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Spanning the Saint-Lawrence

Four years after construction began, traffic is rolling across Montreal’s new Samuel de Champlain Bridge.

The 5G-enabled construction site

5G is the network platform that will enable smart cities, smart highways, and smart jobsites.

Visions of pipelines

The thumbs up to twin the Trans-Mountain Pipeline is good news for aggregate producers.

Tackling erosion

There are many steps aggregate producers can take to minimize erosion at their sites and further downstream.

Equipment spotlight: Washing and screening

Rock to Road showcases latest technologies for washing and screening.
CCA launches new campaign for coming federal election

Unless you’ve been hiding under a rock without your smartphone for the past couple of years, you know that there is a federal election coming very soon.

The construction industry has never been one to sit on the sidelines and wait for an outcome, but this year a particularly interesting campaign has been launched to stress the importance of investment in the country’s infrastructure to the current sitting Members of Parliament.

The Canadian Construction Association (CCA) has launched Construction4CDNs, which calls on its members to write their local MPs to stress the importance of four main issues: strengthening investor confidence; infrastructure planning; supporting innovation; and attracting a skilled and diverse workforce.

Under strengthening investor confidence, the CCA recommend that the government remove further regulatory delays to the Trans Mountain Expansion Project.

The association also asks that the government offer exemptions related to carbon taxes to the heavy construction sector for companies that adopt “green” technologies.

For infrastructure planning, the CCA recommends that the Government of Canada commit to a 25-year plan for infrastructure planning that defines the commitments of each level of government for battling the country’s massive infrastructure deficit.

When it comes to supporting innovation, the CCA is requesting the federal government become a partner for “providing the necessary framework and investment to enhance industry-wide collaboration for innovation in the construction industry.”

The association has asked that this be done through the use of dedicated program funding and incentives designed to help businesses to embrace and access emerging technologies.

And finally, under attracting a skilled and diverse workforce, the CCA is calling on the federal government to increase funding for career and technical training programs – the association has requested that the government fund 1,700 student placements over four years in construction work-integrated learning programs.

The CCA has also requested the feds invest with the association in programs that promote the industry to new Canadians, women, Indigenous groups and other under-represented groups; as well as requested that the current procurement process remain the same.

So, just how much of an impact could the Canadian Construction Association’s membership have on the upcoming federal election?

Well, it’s certainly significant.

The association is the national voice for Canada’s construction industry and represents more than 20,000 member firms. The construction industry itself employs close to 1.5 million Canadians and generates approximately $140 billion to the economy annually.

So get your hard hats on and lace up your steel-toed boots, Members of Parliament. It sounds like you’ve got a lot of construction site visits coming up over the next few months. Because if there’s one thing many people in this industry respect, it’s a good work ethic. And standing on the sidelines with this crowd will definitely leave you feeling left out in the cold this October.

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MHCA signs onto Indigenous Accord

MHCA president Chris Lorenc signed the Winnipeg Indigenous Accord at Winnipeg's City Hall courtyard. As a signatory, the association commits to working in the spirit of the national Truth and Reconciliation Commission's calls to action.

“We are proud to join with the City of Winnipeg and all its partners on meaningful initiatives in our industry to be more inclusive of Indigenous peoples,” Lorenc said. “Our industry has a record of training and employment of Indigenous workers and is working on educational programs to put people on the path to good careers.”

Lorenc said the MHCA intends to hold cultural awareness workshops for staff.

“We all need to know our history better, to ensure our efforts towards inclusion and reconciliation are successful,” he said.

“When First Nations do well, everybody does well,” noted Grand Chief Arlen Dumas, of the Assembly of Manitoba Chiefs. Dumas called the signing ceremony ‘momentous’. There is hard work ahead, he said, but the progress report released Tuesday shows “we are moving the markers together.”

Mayor Brian Bowman launched the Winnipeg Indigenous Accord following the Truth and Reconciliation's Calls to Action in 2015. The commission arose from demands to investigate and acknowledge Canada's colonial, racist history and its policies that trampled the rights of Indigenous peoples through destructive laws and programs, such as the Indian Residential School system.

Reconciliation recognizes that racism has hurt all Canadians, and aims to repair the relationship between Indigenous peoples and governments, other Canadians, cultural, business and educational institutions.

It was noted at the ceremony that, in the same year the TRC released its 94 Calls to Action, Winnipeg was labelled as “arguably” Canada’s most racist city, sparking a loud and painful public debate about how Manitoba’s capital treats Indigenous peoples.

The MHCA’s focus is on Call to Action 92, which calls upon the corporate sector to ensure, amongst other things, equitable access to jobs and training for Indigenous people.

To that end, MHCA to date:
• Is developing a heavy construction certificate program for the high-school setting, with the Southeast Collegiate and Manitoba Construction Sector Council. The certificate would make Grade 12 graduates job-ready for entry-level positions in the industry;
• Is delivering in a variety of settings, including in northern Manitoba communities, introductory programs on heavy equipment operation, and
• Initiated the Canadian Construction Association’s Indigenous Engagement Guide, the first of its kind for Canada’s construction sector. The guide’s intent is to build a respectful partnership in construction projects and ensure legacy value for Indigenous communities.

Source: MHCA.

Metso announces purchase of McCloskey International for $420 million

Metso has signed an agreement to acquire McCloskey International. The mobile aggregate equipment market is expected to grow by four to six per cent annually during 2019 to 2023, driven by the underlying road construction spend. With this acquisition Metso will be able to better take part in the attractive growth of mobile products within the aggregates industry.

