safer roads and highways, improved water and wastewater facilities, and will benefit from new green infrastructure," François-Philippe Champagne, Canada's minister of Infrastructure and Communities, said in a statement.

The bilateral deal earmarks \$302 million in federal funding for green infrastructure, \$109 million for public transit projects, nearly \$105 million for rural and northern community work and just under \$40 million for community and recreational projects. The cash infusion from Ottawa will also prompt investments from both the province and individual city governments.

Part of the wider \$180 billion federal infrastructure plan introduced in 2016, the funding will be handed out through Infrastructure Canada.



PHOTO: TRANSLINK

The Skytrain extension will replace a bus route that runs along the city's Broadway Corridor

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Crews near finish line on two-tower project that will be Toronto's tallest outside downtown

TORONTO—Jutting up abruptly from the rocky shoreline of Lake Ontario, the several dozen towers lining the Humber Bay Shores neighbourhood on the west end of Toronto exemplify the building boom that has swept the city over the past decade.

As a growing population and hot housing market continue to drive up density, the trend toward more, as well as higher, residential towers continues unabated.

In the condo-filled community that looks across Humber Bay toward downtown Toronto, the boom has reached fresh heights

Inching toward completion after close to four years of construction, the Eau du Soleil project now stretches above all others in the area. The distinctive two-building condo includes “Water Tower,” topping out at 50 storeys, and “Sky Tower” that extends 67 storeys above street level in the growing lakeside community.

Even for Toronto’s increasingly lofty skyline, 67 storeys – a figure that includes the podium that connects the two towers – stands out. The height places it just outside the top 10 tallest buildings in the city – though new additions are certain to change this. Once complete, Sky Tower will be the highest in Humber Bay Shores, as well as outside what’s typically considered downtown.

Construction started on the project in early 2015, spearheaded by developer and contractor Empire Communities.

With the site covering about three acres (1.2 hectares) early excavation was a prodigious effort. Josip Cindric, project manager at the site, pointed to the five parking levels to demonstrate the scale of the job.

“If you can picture it, it’s almost 90 Olympic size pools,” he said, referring to the amount of dirt hauled off the site.

The scale of the towers was also a challenge for Empire, which has built numerous residential neighbourhoods and condo towers across the Greater Toronto Area. So far, crews have poured approximately 80,000 cubic metres of concrete.

“The biggest issue was the height of the building,” said Wojtek Wilczak, a superintendent with Empire. “This being phased occupancy, we have to design the building in such a way where we can occupy part of the building at a time. We had to introduce certain elements in the building to make that happen.”

The first residents are scheduled to move into the new condo in February. Construction will continue for approximately 12 months after that, with all occupancies expected by early 2020.

With a large number of trades on-site, management of the workforce of about



Residents will move into the towers in phases as construction crews work on higher levels

350 has also been a major undertaking for project managers with the Vaughan, Ont.-based builder.

While Eau du Soleil will have a similar look to many of the towers built in Toronto in the past 10 years—which rely heavily on exterior glass—Wilczak pointed to several defining features. He noted the white metal panels that will create a band along the exterior of both towers, as well as the unique roofs, which will slope at up to 67 degrees.

The complex was designed by Richmond Architects and Zeidler Partnership Architects.

Once complete, the buildings will house 1280 residential units ranging from 400 sq. ft. to a 3,500 sq. ft. “super” penthouse, plus commercial space on the lower three storeys. All told, the project covers some 956,000 sq.ft., most of which has already been sold.

Quebec breaks ground on \$291M project to widen Henri-IV Highway

QUEBEC CITY—A “major artery” of Quebec City’s road network is undergoing a \$291 million facelift.

Crews broke ground on a project to widen and repair Henri-IV Highway from Charest Highway to Chauveau Avenue Aug. 8 in the province’s Capital Region.

Ottawa has contributed \$128 million to refurbish the road. Initially estimated to cost between \$400 and \$500 million, the federal government scaled back the \$173.6 million in funding it allotted in September 2017.

The highway will be widened to three lanes in both directions between the Charest (440) and Félix-Leclerc (40) highways. That

stretch of road will also be repaved.

A three-lane northbound extension will also be constructed for the portion between the Félix-Leclerc Highway and Chauveau Avenue, to the city limits of L’Ancienne-Lorette.

Related infrastructure, such as overhead signage, drainage and lighting, will undergo repairs as well. Geometric changes will be implemented to certain on- and off-ramps, intended to lengthen merge lanes.

Upgrades to the more than 50-year-old highway began gradually in July and will continue until 2023.

More than 100,000 vehicles use the road each day.

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CONSTRUCTION STATS

A selection of data reflecting trends in the Canadian construction industry



SPENDING ON INFRASTRUCTURE RISES

Canada's total infrastructure tally for 2017 is finally in.

According to the latest Statistics Canada data, government and private spending on roads, institutional buildings and communication networks, among other asset classes, inched up to approximately \$79 billion last year, or increased 1.3 per cent from 2016.

Employment as a result of infrastructure spending also increased, though only marginally, climbing to 547,000 jobs compared to 545,000 the previous year.

Canadian Infrastructure Investment

YEAR	PUBLIC	PRIVATE	TOTAL
2017	57	22	79
2016	54	24	78
2015	49	25	74
2014	47	27	74
2013	47	25	72
2012	50	21	71
2011	49	21	70
2010	53	17	70
2009	45	14	59

In billions of dollars

SOURCE: STATISTICS CANADA

Workers Employed in Construction by Month

2018	August	1,418.80
	July	1,435.20
	June	1,447.50
	May	1,420.30
	April	1,433.30
	March	1,452.20
2017	February	1,433.90
	January	1,433.90
	December	1,448.80
	November	1,441.30
	October	1,425.10
	September	1,406.70

In thousands of workers, seasonally adjusted

SOURCE: STATISTICS CANADA

CONSTRUCTION EMPLOYMENT DIPS IN AUGUST

Hard-earned gains in construction employment made last fall have largely evaporated 12 months later.

The industry posted a loss of 16,400 jobs in August, down 1.1 per cent from a month earlier, according to Statistics Canada.

The industry now has approximately 1.418 million workers, up just one per cent from August 2017. The trend puts the construction industry slightly ahead of Canada as a whole, which had seen employment inch up 0.9 per cent from a year ago.

CONSTRUCTION INDUSTRY FIRING ON ALL CYLINDERS

The building sector is the Canadian industry operating closest to full capacity.

Statistics Canada says construction kept up its breakneck pace in the second quarter of 2018, logging an industrial capacity utilization rate of 93 per cent, up 0.8 per cent from the first three months of the year.

The metric tracks an industry's performance against its potential. The government agency cited increased activity in residential and non-residential building construction for the uptick in the industry's overall capacity utilization rate.

Top Five Industries by Industrial Capacity Utilization

91%
FORESTRY AND LOGGING

90%
PAPER



88%
CHEMICAL PRODUCTS

88%
TRANSPORTATION EQUIPMENT

SOURCE: STATISTICS CANADA



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Shifting gears

Tech enhancements, safety tweaks and a focus on efficiency drive change in the vocational vehicle market

BY NATE HENDLEY

Vocational vehicles aren't sitting idle. The priorities of safety, performance and comfort may have stayed the same, but manufacturers have embraced new ways to bolster everything from air brake stopping times to headlight performance.

With an emphasis on technology, improved systems for remote diagnostics and engine monitoring are connecting vehicles like never before. Even low-tech tweaks such as user-friendly control knobs and better mirrors are finding their way onto the road. The advancements are only accelerating as drivers become more discerning and contractors demand optimal performance.

UNDER THE HOOD

Transmissions have been a major area of focus, with the move towards automated manual transmissions (AMT) continuing unabated. The appeal is obvious.

AMT and fully automatic transmissions let drivers "focus on strictly driving, especially in traffic without the distraction of changing gears," says Kelly Gedert,



PHOTO: VOLVO

director of product marketing at Freightliner Trucks and Detroit, both subsidiaries of Daimler Trucks North America. “We do see increased usage of automatic and automated transmissions, which provide benefits for drivers of all experience levels.”

Likewise, over 90 per cent of Volvo Trucks sold in the North American market now feature the Volvo I-Shift AMT, in combination with a Volvo D11 or D13 engine, says John Felder, product marketing manager for Vocational at Volvo Trucks North America.

“We’ve seen significant growth in recent years as the Volvo I-Shift automated

manual transmission continues to gain preference among our Volvo VHD customers in off-road applications like construction,” Felder says, adding that the Volvo I-Shift for Severe Duty is now the “standard” transmission offering for Volvo’s VHD line of vocational vehicles.

It’s a similar story at Navistar, which offers the HX and HV lines of vocational vehicles under its International Truck brand. The HV series was just introduced last year at the North American Commercial Vehicle Show.

“Manuals are still a little bit in demand,” says Bruce Vasbinder, director of Severe Service product marketing at Navistar. “Our numbers are around five per cent on manual while AMT is in the 25 to 30 per cent [of our] market share area. The largest by far are still automatics.”

Mack Truck is also leaning towards AMT for its main vocational model, the Mack Granite.

