

ASPHALTopics

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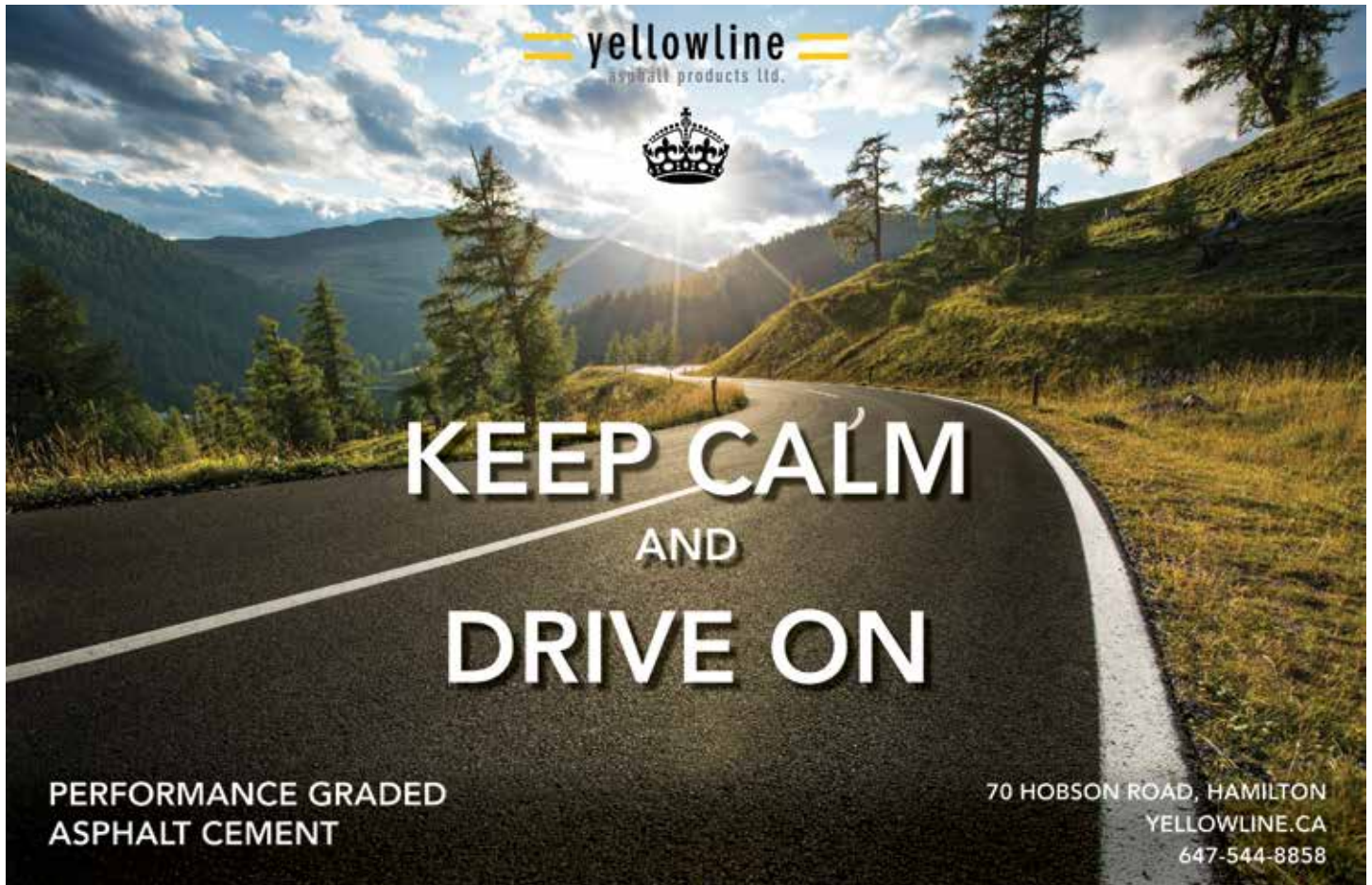
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COVER PHOTO
Highway 8, Hamilton. (Steed and Evans)

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CHAIR's CORNER

John MacKay
Chair

Investing in today for tomorrow

In preparing to write this article, I reread several past *ASPHALT*Topics editions to get an idea for how my article should read. I knew I wanted to address sustainability and OAPC's role in supporting member companies to operate in a sustainable manner, where sustainability is defined as focusing on meeting the needs of the present without compromising the ability of future generations to meet their needs.