“This acquisition is in line with Metso’s profitable growth strategy. It strengthens our aggregates business in key growth areas. The different cycles of aggregates balance our previously more mining focused Minerals portfolio well,” says Pekka Vauramo, Metso’s president and CEO.

“We are proud of the growth achieved in a competitive market. I know that joining Metso is the right move for all our customers, employees, dealers and business partners. The combination of our unique focus on products and people and Metso’s global resources will help create even better solutions for our customers,” says Paschal McCloskey, founder, president and CEO of McCloskey.

Closing is expected to take place during Q4 2019.

Source: Metso.
John Deere now offers the option of factory-installed grade guidance on our 210G, 350G and 470G LC Excavators. The distance-to-grade display allows you to get the job done precisely. And complete joystick integration allows you to do it effortlessly. Perhaps more impressive than what the system provides, is what it helps eliminate – like over-digging and the need for a grade checker. Best of all, it comes backed by expertly trained dealer technicians. So give your dealer a call and let us help you make your grades, make your deadlines, and Run Your World.
At 5 a.m. on June 24 - Fête Nationale du Québec - cars got the green light to begin rolling inbound across Canada’s newest bridge. A week later, on Canada Day, the outbound lanes opened to traffic. Beside it, the original Champlain Bridge, in all of its architectural glory, now sits empty, awaiting dismantling.

The 3.4-kilometre, $4.5-billion bridge, expected to eventually carry 60 million vehicles a year, connects the South Shore (which is on the east side of the Saint-Lawrence) with the Island of Montreal. It replaces the old Champlain Bridge, which opened in 1962. The bridge has been carrying some 50 million vehicles a year in a critical transportation corridor between the eastern United States and Canada.

Signature on the Saint Lawrence Group (SSL) now has a few months to tie off loose ends such as completing the pedestrian and...
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bicycle path, with its four observation points, lighting, landscaping and removing the three huge construction jetties from which work was simultaneously carried out on the east, west (Nun’s Island) and centre of the bridge.

Still further down the road, there is work to complete down the centre of the bridge to accommodate light rail transit trains on a 26-station, 67-kilometre-long system, called the Réseau express métropolitain (REM). Currently under construction at building sites on the South Shore and Montreal Island, the REM will come into service on a phased schedule; the automated trains are expected to start running across the new bridge from South Shore stations to the Bonaventure-Central Station – Montreal’s central hub for its metro, train and bus systems, in 2021.

Construction of the new bridge began in June 2015 on an aggressive, 42-month construction schedule, in a public-private partnership agreement between the government of Canada and SSL. SSL is made up of SNC-Lavalin, ACS and HOCHTIEF. The design and construction group has four members: SNC-Lavalin, Dragados Canada, Flatiron Constructors Canada and EBC Inc. The bridge design team is made up of SNC-Lavalin, TY Lin International and International Bridge Technologies. The highway design team is made up of SNC-Lavalin and MMM Group. In addition to being responsible for the construction of the bridge, SSL will also operate, maintain and rehabilitate the new bridge until 2049.

While the Samuel de Champlain Bridge is the main attraction of this project, much highway and bridge work had to be done to connect it to the highway system on Montreal Island. For example, SSL built the Nun’s Island Bridge, which is about 500 metres long and 24 to 25 metres wide.

“[It] is in fact two bridges: the northern deck and the southern deck. The southern deck is a four-lane bridge that takes all the car traffic from downtown Montreal to the South Shore. The northern deck is a three-lane bridge that takes all the vehicular traffic from the South Shore into downtown Montreal. Apart from the Nun’s Island Bridge, there are another 15 bridges that [had] to be demolished and rebuilt from Nunis Island to the Turcot Interchange,” says Liam Carter, construction manager of Nun’s Island Bridge.

The old Champlain Bridge, completed in 1962, has reached the end of its useful life, with reports that over $300 million has been spent to keep it in safe-to-use condition. The new Champlain Bridge, however, has been built to last 125 years. “I often hear workers coming and telling me they’ve never seen construction techniques or quality requirements like we are doing here. I am just repeating [to] them, ‘It’s normal.’ We’ve never built for 125 years like its required here,” says Sylvain Tremblay, area manager of the pre-cast yard.

SNC-Lavalin reports that the bridge required 8.5 million hours of work, 2,000 employees and 154,000 tonnes of concrete. The bridge sits atop 74 piers (37 pairs), which in turn rise up from pier footings. Thirty-eight were prefabricated in huge tents on the Nunis Island jetty and positioned by global heavy-lifting specialist Sarens. The other 36 were poured in place. The footings weigh between 600 and 1,000 tonnes and measure 9 by 9 by 2 metres. Including the pier starter atop each one, the assemblies are as much as 14 metres high.

As for the piers, Jad Kfouri, project coordinator, says, “Each pier varies from three to eight segments. Each [segment] is 65 to 70 tonnes. The highest pier, close to the cable stay bridge, has a height of 35 metres.” And atop each pair of piers is a W-shaped (or two Ys) steel pier cap, weighing around 400 tonnes apiece and measuring 11 by 3 metres, that ties them together and transfers the weight of the bridge down to the foundations and river bed.

The bridge was built from 601 steel box girders, averaging 35 metres in length, three-and-a-half metres high, and three to four-and-a-half metres wide. Their weight, which range from 50 to 80 tonnes apiece, contributed to the construction schedule being set back by six months. SSL had planned to move box girders across the Champlain Bridge, only to be told later that many of them exceeded the bridge weight limit. The construction delay (there was also a crane
operator strike) and unexpected cost, and time spent, of moving them by ship and rail precipitated a lawsuit, a roughly $95-million settlement and additional monies from the government for measures that would recover some of the lost construction time.