“The adoption of automated manual transmissions has continued, with customers making the AMT the transmission of choice over manuals,” says Tim Wrinkle, construction project manager for Mack Trucks. “In fact, due to customer demand, Mack made the 13-speed Mack mDRIVE HD standard in Granite models.” He says an AMT is now under the hood in nearly half of Granite models.

FOCUS ON EMISSIONS

OEMs also remain dedicated to engine improvements, particularly on the emissions front.

This July, for instance, Volvo rolled out its VNL 300 day cab with a new Cummins Westport ISX12N “Near Zero” natural gas engine, which reduces emissions of nitric oxides, also known as NOx, to almost nil.

Felder recommends using the ISX12N equipped VNL 300 for heavy-duty regional haul truck and tractor applications, port drayage, vocational, refuse and conventional straight-truck applications.

Kenworth, a unit of Paccar, followed suit on natgas in August. It also introduced the ISX12N engine in its flagship T880 and T880S vocational vehicles. The 12-litre engine can be powered with liquefied natural gas (LNG), compressed natural

gas (CNG) or renewable natural gas (RNG).

Navistar, meanwhile, recently expanded its use of in-house engines. It introduced its 12.4-litre International A26 big bore engine as an option for the new International HV series. The A26 is capable of 475 horsepower and 1,700 lb.-ft of torque, though the manufacturer hasn’t abandoned Cummins either.

“Earlier this year we brought out the HX with an A26 engine. It’s a lighter weight and offers very good horsepower and torque ratings,” Vasbinder says, adding that the company plans to bring out a 500 hp option on the A26 in early 2019. “We’ve got the full complement across our HV line, from the Cummins B to the Cummins L as well as our International A26. In the HX line, it starts with our International A26 engine [and] you can get a Cummins X15.”

For the Canadian market, Navistar introduced an HX520 with a Cummins X15 engine and integral front frame extensions for snow plowing applications.

Likewise, Mack recently tweaked its 11-litre MP7 engine to simplify maintenance and improve efficiency. The engine offers up to 425 hp and 1,560 lb.-ft of torque. According to Wrinkle, it also features an updated wave piston design that works in conjunction with a common-rail fuel injection system to enable more complete fuel combustion, which translates to reduced emissions and improved fuel efficiency. “Combined with a two-speed coolant pump, these features help increase MP7 fuel efficiency by up to 5.1 per cent,” Wrinkle says.

Freightliner is partial to affiliated engine manufacturer Detroit, which makes the DD series of engines. Production recently began on Detroit DD5 and DD8 engines.

Gedert says the DD8 is ideal for medium-duty and vocational applications, such as pick-up and delivery, construction, dump, mixer and towing, among others. The six-cylinder, 7.7-litre in-line engine has boosted the performance of Freightliner vocational vehicles such as the M2 106 medium truck by up to 350 hp and torque up to 1,050 lb.-ft., she adds. “This engine provides vocational and medium-duty customers with fuel efficiency



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Freightliner trucks are outfitted with engines from the DD series made by affiliated manufacturer Detroit

PHOTO: FREIGHTLINER

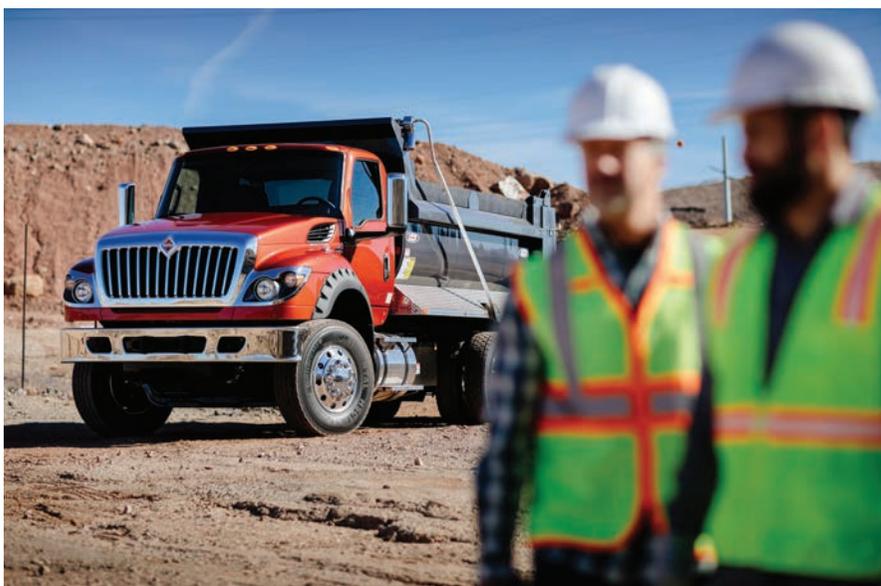


PHOTO: NAVISTAR

Navistar has made operator safety and comfort one of the priorities on its HV line

and best-in-class maintenance intervals. It has both engine and transmission power-takeoff options.”

THE DRIVE TOWARD CONNECTIVITY

Onboard computer systems that automatically monitor vehicle performance, mile-

age, location and other metrics connect vocational trucks like never before. The collected data can be benchmarked to bolster safety, plan predictive maintenance and improve fleet management.

Kenworth offers TruckTech+ remote diagnostics and service management

systems on vocational vehicles. If the remote diagnostics system detects an engine fault code, a notification is issued to a fleet operations manager and designated Kenworth dealer. The service aspect lets office staff monitor vehicle performance and schedule maintenance over a web portal.

Diagnostics and monitoring hardware are also factory-installed on new Volvos, Felder says. “The connectivity hardware also enables remote programming, Volvo’s ‘over the air’ service for software and parameter updates. These solutions are typically viewed as tools for over-the-road fleets, but we’re seeing vocational fleets embrace the technology because it helps improve vehicle uptime and driver productivity.”

Mack Trucks offers a system called GuardDog Connect to monitor fault codes and mechanical trouble. If something is detected, the system notifies agents at the Mack Uptime Center, a support facility that’s open around the clock, so experts can determine a fix. The company rolled out the software update earlier this year, Wrinkle says.

Detroit Connect Virtual Technician for



Kenworth offers remote diagnostics and service management systems on its vocational vehicles

PHOTO: KENWORTH

remote diagnostics come standard with Freightliner trucks equipped with Detroit engines. “Fleet managers are notified within minutes that the vehicle has experienced a fault event, the severity of the fault, and when, where and how to best fix the issue,” Gedert says, adding that “critical fault codes” are analyzed by customer service experts who can provide recommendations.

Navistar offers OnCommand Connection telematics for fleet management and remote diagnostics as an option on International vocational vehicles. The system takes note of fault codes and offers live remote monitoring, mapping capability and customized alerts.

UPGRADES INSIDE AND OUT

The tweaks don’t end there.

This June, Navistar made Bendix Air Brakes standard on International HV and HX trucks. The Bendix ADB22X Air Brakes’ lightweight design allows for enhanced payload, reduced stopping distance and longer brake life.

Earlier in the year, meanwhile, Volvo introduced new LED headlights for Volvo VHD vocational trucks. Now standard on the VHD day cab and regional sleeper model, these LED headlights reduce eye-strain and

increase visibility and safety. They provide roughly 10,000 operating hours, “ten times greater than previous incandescent headlights,” Felder says.

Volvo also recently revealed a Position Perfect steering wheel which features additional controls on the steering wheel itself and enhanced positioning ability.

The Sweden-based company isn’t the only manufacturer that’s been working on the integral cab feature. In late 2017, Mack Trucks introduced “a new, flat-bottom steering wheel – a trucking industry first – enabling easier entering and exiting of the cab, as well as offering more belly room,” Wrinkle says.

Other interior changes in Mack Granite vehicles include dashboard enhancements for improved visibility, more conveniently placed controls and illuminated buttons.

Operator comfort and safety was paramount in the design of Navistar’s International HV series as well.

“On the HV, we did a lot of work on the instrument panel,” Vasbinder says. “We brought everything closer to the driver. The air conditioning knobs and other [controls] are now larger and easier to operate with gloved hands. The doors have been stiffened to allow for a pedestal mirror, which

increases visibility.”

A recent vehicle introduction by Daimler Trucks might provide a glimpse of the future. This June, DTMA unveiled a pair of electric-powered commercial Freightliner test vehicles: the Freightliner eCascadia heavy-duty truck and Freightliner eM2 106 medium-duty.

The eCascadia’s 550 kWh capacity batteries offer a range of 400 kilometres (250 miles) with an engine capable of 750 peak hp. The eM2 has 325 kWh capacity batteries, a 370-kilometre (230-mile) range and 480 peak hp. The vehicles are intended for distribution, delivery and drayage applications.

While the eCascadia and eM2 106 are not specifically designed for construction site work, they might represent the start of an eventual paradigm shift in powering vocational vehicles.

For now, old-fashioned attributes still hold sway when it comes to manufacturing vocational vehicles.