During my research, I read an article in the summer 2003 issue of *ASPHALT*Topics by Mark Rivett (great mustache by the way). Mark wrote about excellence and discussed the University of Waterloo's Centre for Pavement and Transportation Technology (CPATT). The investments that industry and government made in CPATT over the years have now rewarded industry, not only by the completion of asphalt research, but also with an increased talent pool of skilled people in our industry today. For OAPC, we have been rewarded with our current Director of Technical Services, Doubra Ambaiowei, a graduate of the University of Waterloo and CPATT researcher.

Our industry is the direct beneficiary of the actions taken in the past, allowing for us to meet our needs today. Since 2002, OAPC members have contributed \$632,350 to the Asphalt Research Fund. These contributions have directly supported made-in-Ontario asphalt research that expedites the development and adoption of new technologies that facilitate sustainability in the asphalt industry.

As government and companies in 2021 work towards operating in a sustainable manner, OAPC, like in the past, will be a leader in working to set up future generations to meet their needs. The infrastructure that is built by our members needs to be constructed using less carbon and be a circular economy by fully recycling the product we produce.

The Ontario Ministry of Transportation (MTO) and OAPC are working closely in developing a new warm mix asphalt (WMA) specification. WMA isn't new to Ontario —

it's been used here for over a decade. Initially the focus of WMA was to reduce costs and extend the paving season. Both are laudable objectives, but now the goal of reducing emissions is the leading objective for expanding the use of WMA in Ontario. Producing asphalt mixes at lower temperatures goes hand-in-hand with the Ontario Ministry of Environment, Conservation and Parks new Asphalt Mix Industry Standard for local air quality. As we produce at lower temperatures, there will be fewer emissions from the combustion equipment, generating less greenhouse gas emissions.

Performance mix testing and balanced mix designs (BMD), while not here yet, will extend the life of our pavements and allow designers to maximize recycled asphalt in our mixes. Balanced mix designs and performance testing allow producers to design mixes that are specific for the intended application through the incorporation of multiple performance tests which examine the mix for its resistance to rutting and cracking.

Currently, Marshall and Superpave mix designs are volumetric based, whereas balanced mix designs focus on designing asphalt for performance and not just meeting the specified volumetric recipe. This approach will enhance a mix's capability to deal with rutting and cracking based on its intended use and thus extend pavement life. Because BMDs are only focused on the mix's ability to perform in service, the prescriptive recipe approach of today is given a back seat to actual performance. This new approach lends itself to promoting innovation in design, opening the door to increased recycling opportunities.

With the improved mix designs and warm mix asphalt technologies available, and our continued focus on funding asphalt research, OAPC is meeting the needs of today and those of future generations. ■



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Doubra C. Ambaiwei
Director, Technical Services

Better days ahead!

Welcome to the summer issue of *ASPHALTopics* magazine. At this time, OAPC would like to extend its appreciation to the industry's entire workforce and their families for continuing to endure through the restrictions imposed due to the pandemic. We are pleased to learn that, in response to an expected increase in COVID-19 vaccine supply from the federal government, the Ontario government is ramping up its roll-out and administration of the vaccine. This indicates that there are better days ahead. In anticipation of a time when we can return to in-person gatherings, please continue to stay safe, healthy in body, and strong in spirit.

Operationally speaking, this summer the Ontario Road Builders' Association (ORBA) collaborated with the Education Subcommittee of the OGRA/OAPC Municipal Hot Mix Asphalt (HMA) Liaison Committee, and the Asphalt Institute, to deliver a lunch and learn webinar on Reviewing and Interpreting Asphalt Test Results on May 20. Beyond fulfilling the recommendation from the 2018 Quality of Asphalt Report, this webinar is an effort towards improving understanding of the practices and potential ramifications of failing test results associated with asphalt mixtures, and their related components, generated during a project.