Atop the box girders workers laid over 9,600 concrete deck slabs weighing from five to 45 tonnes apiece, followed by waterproofing, asphalt and line painting, some of which was completed barely before the bridge opened.

The cable-stayed, centre section of the bridge, easily located by the harp-arrangement of the cables that support it, is a 500-metre, uninterrupted span that clears the Saint-Lawrence Seaway. It includes 15 huge segments measuring 12.5 metres wide, 60 metres long and weighing around 850 tonnes/apiece. “Such big segments are probably the largest ever installed on any cable-stayed bridge or similar structure. This section of the new Champlain Bridge is definitely one of the biggest challenges of the whole project,” says Frédéric Guitard, area manager, cable-stayed bridge.

The main pylon, from which 15 pairs of cable reach down to the bridge deck, rises 170 metres from water level, just a bit higher than the Olympic Stadium. Its foundations include 42 main shafts drilled 10 metres into the rock. The lower sections of the main pylon were prefabricated. The upper pylon was cast-in-place.

Despite the challenges – strikes, weather, thousands (as many as 5,000, according to some reports) of defects that had to be corrected, the new bridge, with its swooping curve across the river, is done.

“We were faced with an incalculable amount of challenges, but every one of them has been solved,” Guitard says. “I am extremely proud and I think that everybody is extremely proud to have worked on such a project, which is a once-in-a-lifetime opportunity for most of us.”

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On April 22, Marc Benioff, the iconic CEO and founder of software giant Salesforce, noticed that the carrier indicator on his smartphone was labeled “5G E”.

“Does mean I’m now on 5G in San Francisco with 10 Gigabits with super low latency?” he tweeted.

The short answer is no. 5G E is a merely brand name that his provider, AT&T, has given to their latest version of the existing standard, 4G LTE – a marketing move that has been widely criticized. The real 5G, analysts are projecting, won’t be widely available until at least 2020, and some believe it will take much longer than that.

The incident illustrates how much confusion there is about

The network platform that will enable smart cities, smart highways, and smart jobsites

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The incident illustrates how much confusion there is about
5G, even among the tech savvy, and how intense the battle has become as carriers vie to establish themselves as the 5G provider of choice.

It’s not hard to see why the stakes are so high. 5G promises to be much more than just the fifth generation of the cellular network—a number of breakthroughs will allow a paradigm shift in connected technologies, impacting every industry including construction. 5G is essentially the bridge to smart cities, smart highways, and smart job sites.

For consumers, the most obvious change will be a dramatic increase in bandwidth—download time for a high-resolution movie is expected to be around two seconds. There are, however, a number of other features that make 5G a game changer.

One of these is significantly lower latency, which is the time it takes for a connected device to send a package of information to another across the network—essentially, the delay between receiving and sending.

“Latency improvement, or improved response time, excites many network engineers more than the faster speed,” says Lawrence Surtees, vice-president, communications research, at Toronto-based technology research firm IDC Canada.

Latency for existing 4G networks, Surtees explains, is between 50 and 70 milliseconds. With 5G, that figure will drop to less than a millisecond. “Driverless vehicles will need this fast response time to make split-second decisions,” he says.

Low latency will also enable the remote control of construction machinery. In March 2015, visitors at the Ericsson booth at the Mobile World Congress in Barcelona were able to sit in a driver’s seat and, using a virtual reality headset, operate a Volvo excavator located 2,500 kilometres away at the test track of Volvo Construction Equipment in Eke, Sweden.

“This was a use case to show that 5G is needed to lower the latency,” says Calle Stilhager, technical specialist for Volvo Construction Equipment, “because the latency was otherwise so high that the machine was basically not possible to control.”

The full impact of 5G, however, goes further than high speed and low latency.

“5G is not just about faster and swifter wireless connections—the underlying architecture of 5G networks is novel,” says Surtees.

5G, Surtees explains, incorporates two other next-generation network technologies—Software Defined Networks (SDN) and its companion Network Functions Virtualization (NFV). Compatibility with these technologies will establish 5G as a platform for interconnecting billions of sensors and computing devices, allowing Internet of Things (IoT) to become a reality.

“I believe this combination of all three next-generation technologies—5G, SDN, and NFV—will be the most profound development to occur in telecom in our lifetime,” says Surtees.

TRANSFORMING THE JOBSITE
The resulting combination of high bandwidth, low latency, and ubiquitous connectivity is expected to open the door to smart construction.

“Our IoT construction platform, which we call Job Site Insights, is heavily reliant on sensors communicating with the network,” says Mark Bryant, chief information officer of Edmonton-based PCL Construction. “As we add more sensors, and as we add more job sites to our platform, we’re going to see our need for connectiv-

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5G will be key to not only semi-autonomous or autonomous equipment, but also operating it safely. Photos: Volvo CE.

Bryant expects that by this time next year, there will be hundreds of thousands of sensors on PCL jobsites. “We need superior connectivity that’s reliable, and can help our people be safe,” he says, “and we believe 5G is going to enhance that pervasive communication infrastructure that IoT requires. That’s going to be critical.”

“It’s still early days, but the impact of 5G is very exciting,” says Jeff Drake, business area director, OEM solutions for Denver-based Trimble Inc. “From a bandwidth and a data standpoint, we’ll see an increase in availability of information to jobsite personnel in general, making it more easily accessible. I also think that in the near term, we’ll see the ability for more rich data (data conveying qualitative as well as quantitative information) to be realized and used in and around the jobsite, and also, and probably more importantly, to get data back to the jobsite trailer or the head office where decisions about the project have to occur in real time.”