“Safety, weight and durability are the focus of the customer base,” Vasbinder says. “I think it’s been that way for years and I don’t think it will change. They say, get the truck lighter, make it safer [and make it last longer].” □

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028

Steeling for a trade war

Canada's dangerous, unavoidable dependence on foreign steel

BY SAUL CERNOS

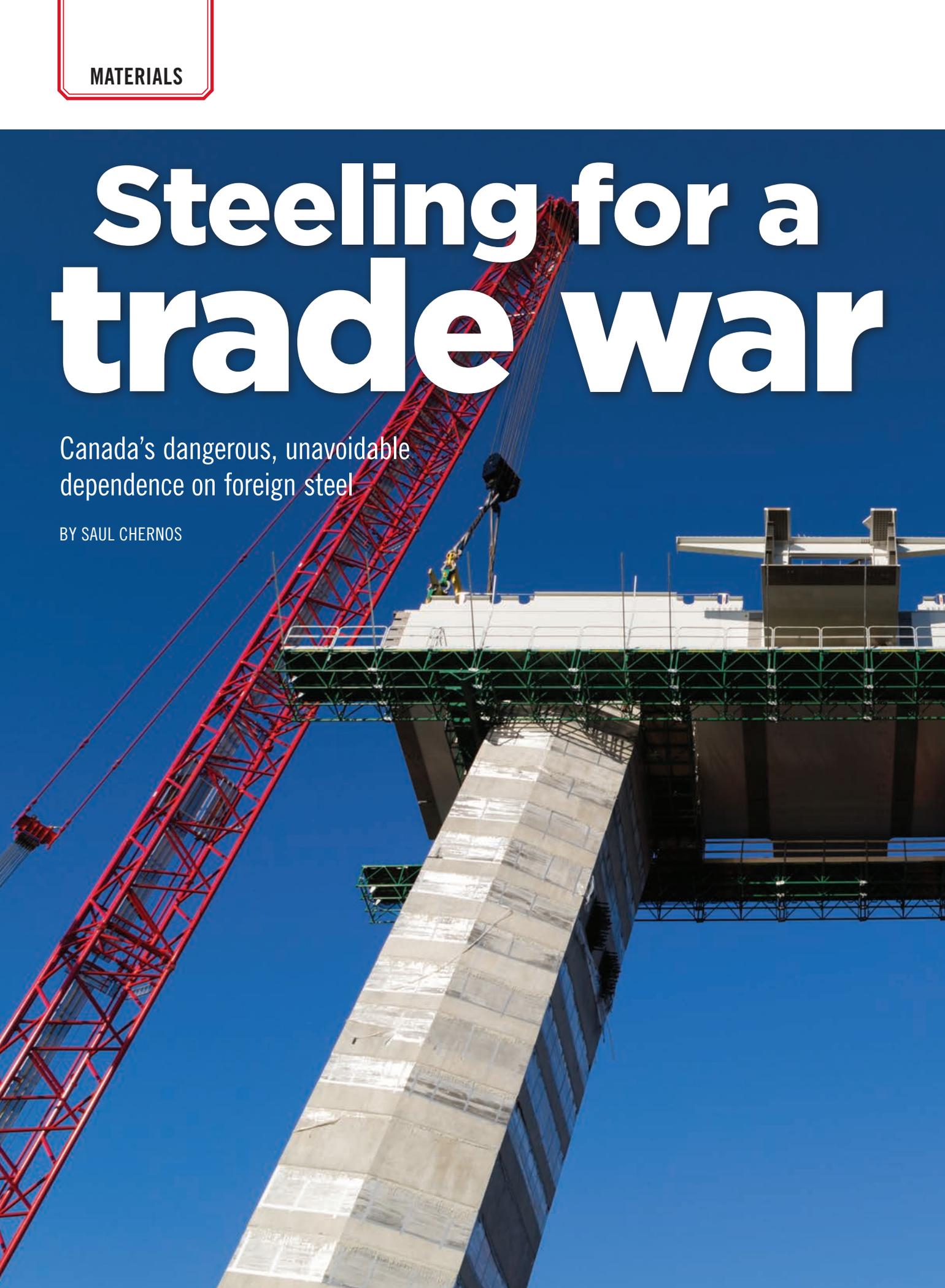




PHOTO: SIGNATURE ON THE SAINT LAWRENCE

An ongoing trade spat, which has seen the U.S. slap tariffs on a list of imports, has shone a spotlight on the Canadian construction sector's dependence on foreign steel.

When U.S. President Donald Trump introduced the tariffs in March, he invoked an obscure clause in U.S. trade legislation that allows special measures for national security purposes. Canada and other key trading partners were initially spared though a temporary carve-out, but when the provision expired May 31 Prime Minister Justin Trudeau responded in kind and announced retaliatory tariffs on U.S. imports effective July 1.

Both countries set their tariffs at 25 per cent for most steel products and 10 per cent for aluminum. While the U.S. tariffs and the Canadian response injected some uncertainty into markets, both events also led to a spike in steel prices.

Looking to prevent large volumes of relatively cheap U.S.-bound foreign steel from being rerouted northwards, and thus undercutting domestic prices, Canadian primary producers lobbied for safeguard mechanisms to restrict seven specific categories, including steel plate, rebar, energy tubular product, hot rolled sheet, pre-painted steel, stainless steel wire, and wire rod.

However, with prices beginning to spike, a group of steel processors and end users formed the Canadian Coalition for Construction Steel to push back, warning that duties and quotas on imports from Canada's other trading partners would severely disrupt construction activity, putting vital infrastructure and residential projects at risk.

Jesse Goldman, a lawyer with Borden Ladner Gervais who the CCCS engaged to help navigate the various trade complexities, says Canadian producers have the capacity to supply just half its domestic demand, adding that Canada has always needed and will continue to need steel imported from outside North America. In fact, he explained, the need is particularly acute because U.S. imports are now becoming more expensive and less available in Canada.

Goldman says the CCCS acknowledges



the government's need to retaliate against the U.S. but worries adding safeguards against other countries misses the mark.

"We understand the Canadian industry is in a difficult situation with the U.S. tariffs, but don't amputate your leg in order to save your arm," he says. "We have to be careful and analytical about how we support the domestic steel industry to ensure that an entire other part of the Canadian steel industry isn't harmed along the way."

Concerns about steel shortages and price hikes are already playing out. Goldman pointed to a developer withdrawing from a large project in Victoria, B.C. in August and an affordable housing project put on hold in Hamilton, Ont. around the same time. Both, he said, were attributed to rising steel prices and related construction costs.

The problem of supply and demand in Canada is complicated by geography. Some steel products are either not manufactured domestically or only in limited quantities. "We have a really big country with a pretty small population with steel mills almost entirely located in central Canada, so we have prohibitive transportation costs," Goldman notes.

In a tariff-free environment, steel trucked from adjacent U.S. states is cheaper than steel hauled long distances from Canada's industrial heartland. But a

substantial price differential also applies to some overseas imports. To move steel from southern Ontario to the west coast by road or rail costs roughly \$170 a tonne, whereas shipping that same tonne from Taiwan costs \$29, Goldman said. Likewise, transportation to St. John's, N.L. costs \$250 from Montreal, compared with \$50 from Istanbul.

"The coasts have a problem getting domestic steel – that's always been the case. So they've been highly reliant on imports, largely from the U.S. but also from offshore," Goldman says, noting that shipping mode, not distance, largely dictates transportation costs.

To illustrate Canadian construction's reliance on imported steel, the CCCS singled out the Champlain Bridge replacement project currently winding up in Montreal. While Montreal falls within Canada's core manufacturing hub, Goldman emphasizes that Canadian mills, no matter where they're located, don't produce the specialty structural plate in the thicknesses and dimensions the bridge required, nor do they commercially produce stainless steel rebar at this time.

While bridges are major users of high-grade, specialty steel, so are dams, high-rises and industrial facilities. So, when steel prices spike or become unpredictable, fixed-price contracts become risky for contractors across the board. "They're

going to walk away from the business," Goldman said, adding that delays occur when contractors need to track down affordable materials in order to make ends meet.

For their part, members of the Canadian Steel Producers Association would have preferred no tariffs in any direction, says President Joe Galimberti. "To suggest that Canadian steel is a threat to the national security of the United States is ludicrous on its face, and to impose tariffs on that basis is inappropriate," he says. "We'd like to go back to a situation where there are no tariffs."

With tariffs in place, however, the CSPA is promoting safeguards as legitimate mechanisms that comply with World Trade Organization and international trade rules. "They're not intended to cause commodity shortages or price shocks, they're intended to safeguard Canadian industry against extraordinary times," Galimberti says. "We're hopeful the government is going to be prepared to move forward on a basis defined by the evidence available to them as regards [to] a surge of steel and the threat of significant harm to Canadian producers."

Ed Whalen, the president and CEO of the Canadian Institute of Steel Construction, says its members fall along the entire supply chain, from producers, mills and service centres to engineers, architects and constructors, so he's hearing multiple perspectives.

"Obviously the steel mills are worried for their own existence at the moment, so they want to make it as profitable as they can and get through this hump," he says. "Downstream folks like service centres and fabricators just want consistency of supply and prices that won't change everyday. And project owners want the most economical solution... that can stand the test of time."

Estimating 70 to 75 per cent of the structural steel and 50 per cent of the rebar used in Canadian construction is foreign-sourced, Whalen said not all construction steel is equally affected by the tariffs. "No Canadian steel mills roll beams, so there aren't any [retaliatory]

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Canadian tariffs on beams,” Whalen said, explaining that steel mills tend to be niche-driven and tariffs are generally not placed on products unavailable domestically.