Furthermore, the third meeting of the **OAPC Asphalt Technical Symposium (ATS)** was held on June 15. The symposium provides a platform for education on the specific elements of technology necessary to achieve high performing asphalt pavement including materials, design and construction practices, unbiased technical discussions, sharing, and connectivity between leading asphalt technical experts.

This year, we built on the successes from the 2019 and 2020 symposiums, while exploring our continued focus on recovered asphalt testing and pathways towards mix performance testing in Ontario. While attendance was by invitation only, industry can look forward to an update of the proceedings at the 2021 OAPC **Fall Asphalt Seminar** on December 2. The ATS presentations and webinar recording are available on the ORBA and OAPC websites.

Specification consultation reviews continue through the usual channels with key wins pertaining to the possibility of full implementation of warm mix asphalt, and the anticipated revisions to the tack coat specification. A reminder that specification updates and other technical insights are communicated to members through the ORBA Quarterly Technical Highlights Update Bulletin. To subscribe, please connect with us.

This issue of *ASPHALTopics* includes the project winner and finalists of the Municipal Paving Award; highlights the ORBA Road Building Academy (February 22 - 26), OAPC Spring Operations Seminar (March 25), and OAPC Partners in Quality webinar (April 29); and provides a detailed overview on an improved test method of low temperature PG of binders. A special project feature details how increasing the asphalt depth on the runways and taxiways at the Timmins Airport will allow for the handling of heavier aircraft. You'll find further interesting content to digest and enjoy in the Last Word, Unsung Heroes, marketing, technical, and environmental columns. ■



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Turning a spotlight on our worst and favourite roads

For millennia, humans have blazed trails forged into ancient roads that shaped world history and civilizations. From the Khmer Highway that runs through Cambodia and Thailand to the Persian Royal Road that winds from Turkey to Iran to Ontario's Yonge Street, the longest in the world, these roads served as vital passages. Thanks to centuries of building and maintenance, many roads of bygone eras are still in use today. In days past, much financing, blood, sweat and tears went into building, repairing and maintaining the world's thoroughfares. Today the need for transportation infrastructure investment is no different.

The Canadian Automobile Association's annual Worst Roads Campaign aims to bring awareness to the roads across the country that are in poor condition and in need of funding and maintenance. The campaign calls upon the public to nominate roads that cause them angst, whether it is due to potholes

or traffic congestion. Since 2006, the Ontario Road Builders' Association has partnered with the Ontario chapter of CAA to verify the condition of the roads listed in their annual Worst Roads Campaign. After being put on pause in 2020 due to the COVID-19 pandemic, the campaign was launched once again on March 23, and on June 3 Ontario's Top 10 Worst Roads were revealed. Number one on the 2021 list is Victoria Road in Prince Edward County.