On the autonomous equipment side, Trimble is collaborating with Hyundai Construction Equipment and SK Telecom. According to Drake, 5G will be key to not only semi-autonomous or autonomous equipment, but also operating it safely.

“As with automotive, safety is a foundational step to semi-autonomous and autonomous use of equipment,” says Drake. “On a busy site, you need to know where your assets are in relation to one another. So a dozer grading an area would know where other equipment and other personnel are on the jobsite. That way you can send out alerts, or limit the operation of the machine if it gets in a certain work zone of other assets or personnel.”

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SMART HIGHWAYS

A key requirement for autonomous vehicles, Surtees notes, will be smart highways equipped with 5G access points. The trend is likely to impact how roads are built and maintained. “A 5G highway would not only support smart vehicles, but could monitor the state of highways,” says Drake. “Information about rideability or smoothness or other defects, such as potholes, could be collected by vehicles on the road and transmitted back to highway officials; for example, through a smart highway network. Today we have crews that run up and down highways looking for defects. I think that process gets a whole lot smarter as 5G networks get rolled out over time.”

Smart highways, however, won’t happen overnight, let alone smart cities. Because 5G uses a higher frequency than previous networks, signals are easily obstructed, which means that, for every cell tower using current technology, there are likely to be at least one hundred 5G access points. The bulk of these will have to be retrofitted in existing buildings and roadways.

“Carriers are going to need help in the way of project management skills and construction skills,” says Bryant. “So we feel there’s a role for us as a constructor to work with the carriers to help them get their technology rolled out.”

While 5G is already driving a number of use cases in construction, many unknowns remain. “There’s an ecosystem there that 5G will drive,” says Bryant. “We don’t know what solutions will be out there, but we do know that it’s going to bring new ideas and innovations that we haven’t thought of based on the capability of moving information and data faster and more reliably.”
Busy times would seem to lie ahead for aggregate producers, now that the federal government has approved the twinning of the Trans-Mountain Pipeline (TMP) between Edmonton and Burnaby, B.C. But it may be premature to uncork the champagne, as opposition is plentiful to what many argue is an economically flawed and environmentally dangerous project.

Twinning the TMP includes laying around 980 kilometres of new pipeline, which, along with 193 kilometres of pipeline already built and ready for re-activation, would complete the twinning of the 1,140-kilometre TMP between Strathcona County (near Edmonton) and Burnaby. One estimate of the completion date is sometime in 2022, should construction begin this year. (The project is
reportedly still hundreds of permits and several route segments short of full approval.

The aggregate required to cradle the buried pipe would be substantial. The exact amount and kind required depends on factors such as the porosity and rockiness of soil along the pipeline route, and the slope of the terrain. Photos: Trans Mountain Corporation.

The aggregate required to cradle the buried pipe would be substantial. The exact amount and kind required depends on factors such as the porosity and rockiness of soil along the pipeline route, and the slope of the terrain. But ballpark estimates put it at between one and two million tonnes.

“Native soil can be used if it is adequate – but no large rocks, nothing above two inches. If the soil is not proper, then material will have to be transported in from another site. Imported fill would be a nice sand - 0-3/4 inch - but it could be a little coarser - let’s say one inch,” according to an engineer who kindly offered a thumbnail analysis of the task, and who also asked to remain unnamed.

As for how much aggregate this could tote up to, the engineer continues, “Under the pipe, possibly around 15 centimetres of well-compacted material [totaling] approximately half the pipe diameter to make a bed to lay the pipe. If there is bad soil around pipeline [and] you need to borrow aggregate, then considering 30 centimetres of cover… a very rough estimate of one cubic yard per metre of pipe.”

Assuming an average weight of 1,202 kilograms per cubic yard, a bit of basic arithmetic (1 CY x 980,000 metres x 1,202/1,000) suggests that 1,177,960 tonnes of aggregate would be needed. While admittedly back-of-the-napkin, the number is not a galaxy distant from what Tyson Craiggs, president of the board of directors for the British Columbia Stone, Sand & Gravel Association (BCSSGA) has heard.

“I heard one million tonnes from the Fraser Valley to Vancouver. I heard two million. One guy told me 160 tonnes per length of pipe [whatever that is].”

Whatever the quantity, Craiggs sees good business for BCSSGA members. “It is going to allow for a lot of extra gravel production along the line. All the aggregate will come from private producers. There will be no government pits involved. That opens the doors for producers. One of the challenges on large highway projects is that they use government pits.”

As for how many producers may be able to get in on the action, Craiggs notes, “Just speaking in the Lower Mainland, from Hope to Vancouver, we have 30 to 40 gravel pits. It will allow a lot of participants from our industry. From Hope to Vancouver there
A TMP route map prepared by Trans Mountain shows that the existing twinned section runs from Hinton, Alta. to Hargreaves, B.C. That leaves about 290 kilometres of twinning to do between Edmonton and Hinton, Alta. The rest of the twinning work would be done in B.C.

John Ashton, the executive director of the Alberta Sand & Gravel Association (ASGA), assesses the value of the twinning work to ASGA members like this: “The project itself does not have a massive impact on us directly. The pipeline cannot be the real economic significance of it. TMP is not a cure-all.

“What it does mean is that with Alberta oil potentially having more customers and [becoming] more valuable, there are a number of companies in the north [of Alberta] who provide services, and for whom demand might go up. The story is what is going to happen to the economy if and when it is completed. It has the potential to be a stimulus. It is iffy that it would be that great, but it would have an effect. I am very certain that the effect would not be zero.”