That said, with U.S. mills adjusting prices as they navigate supply and demand, all types of steel, beams included, are experiencing market volatility. The U.S. tariffs have effectively allowed U.S. mills to increase prices of all products, so even if Canadian constructors aren't slapped by Canadian import tariffs they're impacted by higher prices due to U.S. tariffs.

The price confusion has muddied the terrain for everyone. “The U.S. tariffs have built a wall around themselves,” Whalen says. “They've encouraged more U.S. consumption of U.S. steel, because offshore steel is now a lot more higher-priced. So the mills in the U.S. are selling more of their stuff within the U.S., and it's curbing the amount somewhat that used to be sent up here to Canada.”

Canadian Finance Minister Bill Morneau undertook a 15-day industry-wide consultation, which wrapped up at the end of August. While a decision was pending at press time, it's entirely possible ongoing NAFTA negotiations will put a halt to the tariffs so far as Canada is concerned. That would be good news for the nearly 1.4

million people employed in construction in Canada, says Mary Van Buren, president of the Canadian Construction Association.

“We're really happy the government invested \$180 billion in infrastructure over the next 10 to 12 years, but this could be impacted if there's a (supply) shortage or huge escalation in cost,” Van Buren says. “Project delays would ultimately deprive communities of the infrastructure projects they need to improve their quality of life.”

Should tariffs become the new norm, Van Buren says, the CCA hopes the government will offset the impact through tax relief measures such as accelerated depreciation of construction equipment, as well as mechanisms to protect contractors from price fluctuations, and a research and development fund allocated to the Canadian construction industry to improve productivity.

The CCA also hopes project owners will be more understanding and flexible in terms of fixed-price contracts.

“You're talking about a huge industry that accounts for seven per cent of Canada's GDP,” Van Buren says. “We've suggested the government find an alternative to safeguards because trade wars aren't good for anyone and these safeguards will add additional hardship to a sector already facing major challenges.” □

CHRISTMAS TO COME EARLY IN MONTREAL?

Even without tariffs on steel and aluminum, the Champlain Bridge project in Montreal has been a tough slog.

The new six-kilometre cable-stayed span replaces an aging and rapidly deteriorating adjacent structure, which has been operational since 1962 and linked Montreal with its south shore.

However, the replacement project has been besieged by multiple challenges, including load restrictions for the transportation of oversized pieces and up to 2,000 defects – ranging from cracked plates to missing welds.

In April, the federal government and Signature on the Saint Lawrence, the private-sector consortium building the bridge, resolved a long-simmering legal dispute. The settlement extended the planned opening from Dec. 1 to Dec. 21 and added \$172 million to the overall \$4.2 billion contract to cover construction delays, plus another \$63 million related to the transportation of oversized parts.

But will SSL be able to meet the revised schedule? A report in June by the federal auditor general cast the Dec. 21 date as “very challenging.”

The auditor general concluded Infrastructure Canada didn't plan the project in a cost-effective manner and didn't adequately manage procurement risks to mitigate cost overruns and delays. The report issued multiple recommendations, including that the government question the cost-competitiveness of different procurement arrangements and revise its methods for evaluating technical criteria submitted in project bids.

“A work site the size of the new Champlain Bridge comes with its share of challenges,” says SSL spokesperson Véronique Richard-Charrier in a written reply to questions.

Richard-Charrier noted the bridge's use of specialized steel, including 600 box girders and a steel superstructure. However, she declined to comment on how construction has been affected by tariffs, citing commercial confidentiality.



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BRIDGING CANADA'S BUSIEST ROAD

Crews cap off distinctive pedestrian span over Ontario Hwy. 401

BY DAVID KENNEDY

Leapfrogging 14 of the busiest traffic lanes in the country, six railway tracks and a city street, the pedestrian bridge over Highway 401

in Pickering, Ont. is one of the longest enclosed footbridges in the world.

After nearly eight protracted years of construction, crews officially wrapped up work on the new span Sept. 21.

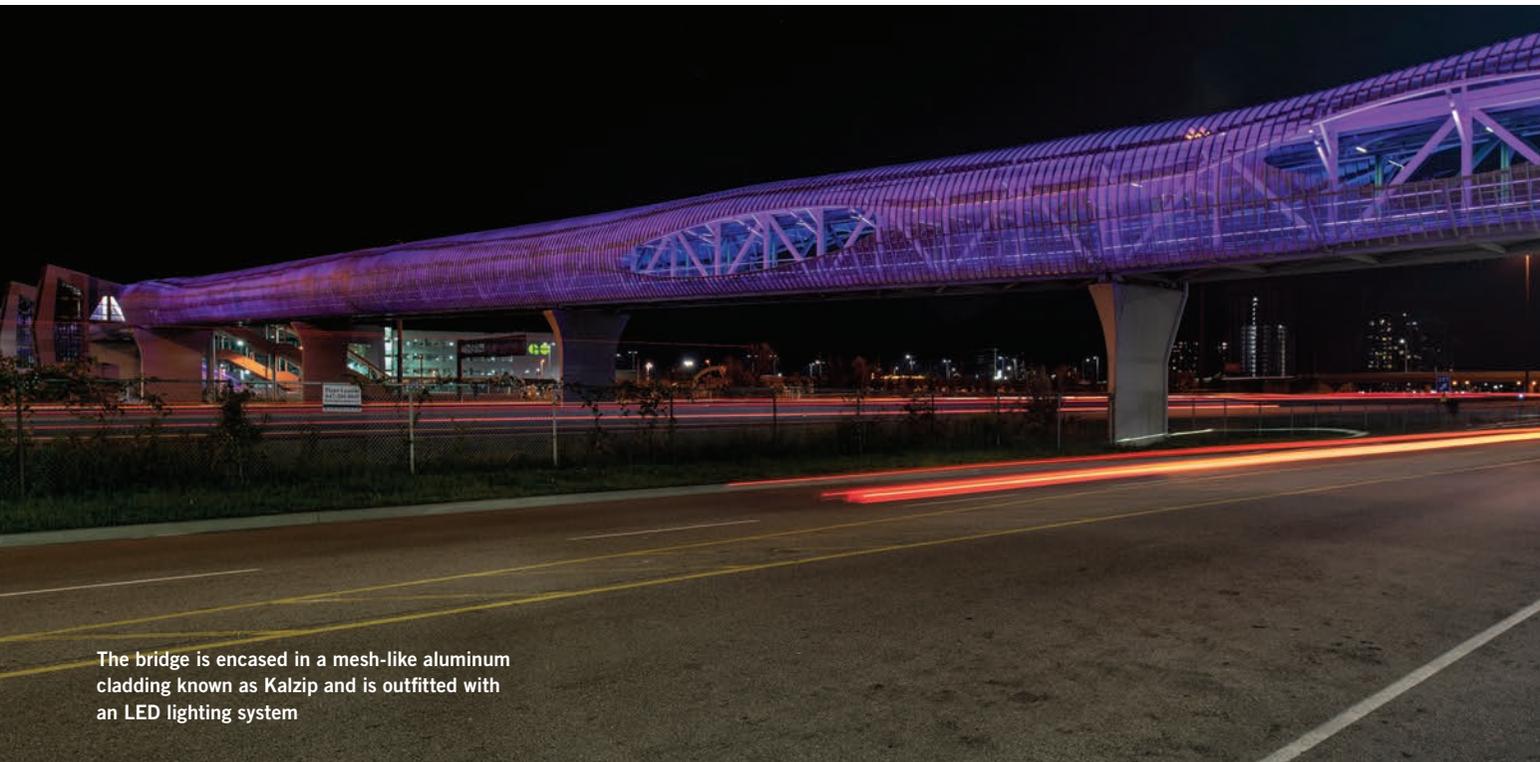
The distinctive bridge stretches 250-metres from end to end, connecting a bustling commuter parking lot with the Pickering GO Station south of the highway. It's also frequented by students and shoppers bound for college classes or Pickering Town Centre.

While the bridge opened to foot traffic in 2012 – little more than a year after crews broke ground – a string of setbacks, including trouble with the original contractor, kept it under construction until

this fall.

“This pedestrian bridge was a first for us, for the province, and even for Canada in regards to providing a significant connectivity solution over well-established and heavily-used infrastructure,” says Metrolinx spokesperson Scott Money.

Spearheaded by the provincial transit agency and its subsidiary GO Transit, early construction involved the installation of seven separate box trusses to span each segment of road and rail. Contractors built concrete piers between sections of the 401's express and collector lanes to support the huge trusses before using a crane to lift the purpose-built metal sections across the highway.



The bridge is encased in a mesh-like aluminum cladding known as Kalzip and is outfitted with an LED lighting system



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The trusses provoked significant controversy when Ontario Auditor General Bonnie Lysyk released a scathing report in 2016 about oversight issues on the bridge project. Among other issues, the report stated one of the trusses had been installed upside down.

Metrolinx admits to running into numerous problems during construction, but denies one of the trusses was inverted during installation. In a Q&A session put on by the transit agency, Roberto Sguassero, a project manager for the job, said it would have been “virtually impossible” to assemble the bridge with one truss flipped 180 degrees.

The report did lead to changes to Metrolinx’s procurement process, however. The agency vowed to put existing contractors under closer scrutiny, as well as factor past construction performance into bids for future work.