Ashton sees the work being shared among a lot of aggregate producers and haulers because of the prohibitive cost of transporting aggregate long distances. “There would be a different provider every 30 kilometres,” he says.

Prime Minister Justin Trudeau’s June 18 announcement approving the twinning certainly generated a lot of excitement. And the aggressive press release issued the day before by the Canadian Association of Petroleum Producers (CAPP) made it sound like the twinning is a national economic imperative of the highest order, one which only the idiocracy could fail to comprehend.

The misleading information swirling around the TMP story is staggering; e.g., the expertly-disputed insistence that not having it is costing the Canadian economy $80 million a day – a bloating by politicians and the O&G industry of what economist Robyn Allan writes is an incorrect $40 million penalty presented in a deeply flawed Scotiabank report.

Yet while the federal government is bent on spending $13.8 billion of taxpayer money, including the $4.5 billion already spent to buy the old TMP, to build another pipeline for which some experts say is a non-existent Asian market, and irresponsible from a global warming crisis point of view, the TMP may be blocked by more of the same public opposition, and particularly court action, that resulted in the Federal Court of Appeals overturning Ottawa’s 2018 approval of the TMP.

Protesters have already hit the streets,
Twinning the TMP includes laying around 980 kilometres of new pipeline.

and First Nations are insisting that their established rights to free, prior and informed consent have once again not been respected. The National Observer reported this in a June 19, 2019 article: “We will be appealing this decision to the Federal Court of Appeal,” said [Chief Leah George-Wilson of the Tsleil-Waututh Nation]. “Tsleil-Waututh Nation continues to withhold our free, prior and informed consent, and are prepared to use all legal tools to ensure our government’s rights are respected.”

Protect the Inlet reported in a June 19, 2019 press release these words: “No matter who approves it, this pipeline will not be built,” said Will George, a leader of Protect The Inlet and community member of the Tsleil-Waututh Nation whose territory encompasses the tanker terminal.”

After the June TMP approval announcement, Al Jazerra interviewed Tzeporah Berman, international program director at Stand.earth. She said, “The fact is, there have been many approvals of pipelines – Keystone XL, Northern Gateway in Canada – none of them have gone forward, because what we’re seeing is growing opposition. It is not just environmentalists and Indigenous nations that are opposed to this project. It’s 19 municipalities, the City of Vancouver, the City of Burnaby, the province of British Columbia. There will be more legal challenges. There are already protests.”

History may yet show that there was a lot more business to be had in the long term for the construction industry had the federal government offered $14 billion for energy conservation and to help grow the already valuable alternate energy industries.
There are many steps aggregate producers can take to minimize erosion at their sites and further downstream.

> Erosion is a word that carries with it many negative connotations. It comes from the Latin erodere, which means “to gnaw away” – a good description for this powerful force of nature.

Aggregate producers have a rather complex relationship with erosion. On one hand, we provide some of the best tools for erosion control and protection, and our products do much to limit its impact. But we are still subject to erosion’s relentless force and its detrimental effect at aggregate sites. It can create many challenges for a site’s operation, particularly in terms of its impact on water quality. This can impact both active operations and rehabilitation efforts at the end of a site’s extraction period.

For most people, erosion is a familiar process. At its most basic, it is simply a mechanism that results in the transportation
of soil or rock particles from one location to another. Wind, for instance, can be an important mechanism for particulate transport and the industry has a good history of dealing with dust issues. Most of the time, however, erosion is usually the result of water forces. Fine particulate, generated by erosion, can have serious impacts on water quality as well as the ecological function of water courses themselves. Rivers and streams naturally convey sediments – this fine particulate transport can fluctuate over time and is influenced by geology, climate and terrain. Aquatic species living in streams have adapted to these cycles.

Excessive erosion, however, is more serious and far more than just an eyesore. Water that carries eroded particles from human activities will cause reduced water clarity and can impact water quality. Transported sediments in water can significantly alter streambed composition. Excessive sedimentation can impact the quality of habitat for aquatic species, which disrupts their lifecycles. For this reason, the Ministry of Environment Conservation and Parks sets limits to suspended solids in aggregate site discharges.

In the built world, erosion can diminish the carrying capacity of water courses. This inability to transport water efficiently then increases issues with flooding. A plugged culvert, for instance, conveys little water. Erosion and flooding at operating sites can damage access roads making them impassable. The damage can significantly complicate extraction and rehabilitation efforts.

Aggregate sites are particularly susceptible to erosion for a number of reasons. When vegetation is cleared ahead of extraction, it makes soil more vulnerable to erosion forces. Plant roots reinforce and act to bind the soil, and vegetation intercepts rainfall, which reduces the volume of runoff and slows its velocity. Plants also extract moisture from the soil, reducing the time the soil remains saturated making it less prone to erosion.

Secondly, erosion can be exacerbated by the tall slopes typical of many rehabilitated aggregate sites. Precipitation that falls on slopes can concentrate and gain velocity as it moves downhill. The erosive forces of this flowing water intensify with increased gradient and slope length. This often results in the formation of rills and gullies on rehabilitated slopes that don’t have adequate protection. These gullies are often deepest and widest near the base of the slope where water has reached its maximum velocity.
Thirdly, the quality of rehabilitated slopes can impact the severity of erosion. Fine particles left over from aggregate processing or from natural parts of the resource that are not marketable are commonly used for sloping at pits and quarries. Unlike engineered backfill used in construction projects, this fine material is often placed with less emphasis on compaction and slope construction. As a result, loose and fine-grained material, common at aggregate sites, is more sensitive to the forces of nature.

WHAT CAN BE DONE?