Despite the public spat over the flipped truss, it was the bridge’s more superficial features that have led to the lengthy delays. By the time the auditor general’s report was released nearly two years ago, the bridge was already well behind schedule and Metrolinx had terminated its contract with the initial contractor.

Among other issues, the contractor caused serious damage to the bridge’s glass panels when it failed to protect them prior to welding. Many of the sheets needed to be replaced.

The new glass was finally put in place last summer and crews worked to put the finishing touches on the bridge’s outer coverings over the past few months.

It was a long road for the relatively short bridge – and the significant delays took their toll on the project’s budget. Metrolinx says the final cost of the project reached \$38 million, up from an expected cost of \$22.5 million when construction began in 2011.

Still, the project was far more ambitious than most.

Unlike typical highway overpasses along the 401 corridor, which are strictly utilitarian, designers of the Pickering bridge made the appearance of the final structure a key factor in the plans. Along with serving some 9,000 commuters boarding trains at the Pickering GO each day, the bridge is designed as a showpiece for the growing city east of Toronto.

An LED lighting system, similar to the one that illuminates Toronto’s CN Tower and other landmarks around the world, lights up the exterior of the span. The bridge is also encased in a type of mesh-like aluminum cladding known as Kalzip. The material, more commonly used as roofing, coils around the outermost section of the bridge like a shell.

“The Kalzip cladding system gives the bridge its iconic form and controls the solar heat for customers,” Money says. “Kalzip is also energy-saving and weather-resistant and allows for visibility and light – the interior of the bridge structure is never dark, so people walking through it are always visible.”

Flipping the switch on the LED lighting system, top Metrolinx brass, as well as local and provincial politicians officially wrapped up the project Sept. 21. □

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NIPPING JOB SITE IMPAIRMENT IN THE BUD

Construction industry grapples with cannabis legalization

BY JILLIAN MORGAN

Left high and dry, Canada's construction industry is tackling recreational marijuana legalization with few proven tools at its disposal and the deadly threat of impairment lurking in the haze.

"Cannabis changes nothing and cannabis changes everything," says Andrew Pariser, vice president of the Residential

Construction Council of Ontario. "Impairment is impairment is impairment, but at the same time cannabis will introduce new obstacles."

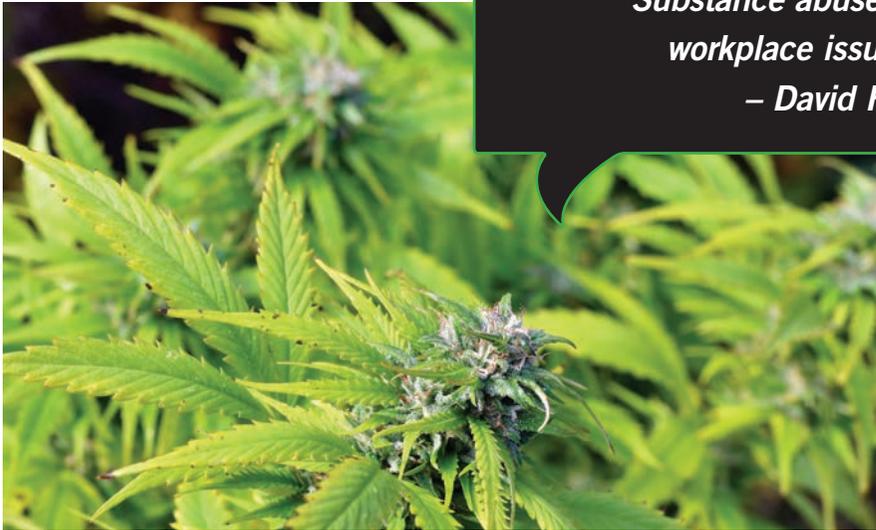
Uncertainty over enforcement on job sites, a possible rise in usage and the little-researched effects of cannabis consumption on workers has left the construction industry with more than a few

burning questions in the months leading up to Oct. 17.

"The science is behind the law," Pariser says. "We need more information on cannabis and we're not going to get a lot of that information until some of these scientific, academic studies are done."

At the Toronto-based Institute of Work and Health (IWH), a team of researchers





“Substance abuse [is already] a serious workplace issue in our industry.”
– David Frame, OGCA

is studying the relationship between drug impairment and workplace fatalities and near misses.

Expected to wrap up in the fall, the study examines the use of non-medical cannabis and prescription drugs, such as opioids, benzodiazepines and stimulants.

“It’s been very difficult for researchers to be able to do the research that they want to be able to do given the illegal nature of the product. Now, [legalization] opens up, I think, a lot of doors,” says Nancy Carnide, principle investigator of the study and post-doctoral fellow at IWH.

Cannabis is proven to have acute, adverse effects on psychomotor functions, such as reaction time, speed, attention, dexterity, coordination and memory, she says. When smoked, its effects are typically immediate; a psychoactive high kicks in within 30 minutes and takes two to three hours to wear off. But even then, Carnide says a worker may still be impaired for several hours.

“The other aspect is when you ingest cannabis, so when you have some sort of edible... It’s often about two hours after you consume that the effects might take hold,” she says. “Those effects can last even longer than when you’ve actually smoked.”

A number of other factors influence the degree to which cannabis affects any given individual, such as the amount of THC – the drug’s principle psychoactive constituent – and how often it’s consumed.

“With all of the different active ingredients in marijuana, there’s almost an endless number of combinations that can be done,” Pariser says. “It’s the ultimate customizable product.”

In another ongoing project at IWH, researchers are studying cannabis consumption patterns of Canadian workers, with the goal of informing policies and regulations governing cannabis in the workplace.

“The onus is on [the employee] to show up fit for work,” she says. “But I think that it’s also important that employees feel able to disclose freely to their employers if they feel that, for whatever reason, whether it be from some sort of drug use, prescription or otherwise, whether it be from fatigue, that they are impaired or don’t feel that they can safely do the job that they need to do, and by opening up that dialogue... It helps to encourage that disclosure before something actually happens.”

Until this research is complete, employers should be watchful of a rise in harmful use, not just use, says Bill Bogart, law professor at the University of Windsor.

“If somebody says, ‘Well, now that it’s legal I think I’ll satisfy my curiosity and try it, and they smoke a couple of joints a month, that’s neither here nor there, that’s like having a couple glasses of wine a month,’” he says, adding that statistics suggesting an uptick in use may be an artefact of people starting to tell the truth.

“It’s our belief that those who were

already using it, or are interested in using it, are more likely to use it immediately before or during work,” says David Frame, director of government relations at the Ontario General Contractors Association (OGCA).

“Substance abuse [is already] a serious workplace issue in our industry. There aren’t a lot of reliable stats that we can pull out that says this is what it is. We know in society in general it’s a problem, we know particularly in our industry it’s a problem... We know a very high percentage of workers who are involved in fatal accidents in the construction industry are under the influence of some sort of substance.”

The OGCA has been vocal in its campaign to introduce additional controls on the job site, calling for revisions to the Ontario Health and Safety Act, namely to allow for random drug testing in the construction industry.

“Some have determined that it challenges the rights of the worker. The problem with that is, we have a responsibility to keep the worker safe. We need the tools to be able to do that,” Frame says.

Unlike an alcohol breathalyzer, there’s no threshold of THC in the bloodstream that will definitively say a person is impaired, meaning current drug tests are insufficient to detect cannabis impairment, Carnide says.

“With urine, you might find that THC remains in the system for a few weeks. Because someone tests positive, that doesn’t mean they’re necessarily impaired,” she says.

Conversely, in Western Canada, random drug testing policies have had a longer runway of development, according to Andrew Wallace, legal counsel for PCL Construction.

“These existing testing programs continue to evolve in labour arbitrations and workplace issues. In various parts of the country, they’ve achieved somewhat of a level of equilibrium. Post-legalization, is

JOB SITE SAFETY

that equilibrium going to be upset? And will there be more arbitration and court challenges around testing programs?" Wallace asks.

"It could be relatively uneventful, or we could see more actions before the courts and labour arbitration boards to define a new equilibrium around drug and alcohol testing."

The coast-to-coast company is refining its existing practices and policies provincially, though Wallace says he doesn't expect to introduce any changes under the new regime, aside from some refinements to existing policies and development of an education program for workers.

"Legalization of cannabis doesn't create a new issue... For us, before cannabis legalization, we had this concern in our industry. It's probably heightened now, but it's an issue that we've had to deal with for some time and so post legalization we

"Legalization of cannabis doesn't create a new issue... It's probably heightened now, but it's an issue that we've had to deal with for some time."

– Andrew Wallace, PCL

expect to deal with it in the same way," he says.

"We're a company, like other contractors, that work in highly safety-sensitive environments where little slip-ups can lead to tragic events, so safety is paramount for our business."

Having had nearly three years to prepare for the federal Liberal's promise of cannabis legalization, employers should already have an articulated, zero tolerance policy for drugs in the workplace, in addition to policies for the recreational and medical use of cannabis, Bogart says.

"Dealing with cannabis isn't something that we have to start from square one. There's a whole framework of human rights codes and employment standards acts that

deal with employment issues," he adds.

Despite having some of the groundwork in place, the construction industry enters the fall with uncertainty as cannabis regulation, enforcement and research evolves. In the end, cannabis legalization may prove to be merely a catalyst, pressuring an industry vulnerable to fatalities to face longstanding challenges around impairment in its many forms.

"I think with cannabis it will be a go forward proposition... I think we do have a huge issue with opioids. I suspect – I don't have stats – that you've got employees coming to work who are using opioids recreationally. And that's a very serious problem for them and potentially a very serious problem for the employer," Bogart says. □

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Elevating your game

New regulations and focus on safety redefining working from heights

BY DAVID KENNEDY

With their feet planted on an elevated work platform 40 metres (130 feet) above the Ottawa River, a pair of employees with marine construction contractor O.D.S. Marine set to work replacing a series of 10 high-voltage power lines on an isolated transmission tower last fall.

The maintenance project involved a complex set-up to reach the tower, which is situated on a small island just downriver from the Chenuaux Generating Station. Rocky, rough terrain made setting up a lift on the island a non-starter, while other options such as a helicopter or jack-up barge carried significant costs.



To solve the problem, the contractor turned to a piece of equipment typically confined to dry land. It paired a sizable mobile elevated work platform (MEWP) with a four-section barge secured to the shoreline. After careful preparation, the Genie SX-180 was strapped into place on the barge and a crew of four – two on the elevated platform and two for marine support – set about replacing the power lines. Capable of extending 55 metres (180 feet) and performing a range of jib motions, the telescopic boom let the platform crew safely manoeuvre around the tower. It helped the team complete the job in two weeks, one week earlier than estimated, saving considerably on costs.

The novel approach to the hydro maintenance project is just one of the many ways contractors are reimagining how to carry out work in hard-to-reach places. Modern regulations and a new generation of technology are playing no small part in the steady advance of lifting equipment on job sites coast to coast.

A NEW STANDARD

Updated regulations from the Canadian Standards Association (CSA) and the American National Standards Institute (ANSI) are changing the rules of the game for scissor and boom lifts across North America.

Adam Hailey, the director of product management at equipment maker Genie, a unit of Terex Corp., says the fresh set of rules will establish a “new normal” for the industry and better align job sites in the U.S. and Canada with their European counterparts.

“The current standards have, for almost four decades, provided best practices for safe, reliable access to work at height,” he says, adding that modernizing the regulations will make features such as platform load limits and tilt sensing standard on new MEWPs.

Along with these major technological changes, the new standards will ban chain gates or other flexible gates as platform entrances and require an “indoor only”



PHOTO: JLG

New standards governing mobile elevated work platforms (MEWPs) are designed to make working from heights safer for contractors. Equipment manufacturers are quickly adapting their scissors and booms in order to meet the new requirements

“Our emphasis on safety begins at the design engineering phase and follows through manufacturing and test facilities”
 – Bill Dovey, JLG

rating on small, less durable models.

For the contractors using the equipment, the CSA standards set new requirements for training, safe use and risk assessment, among other aspects. They also aim to rework common industry terminology, shelving the term aerial work platform (AWP) in favour of mobile elevated work platform.

Bill Dovey, senior product manager for Booms at JLG Industries, notes that while crews using newly-built MEWPs need to follow the new regulations, older models will continue to be governed by existing standards.

Pointing to enhanced features such

as toe boards on scissor lifts and solid or foam-filled tires on all MEWPs, Dovey says product safety, along with meeting or exceeding regulations, are priorities for JLG. “Our emphasis on safety begins at the design engineering phase and follows through manufacturing and test facilities,” he says.

Manitou Group, the new kid on the block in the North American MEWP market, has also adapted its recently launched booms to meet the updated set of rules.

“For us, the new CSA and ANSI rules were not that big of a shock because that regulation is very close to the European regulations,” says Chris Mathijs, director

of sales for Manitou, adding that many of the safety features new to North America have been in use in its European MEWPs for years. The company logged its first Canadian aerial sales at the end of last year, but has been active in other markets worldwide for more than two decades.

TAKING SAFETY A STEP FURTHER

Extending even beyond the new standards, the focus on job site safety continues to drive innovation.

“Safety is a paramount concern for Canadian contractors,” says Matthew Elvin, CEO of U.S.-based Snorkel. “There have been particular areas of focus from contractors in the past few years, which has led manufacturers and after-market companies to develop solutions that can provide additional layers of protection for aerial lift operators.”

Elvin pointed to a safety device known

as the Snorkel Guard that now comes standard on all its boom lifts as one example. The mechanically operated bar sits above the upper controls and if compressed, stops the machine. Snorkel also began rolling out a trigger guard for the operator joystick designed to stamp out involuntary movement earlier this year.

Along with improving machinery operation on-site, Manitou is looking to change how crews move lifts from job to job.

While many machines require operators to be in the basket when driving the lift off a truck or trailer, the company plans to roll out a remote control on some models that would keep workers on solid ground. Operators could control the MEWP at a distance, eliminating a common cause of injury.

A new breed of Genie lift aims to tackle another commonplace problem: the risks involved in elevating increasingly

heavy loads.

“At Genie, we expect to see boom load capacities go up and more secondary envelopes incorporated into the design of new machines,” Hailey says, singling out the Genie Xtra Capacity. The line-up of booms have a 300-kilogram (660-pound) capacity at full outreach and 454-kilogram (1,000-pound) limit at reduced stretch.

Hailey also points to new sensing features that continually check the weight in the platform and adjust the envelope accordingly. “A tilt sensor also gives users access to different ranges of motion based on the machine’s rated slope limit, on certain machines even on extreme angles, maximizing the ability to access even the most hard-to-reach work areas,” he adds.

RUNNING CLEAN

With lower emissions also becoming a major priority across job sites, OEMs are moving toward – or have fully-embraced – cleaner equipment.

JLG now offers electric versions of numerous scissor, articulated boom and telescopic boom lifts. One example, its ES-Series scissors, have platform heights of between 5.8 metres (19 feet) to 9.8 metres (32 feet) and platform capacities of up to 450 kilograms (1,000 pounds). The equipment runs cleaner and quieter than their diesel-powered cousins.

The company is also rolling out hybrids.

“Electric AWP’s have been the primary answer to more environmentally friendly machines in years past,” Dovey says. “Today, there is increasing demand from customers to create an environmentally friendly powertrain that delivers similar performance to a diesel-powered machine. That’s where the hybrid machines come into play.”

The area is also a focus at Manitou. The manufacturer already has bi-energy models on the market in Europe and later plans to introduce them to the Canadian market. The units contain a battery package, but also include an on-board diesel generator to charge the batteries. They’re designed to work jobs that require workers



PHOTO: MANITOU GROUP

Manitou recently stepped into the North American market for MEWPs



PHOTO: SNORKEL

The Snorkel Guard sits above the operator's controls and if compressed, stops the lift

to access hard-to-reach spaces both inside and outdoors.

Meanwhile, other Manitou models include features that trim engine emissions. One tweak – a start-stop engine function – aims to reduce fuel consumption while idling.

“For example, if a worker is at a certain height in the same stable position for a period of time, the engine will shut off automatically,” Mathijs says. “This will help reduce the noise on the work site and will also benefit from less overall fuel consumption. Similar to some vehicles today, if you press the gas pedal the engine starts up again automatically.”

The company is also working to regulate engine rev. Mathijs says the feature will restrict the engine's torque or horsepower to match the required output, meaning the engine wouldn't needlessly waste fuel.

For its part, Snorkel recently designed two new electric-drive telescopic mast lifts. It says the drive systems in its TM12E and TM16E draw half the amperage of most of their competitors. “The new electric drive system also brings the benefit of a zero inside turning radius for greater manoeuvrability when working in tight spaces,” Elvin says. The TM12E is already available in Canada, while the larger TM16E is set to be released next year.

GOING LADDERLESS

Conventional tools, such as ladders and

scaffolding, continue to yield ground to safer, more reliable equipment. The construction industry is no exception to this ongoing march of technology.

“With all the evolutions in MEWPs,

these machines continue to provide a more safe and more efficient way of working at height,” Mathijs says.

As the number of applications grow, the major manufacturers expect the rental market to maintain its dominance.

“A retail market still exists, but companies in general have learned to appreciate the benefits of letting the experts own the equipment, selecting the right model for each particular job, delivering equipment, training operators, supporting and picking up the machines, and storing the equipment when the contractor no longer needs it,” Dovey says. “This takes care of many things that most contractors don't have time to manage.”

As lifting technologies and the job sites they're used on evolve, Dovey expects to see MEWPs continue to take on fresh tasks. □



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By Jacob Stoller



Managing heavy equipment

A multitude of sensors installed on on-road and off-road construction vehicles are creating a tsunami of data covering just about every aspect of equipment operation. The key is making sense of it all

Construction, it is frequently observed, has not enjoyed the technology-driven productivity gains that have occurred in manufacturing over the past two decades. A partial explanation for this is that manufacturing equipment operates in a static environment, making it relatively easy to manage, while construction machines – trucks, earth moving equipment, cranes, etc. – are constantly on the move.

New technology is helping to close this equipment management gap. Thanks to a trend called the Internet of Things (IoT), construction equipment is now being equipped with a plethora of sensing devices, and through the use of telematics, the resulting data can be gathered and transmitted to a central repository for computational purposes.