Aggregate producers in Ontario have a good record of employing practices to limit erosion. An option is to have facilities in place that slow water velocity, improve retention times and encourage particulate settlement. In this way, aggregate producers can improve water quality and reduce the potential for erosion on and further downstream from their facilities. Attendees at OSSGA’s rehabilitation tours have seen a number of their colleagues address erosion challenges, including some in very difficult conditions. Below are examples of effective strategies that aggregate producers can follow.

Good planning goes a long way, and a rehabilitation plan needs to consider erosion from the start. For example, any time a producer modifies a drainage feature or alters the topography on a site, erosion and sedimentation protection should be considered. A good mining plan will limit the amount of time a stripped area is exposed and can significantly reduce erosion effects. Planting windows are also important in order to quickly establish vegetation. Scheduling extraction and rehabilitation needs to be an integral part of a well-designed mining plan.

The areal extent of exposed terrain is also critical. Unmitigated problems tied to erosion usually grow over time as rills and gullies from runoff become deeper and wider with every new storm. Producers need to keep erosion-prone areas limited in size and they need to quickly rehabilitate these areas. One of the best defences against erosion is to seed and encourage vegetation on slopes, and this vegetation can take time to establish.

To slow the velocity of runoff, the industry employs a number of different methodologies. In the Oak Ridges Moraine, where some of the tallest aggregate slopes in the province exist, it is common to “break up” slopes with short steps or terraces. Although these flattened areas make the slope longer or possibly steeper over short distances, they act to break up the flow of water and can redirect storm water to limit concentration. As a bonus, steps are particularly favourable for establishing vegetation, as seeded material is less likely to move downslope in flattened areas.

Directing runoff away from the top of slopes will often prevent the concentration of flow. Given that a deep excavation is often the nature of aggregate extraction, it is not always possible to direct overland flow away from slopes. Engineered diversion channels, however, can be installed in steep areas to direct water flow. These are often re-enforced with riprap or through some form of innovative engineering. Civil engineers have designed tools for erosion control in construction that provide separation, filtration, drainage and reinforcement. These include geotextiles, walls, mats or the placement of specialty aggregates. These solutions are sometimes used in particularly problematic areas at aggregate sites – the Herber Down site in Durham County is a good example.

Understanding that erosion is a natural process, some erosion is unavoidable. The goal for operators is not to eliminate all erosion but to control problems and to find solutions to site specific needs. Planning ahead to address erosion concerns and choosing the right erosion-control methods are critical. During an aggregate site’s active operation, inspection and maintenance of storm water and erosion control facilities should be part of routine work.

This article first appeared in the Winter 2019 issue of Avenues.
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A look at some of the latest technologies for aggregate operations

CDE
CDE’s patented Combo encompasses five processes: feeding, sizing, sand washing, stockpiling and complete integrated water management. This innovation is a technological response to the challenges faced by materials producers in the construction, industrial sands, mining, and C&D waste sectors. It has been designed with a focus on transferring greater reliability and efficiency benefits to customers. Offering a turnkey solution that delivers unrivalled control of in-spec washed products from a wide range of feed materials. In brief, the Combo creates enhanced reliability and efficiency offering rapid onsite set-up, reduced start-up costs, the ability to process a wide range of feed materials (both natural sand and crushed rock), lower power consumption, a smaller footprint and unrivalled accessibility for maintenance.

ELRUS AGGREGATE SYSTEMS
EL-XTRA engineered self-cleaning screens from ELRUS Aggregate Systems stay clean longer and don’t need to be changed as often. Innovative polyurethane strips allow individual wires to vibrate independently of each other at high frequencies. The amplified screen action allows faster stratification, better bed depth, and virtually eliminates blinding and pegging, making them ideal for applications with wet and/or sticky material. Benefits of self-clean media include: rapid fines removal; almost completely eliminates the need to stop and clean screens; and the crusher
runs more efficiently because fines are removed. The EL-XTRA solution is available in an extensive range of openings.

www.elrus.com

SUPERIOR INDUSTRIES
Among Superior’s complete line of washing and classifying equipment, is its new Spirit Sand Plant, a modular system that delivers cost-efficient sand production, fines recovery, and dewatering via a single, compact plant. The custom-configured plant combines Superior’s Helix Cyclones with a dewatering screen, sump tank, and slurry pump. By manufacturing its own cyclones and dewatering screens, Superior says it ensures a plant is configured with the right cyclone and screen for the specific sands and fines recovery cut points.

www.superior-ind.com

KPI-JCI AND ASTEC MOBILE SCREENS
Producers can efficiently process aggregate material with the portable Series 1800 screening and washing plants by Kolberg-Pioneer. These plants can rinse and size multiple stone products while simultaneously washing, dewatering and fine-tuning a single sand product to meet almost any gradation. The company’s knowledgeable experts have designed the screening and washing plants with flexibility and profitability in mind, creating configurations to fit any operation. These industry-leading plants are available with inclined or horizontal single-, double- or triple-shaft screens with two or three decks all on a single chassis. Additional equipment, like a blademill, can be added for versatility.

www.kpijci.com

TEREX MPS
The Simplicity SI Series screens are intelligently engineered with common footprints and wide spacing between decks, allowing for increased ease of maintenance and quick media changes. Built with a robust drive mechanism and oversized bearings, these units can handle large tonnages and a wide variety of applications. Utilized as wet or dry screens, these units have adjustable stroke and speed combinations to fit a customer’s specific application.

www.terex.com/mps

HAVER & BOECKER NIAGARA
Haver & Boecker Niagara offers the rugged, efficiency-enhancing N-Class vibrating screen to optimize crushing plants and screening operations through its ability to screen as much as 5,000 tons per hour. The

In order to increase Lindsey Aggregates’ product portfolio and open new business opportunities, we installed a new integrated sand washing system that expanded their outputs into C33 spec and mason sand, helping to extract extra value from the current process.