“The challenge here is to have better analytics,” says Denver-based John Naughton, business area manager for Machine Control at Trimble, a global provider of electronic positioning solutions. “We need to present information in usable ways for operators, fleet operators, or construction management teams – ways that haven’t been there in the past.”

User requirements vary considerably. “Each company looks at their data differently,” says Chicago-based Scott Sutarik, associate vice-president of Commercial Vehicle Solutions at global telematics provider GeoTab. “One might be interested in safety. Another might be interested in utilization. Another might be interested in compliance.”

Sutarik notes that due to government mandated emissions for diesel engines, current equipment is required to have sensing capabilities for monitoring environmental performance. In order to accomplish this, OEMs include a variety of electronic modules that control the various systems on the vehicle. These modules record rich information, including idle time, fuel burn, and hours used. By utilizing this information, fleets can also reduce emissions and associated costs, helping them better manage their day to day business.

Gathering the data manually, however, can be time-consuming and unreliable. By installing a telematics device on each vehicle, contractors can automate the data collection process.

Maximizing uptime is another basic requirement. Software can use metrics, such as engine hours, fuel consumption, engine fault codes and temperatures, to predict potential failures for preventive maintenance purposes, or detect patterns that could shorten the lifespan of the equipment.

“Data scientists can utilize techniques like machine learning,” Sutarik says. “This allows firms to look at large swaths of data and

typical failure patterns, and then leverage that information to avoid instances where failures are most likely.”

One of the keys on the maintenance side is the ability to aggregate data from different OEMs. “Contractors have mixed fleets, and each OEM has its own equipment management system,” Naughton says. “In the past people had to log into multiple systems. Today, you can manage maintenance on an overall scale so you can do more accurate planning for various levels of maintenance. This leads to more uptime, better predictability, and better profitability.”

When it comes to safety, vehicle data tells owners not only how the equipment is operating, but how it is being operated. Accelerometer data can detect driving behaviours such as hard cornering or sudden braking. Images from cameras and backup sensors can warn of hazards. Interfaces that require operators to “badge in” can prevent untrained workers from operating a piece of dangerous equipment. When accidents do occur, post mortem data can be analyzed to help prevent future incidents.

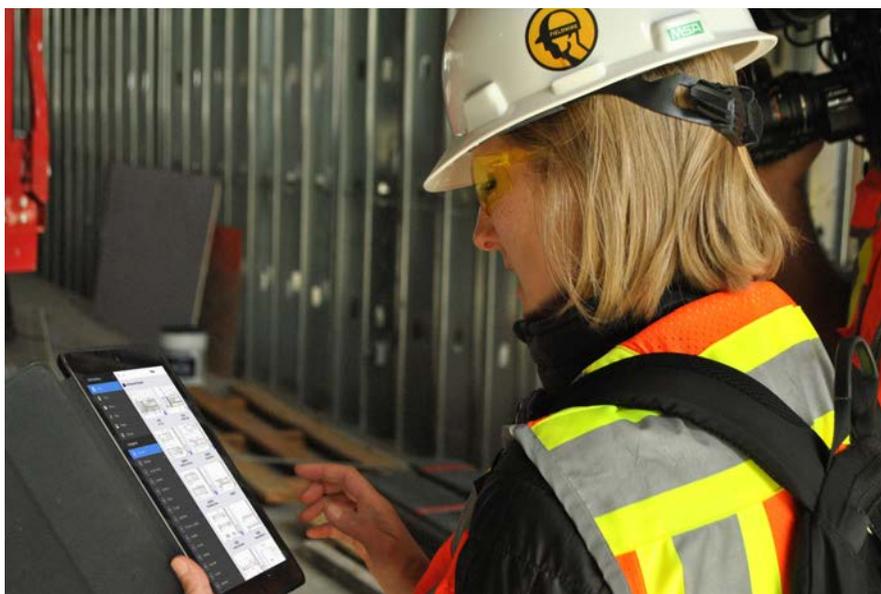
In complex tasks such as site grading, management technology can be applied to help workers operate equipment more effectively. “We have point solutions that help a single operator do a better job,” Naughton says. “That ties into what we call the connected site, which allows you to have an overall view that lets you optimize and manage that site.”

For example, the work of multiple machines and operators can be coordinated using a virtual model. “We can send a design or terrain model to all of the grading and excavating machines out there,” Naughton says. “Then each operator has an indication of where to dig and how to grade. We’ve automated elements of operating the machine. With a dozer, for example, we use high-accuracy GPS to drive hydraulics on [the] right and left side of the blade.”

The benefits that equipment management technology can provide – optimal equipment operation and total visibility of all costs and risks – are compelling, but depend on overcoming the same technology challenges that contractors have struggled with for over a decade. Bringing data into a common platform, ensuring data integrity, and keeping all system components operating synergistically are the same hurdles that contractors face with BIM systems and other categories of advanced construction software. The potential advantages of proactive equipment management may be just one more tipping point motivating construction firms to overcome these barriers. □

Jacob Stoller is principal of StollerStrategies. Send comments to editor@on-sitemag.com

PHOTO: FIELDWIRE



Putting focus on job site technology, EllisDon to implement Fieldwire on all Canadian projects

BY: DAVID KENNEDY

The traditional clipboard, and other rudimentary job site tools like it, are living on borrowed time.

Following three years testing out a new technology platform on various projects, EllisDon will become the latest to shun certain age-old methods that simply haven't kept pace with modern demands.

The Canadian contractor signed a new partnership to embed field management technology on each of its projects across the country August 27. The enterprise deal with California-based Fieldwire will link all EllisDon workers, clients, architects, consultants and other partners through a management platform that enables real-time information sharing, scheduling and

job assigning.

"The construction industry is changing at a rapid pace. Leveraging technology allows us to further drive productivity at the project level," said EllisDon Chief Technology Officer, Tom Strong. He added that Fieldwire will help the contractor's project teams connect seamlessly with its clients and partners.

EllisDon has been using the software platform for about three years across hundreds of different job sites, including complex projects such as the Toronto-York Spadina Subway Extension and Calgary's Brookfield Place.

Yves Frinault, Fieldwire's CEO and co-founder, said the technology enables

builders to assign, track and review each stage of construction, as well as share data collected with relevant stakeholders. It does it all without a cumbersome paper trail and costly face-to-face meetings.

"We're moving from a world where it was okay to not know exactly how things were completed, or to not track the quality accurately, to a world where we want to know exactly what was completed and how well it was completed," he said in an interview.

Among other features, the Fieldwire app lets workers carry out inspections, set schedules, record as-builts and log photos and videos for verification. By tracking data and collecting it in one centralized hub, the platform saves significantly on time.

"If you think about it, it's very simple," Frinault said. "You have a foreman on-site and they have to run back to the trailer several times a day to ask a question to an engineer and then come back to their crew... That takes an insane amount of time if you're working on a large hospital or a high-rise."

Though the tech company says a precise return on investment is difficult to determine, customer surveys show taking advantage of the platform saves about an hour every day for each connected worker. With 30 per cent of the workers on any given job site plugged in – the average number, according to Fieldwire – savings on time add up quickly.

Along with EllisDon, Fieldwire pointed to Walsh Canada and B.C.-based Marcon as two other builders it's working with in Canada. It also includes project owners such as Brookfield Asset Management Inc. and Morguard Corp. among its list of clients.

Because data collected throughout construction can be easily passed to the project owners when crews wrap up work, developers have a significant stake in the process.

For its part, Strong said EllisDon expects the freer flow of information to make its construction process more transparent. □

By David Bowcott



Managing risk through business development

It used to be that the construction business was relatively straightforward for contractors. You staffed your operations with estimators, project managers and superintendents, and then pursued business through a tendering process in which the low bid would win the job. The procurement model was invariably design-bid-build and the owner often ran the bidding process, going so far as to simply appoint the design firm.

That times have changed goes without saying.

The design-bid-build model still exists, but it's used far less as owners, designers and contractors experiment with other methods in hopes of improving the rather abysmal results of the traditional model when it comes to delivering on-time and on-budget results.

Several models have been brought forward over the past 20 years that challenged the status quo, including design-build, Construction Management Agency, Construction Management at Risk and Integrated Project Delivery. Other new models, such as design-build-finance-operate-maintain, have even expanded contractors' responsibility into the financing and operations realms.

As these procurement models have moved from the experimentation phase into what is now considered "normal," contractors have evolved their own operations to better manage risks and profitability. Builders pushing the envelope have begun hiring staff outside the traditional estimator, project manager and superintendent roles. The following are just some of the new positions that have cropped up within contractors' operations:

Legal – In the past contractors would hire outside counsel for legal advice and actions. As contracts evolved, firms began seeing it as advantageous to hire on-staff lawyers who understood the risk tolerances and culture of the company.

Risk management – With greater complexity around an array of contract delivery models came greater risk. Several contractors over the last 10 years have either hired dedicated staff to better manage risk or expanded the role of existing staff.

Design – Shouldering more design responsibility as a result of new delivery methods, several contractors have hired staff to vet design for potential problems before the construction phase begins.

Specialty trades – As prime contractors take on more risk, several have brought on expertise typically left to subcontractors. Firms are turning to workers within the mechanical, electrical and structural disciplines to identify problems before they are able to arise during construction.

Quality assurance/control – Exposed to greater risk at the design and operations phases, contractors have enlisted more talent around QA/QC practices by expanding existing roles or bringing on

dedicated teams within their organizations.

Technology – Titles such as chief technology officer and chief information officer are among the newest in the construction sector. New technologies that can impact productivity, risk and profitability, have convinced companies they need somebody to help them adapt to the massive rate of change.

Business development – As the open market, low-bid model became less dominant, contractors saw they required a team that would engage owners much earlier in order to ensure success. To do this, several firms developed a role that never evolved naturally out of the low-bid model – one that focused on building relationships.

Many of these new postings are absolutely necessary for contractors that play in new procurement arenas that have developed over the past 20 years, but perhaps none are more important to managing risk than the more recently created role of business development.

I know what you're thinking: "Why is this guy saying investing in sales is an ideal way to manage risk, versus the investments I could make in areas like legal, risk management, or technology?"

Well, though business development is about identifying new revenue opportunities for your company, in essence, it's about creating relationships with your customers. Investing in people who can create a more trusting relationship between you and your customers is perhaps the best investment your company can make.

With the groundwork in place, members of your team and your customers can engage in honest dialogues about all aspects of risk. Both parties will also be in a better position to avoid painful outcomes because they can fall back on the established relationship during tough times.

Some of the best-managed construction companies I've worked with have direct relationships with the top levels of their most important customers. This is not to say these companies are getting sole source contracts with their customers – though that does occasionally happen – but to simply point out the opportunities created by developing relationships beyond a project-to-project basis. Even in a low-bid marketplace having strong relationships with the owner can help both contractors and owners better manage risks at all phases of a construction project's life. □

David Bowcott is Global Director – Growth, Innovation & Insight, Global Construction and Infrastructure Group at Aon Risk Solutions. Please send comments to editor@on-sitemag.com.

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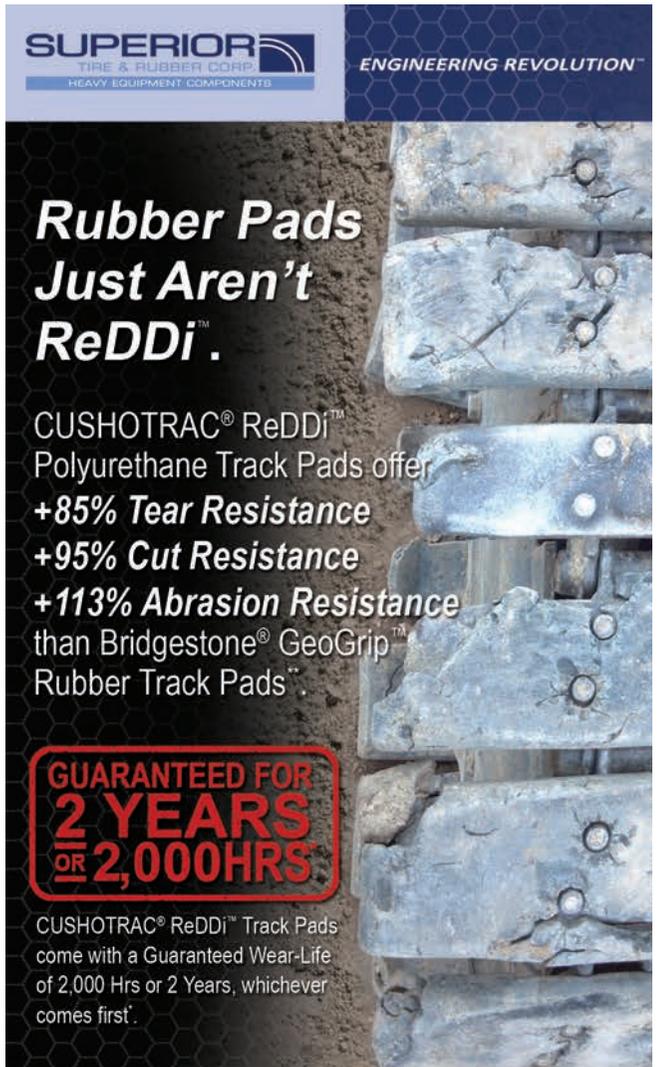


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By Krista Johanson and Siobhan Small



Certificates of completion: The purpose, process and pitfalls

Completion certificates play an important role in any construction contract or subcontract.

This article sets out how certificates of completion influence projects, details how to issue a valid certificate and explores some common mistakes that can postpone the lien period. While we focus on British Columbia regulations in this column, most other Canadian provinces have similar rules that stipulate how to manage certificates of completion.

THE PURPOSE

The posting of a “notice of certification of completion” can trigger both the 45-day lien filing period and the 55-day holdback period that follows substantial completion. The lien period runs from the date of substantial completion, but as this date can be difficult to pin down, it is important to ensure that the payment certifier issues a valid certificate of completion and posts a proper notice of certification of completion.

Invalidly-posted certificates can hurt the parties relying on them. For instance, claims of lien may still be valid when they should have expired if notice had been posted properly. An owner who pays out a holdback while relying on a certificate that was never posted could be liable to pay a second time to discharge lien claims. In another scenario, contractors or subcontractors trusting a notice might assume a lien period had expired and forego their right to file a lien, only to find out the lien period hadn't even started.

THE PROCESS

It is important to comply strictly with the provisions of the Builders Lien Act that specify how to issue a certificate of completion and post notice of certification of completion.

THE REQUEST

Certification of completion must be done at the request of the person from whom the holdback was retained. The owner or payment certifier cannot unilaterally decide to trigger the lien filing and holdback release periods by declaring the contract complete.

THE PAYMENT CERTIFIER

Certification must be done by the payment certifier – usually the architect, engineer, or consultant. If the contract does not identify a certifier, the owner is the certifier for contractors. The contractor and owner typically work together to certify subcontract completion.

SUBSTANTIALLY COMPLETE

A project with a head contractor is considered substantially complete when the remaining cost of completion equals no more than three per cent of the first \$500,000 on the contract price, two per cent of the next \$500,000, and one per cent of the balance (known as the 3-2-1 test).

THE FORMS

The BC Builders Lien Forms Regulation provides an official form for certification of completion. This form is not mandatory, but the certifier must include every piece of information specified in that form. Missing information can invalidate the certificate.

The regulation provides a second form for notice of certification of completion. This form is mandatory and is different from the certification of completion form.

ISSUANCE

The payment certifier must issue the certification within 10 days of the request. To be issued, a copy must be delivered to the owner, the head contractor (if one exists) and anyone who delivered a written request for it. A payment certifier can be liable for failing or refusing to certify completion without a valid reason.

POSTING OF NOTICE OF CERTIFICATION OF COMPLETION

The certifier (not the contractor) must, within seven days of issuance of the certification of completion, post a notice of certification of completion. This is to ensure lien claimants are given adequate notice that the chance to file a lien is coming to a close.

The notice of certification of completion is a separate form from certification of completion. Posting a copy of the certification of completion is insufficient. Unlike certification of completion, the notice of certification must be in the legislated format.

The notice must be posted “in a prominent place on the improvement.” It must be visible to the public and physically attached to the actual work. For instance, a court held a notice of certification posted inside an on-site office trailer was invalid because the trailer was not part of the improvement. □

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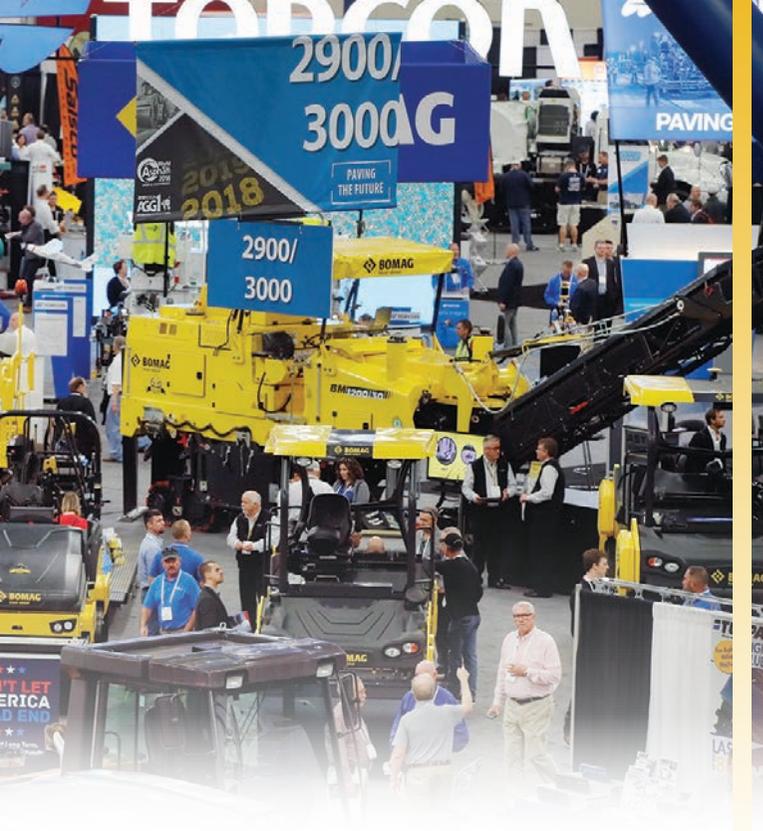
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