The new CDE washing plant allows for highly efficient sand recovery, customized integration with the existing plant, and an expanded variety of quality sand and aggregates produced simultaneously and ready for market straight from the belts.

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• Capacity of over 500 tons per hour
• Producing 5 new products including the C-33 spec and mason sand
• Designed to integrate seamlessly with the producer’s current on-site operation

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Niagara N-Class is ideal for tough jobs, such as scalping and classifying ores, minerals, stones, sand and gravel in aggregates and mining applications. The equipment is built with an advanced four-bearing design that minimizes structural vibration and maintains constant g-force even through fluctuating material feed rates. The N-Class offers one to three screen decks and features an advanced single-eccentric shaft design.

**METSO**
The stickier the feed material, the bigger stroke needed from your mobile screen. Metso’s ST2.8 mobile screen has the biggest stroke on the market to make it a dependable and versatile choice for top soil, demolition waste, river gravel, and even sand applications. Ready in minutes and available with a washing screen attachment, the ST2.8 is an easy addition to your multi-stage crushing operation.

**KLEEMANN**
A series of four new MOBISCREEN EVO aggregate classifying plants from Kleemann complements the company’s mobile jaw, impact and cone crushing plants with easy mobility, flexible application options and high output. Now available for North America, Kleemann’s four new classifying screens are the track-mounted double-deck classifying screens MS 702i EVO and MS 952i EVO, and the triple-deck classifying screens MS 703i EVO and MS 953i EVO. The two plant sizes have a screening area in the upper deck of 75 or 102 sq. ft., respectively. As with the crushing plants, the classifying screens with their convenient transport dimensions and short setup times optimize the productivity of contractor crushing operations. The MS 702i/703i EVO achieves a maximum output of 386 t/h and the MS 952i/953i EVO an hourly output of up to 551 tons.

**KEESTRACK**
A high production screener with capacities of 400 tph, the Keestrack C6 is available in a double and triple deck configuration capable of making a 3- or 4-way split. Each deck is equipped with 8.1 m² of screening surface for high quality and high capacity processing. The optional wash plant results in the production of three washed products on the double deck or four with the triple deck option. These, in addition to load sending hydraulics and hybrid options, make the C6
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The new McCloskey S250 Screener rises above all industry standards, positioned as one of the world’s largest track mobile screens. The 22 x 6 heavy duty high energy two-bearing, three-deck screenbox delivers more true screening area, and the 225 Hp CAT engine or 218 Hp Volvo engine deliver all the power needed for maximum production. Available in double or triple deck models, the S250 features 900mm (36”) wide side conveyors and 800mm (32”) wide auxiliary conveyors for higher material flow. The auxiliary conveyor also features rollers on the S250, rather than sliding plastic and solid frame, offering less friction. This class leading screening area, along with its high energy screening action, ensure that the McCloskey S250 is the superior choice for aggregate material screening.
www.mccloskeyinternational.com

MCLANAHAN
McLanahan knows the importance of uptime, so the UltraWASH is designed with ease of maintenance in mind. The Eze-Riser feature works with the unit’s pump service trolley to enable safe and efficient pump maintenance, such as changing the impellers or replacing the case liners. A foot pedal for lifting the discharge pipe offers the clearance needed for the pumps to roll out on the trolley service platform unrestricted. The unit’s Fines Forward Slide is able to divert a portion of raw fines into the coarse sand processing stream. This balances the downstream process to optimize plant capacity. Alternatively, by substituting the last row of fine material screen panels with coarse material screen panels, the Fines Forward Slide will allow alterations of the proportions of fine and coarse decking areas above, while still preventing the loss of coarse material into the fines processing stream.
www.mclanahan.com

MAJOR WIRE
With the Flex-Mat Sensor, a valuable and easy to operate vibration data measurement tool, users can review results and fine tune their screen machine without shutting down the equipment. The app-controlled vibration analysis sensor enables readings of screen box vibrations within seconds and generates a report that can be sent or reviewed. The simplicity of the system’s design ensures valuable and actionable data without the requirement for a plant shutdown to calibrate the sensor.
www.majorflexmat.com

POWERSCREEN
The Powerscreen Chieftain 2200 is designed for operators who require large volumes of high specification products with maximum versatility. It has a revolutionary patented drive system which allows switching between 2 and 4 bearing with bolt-on parts. The maximum variability of the Chieftain offers improved capabilities over its class rivals, especially when trying to make high specification aggregate. It’s two highly versatile, double deck screenboxes provide a total screening area of 19.5m².
www.powerscreen.com
Superior Industries is ready to paint the town grey and orange with the addition of its new 2,000-sq.-ft. paint shop at the company’s facility in Miramichi, N.B.

The paint shop is the latest addition to the 25,000-sq.-ft. facility, which has plenty of room to grow. And grow it has. When Superior purchased the facility from MFE Manufacturing Inc. in 2015 it had 17 employees. Four years later Superior employs 47 people at its Miramichi plant, making the company a significant employer in the town of just over 17,000 people. What makes this an even bigger success story for the town and Superior is that the company has been able to grow in a way many companies currently struggle with – by tapping into a generation of millennials. Of Superior’s 47 staff in Miramichi, millennials make up 27 of the employees.

“Superior has a different take, a different culture,” says Superior Industries operations manager Perry Kelly, who has been working at this location since 1998, when it was still owned by MFE Manufacturing (MFE Manufacturing did fabricating work for Superior Industries). “They really want their employees to be happy, to care about the work, and be proud of their work.”
Recognizing the next generation of the rock to road industry!

Canada is full of young, skilled and knowledgeable people who are driving the rock to road industry forward. From aggregate suppliers to roadbuilders, engineers, supervisors and operators, they are the best and brightest in our industry.

The Rock to Road Top 10 Under 40 will recognize the achievements of the newest generation of roadbuilding industry owners and workers. Strong work ethics, leadership by example and efforts to grow the quality of our industry will be acknowledged.

ALL NOMINEES SHOULD:
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- Show leadership and initiative
- Actively seek new opportunities for training and education
- Be involved in industry associations

WHO CAN BE NOMINATED?
Anyone in the aggregates, roadbuilding or associated industries in Canada who will be under the age of 40 as of December 31, 2018.

NOMINATIONS NOW OPEN!
Nominations for Rock to Road Top 10 Under 40 close September 15, 2019.

VISIT ROCKTOROAD/TOP-10-UNDER-40 FOR DETAILS
Kelly has been there to watch the company grow from a relatively small metal fabrication shop to a full production facility shipping aggregate processing machinery around the world.

“When I look back 10 years ago, it took a month to build a crusher. Now we’re building them in five days,” Kelly says.

This type of production is particularly impressive given the facility’s fairly small footprint. Kelly says his team has needed to get pretty creative at times to make sure it has the footprint to handle the orders coming in. This can mean a fair bit of shuffling things around, but Kelly and his staff are happy to do whatever is necessary to get the product built and out the door to Superior’s customers around the globe. The company’s other facilities are extremely impressed with what the Miramichi plant is able to produce in its manufacturing space.

“Right now we’re building a 115-foot conveyor once a day,” Kelly says.

Kelly has truly enjoyed his time working with Superior Industries. When asked what his favourite aspect of working for the company was, he said it’s the company culture.

“The support, the people, and the systems they have in place. I love that people are so important to them, because it makes it easy for me to know that I have the support to support my employees,” he says. “Earlier this year I asked CEO Micah Zeltwanger what the main reasons were for wanting to acquire MFE Manufacturing and have them part of the Superior Family. As per Micah, ‘Culture fit! I could feel the integrity and worth ethic the moment I stepped foot in the door. When I came back and met with the board, I said that it feels like Superior in the hearts of the people there, and they happen to have products that we can use. We invest in people, those people then take care of customers and pricing, and returns are a result of that investment and stewardship. We have been investing in Miramichi and are looking forward to the future!’”
Driving into Manitoba any time soon? Get the shocks ready.

Manitoba’s highways are on a rough ride, suffering from years of neglect now being compounded by severe cuts to Manitoba Infrastructure’s highways capital budget.

The heavy construction industry is alarmed by the lack of attention to a critical piece of the provincial economy – our province relies heavily on trade, which generates fully half of the GDP. It is an incontrovertible fact that trade’s potential for growth rides on transportation infrastructure. Let it crumble and economic growth is impaired.

In 2015-16, the province’s Highways Capital expenditure was $628.4 million. This year, the province budgeted for $350 million – the same level as 2018-19. That’s a 44-per-cent cut.

We understood in 2016, when the provincial election put the Progressive Conservatives in power, that Manitoba’s deficit had to be cut, it was the priority. But Manitobans were told the highways capital budget would fall to no less than $500 million annually.

To underscore the damage these cuts are exacting, consider this: Manitoba’s highways and bridges need some $9 billion in construction and repair. At the current level of investment, the province is actually adding $100 million to that tab every year.

Further, Manitoba is not taking full advantage of the federal cost-shared dollars available for core infrastructure. The Parliamentary Budget Office’s March 2019 report identified Manitoba as the worst jurisdiction in Canada for using federal dollars to supplant its own planned capital expenditures.

There is a definable economic cost to this. Most immediately, the combined effect of budget cuts and annual under-expenditure has meant $100 million in lost wages to our employees. Our industry is reeling; contractors are selling off assets to make the business plan work.

On a broader public interest level, roads are decaying. It costs up to 10 times more to rebuild as to maintain a road; letting the transportation system crumble merely loads liability on future generations.

Infrastructure’s critical role in our economy is reflected in multiple economic reports: strategic infrastructure investment boosts the GDP between $1.30 and $1.60 for every $1 of investment – in the same year.

Given the verified link between infrastructure, trade and the economy, it should be widely accepted that slashing highways investment is the wrong thing to do when the focus, now, must be on growing the economy. Manitoba cannot afford to freeze its highways capital budgets at $350 million.

Manitoba Heavy Construction Association’s message as we enter a provincial election campaign leading to a September call to the polls – a month prior to the federal election – is simple: You can’t cut your way to prosperity.

It’s being echoed by leading Manitoba business organizations that recognize the economic implications of depressed infrastructure investment.

Now the provincial deficit is well under control and fiscal balance is within reach, it is time to focus on investments in support of economic growth.

And next to the economy itself, strategic infrastructure investment is the priority because without a strong, efficient and reliable trade transportation system, there is no economy.

And no politician has ever run on a platform of “I promise if elected to neglect your infrastructure, your highways, your streets.”

It is perverse that our highways budget – foundational to economic potential – is a political football tossed about on the campaign trail every three or four years.

It’s time to divorce infrastructure investment from the political expediencies of election cycles. It is time the new provincial government crafted a long-term, predictable, sustainable and incremental strategic infrastructure investment strategy to propel economic growth.

Chris Lorenc is the president of the Manitoba Heavy Construction Association.
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