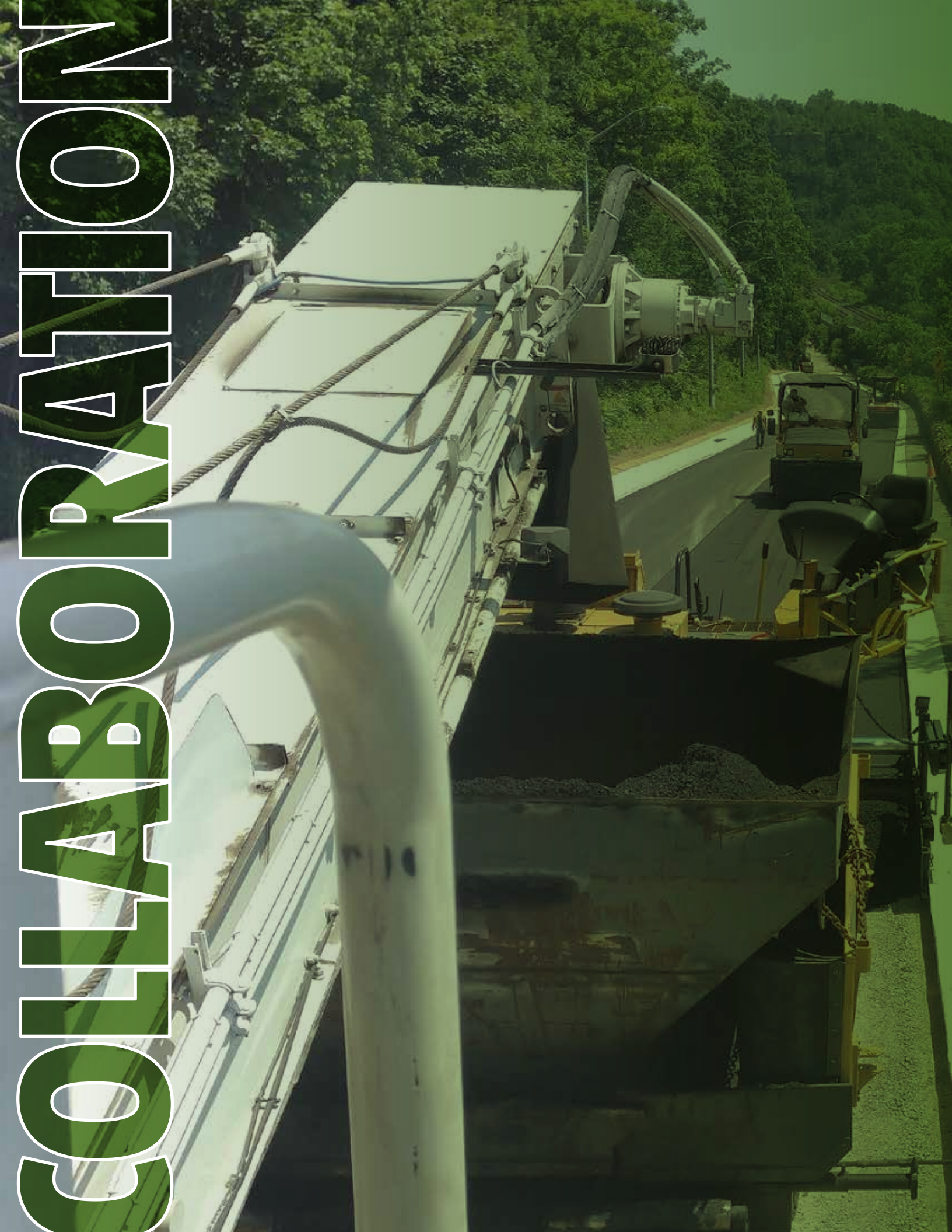
This year our partnership with CAA went a bit deeper than identifying the technical condition that is ailing a "worst road". Ahead of the campaign launch, we provided an article for CAA's educational blog called *Understanding Roadways: The Science Behind Their Design, Construction and Maintenance*. On April 8, ORBA's Director of Technical Services, Doubra Ambaiowei, was a panelist on CAA's Town Hall – A Look at Belleville: The Importance of Road Repair. Doubra presented on *Solving the*

Premature Cracking Problem in Ontario and emphasized the importance of investing and maintaining our roads to keep essential goods and services moving.

Whether you are a commuter that spends hours driving on underfunded roads, a road owner making decisions on how funding will be invested, or a road builder who strives to produce quality asphalt pavements, we all want the same thing – long lasting roads that safely get us to our destination. A first step in achieving our common goal is educating the public and stakeholders on what it takes to ensure our roads will last for generations.

By the time this edition of *ASPHALT*Topics is published, we will have launched our #ONGreatRoads campaign which last ran in 2016. From June 29 to August 3, #ONGreatRoads calls for the public to post a photo of their favourite road on Twitter, Instagram, Facebook or LinkedIn and explain why it is their favourite. For five weeks there will be a weekly draw from entries to win a \$100 gas gift card. Winners' photos and stories will be featured in the fall 2021 edition of *ASPHALT*Topics. This campaign fosters a conversation with Ontarians about how our roads and road builders are an integral part of our lives.

While the Worst Roads Campaign of the spring brings important awareness to the roads that need our attention and investment, summer 2021 is a perfect time to celebrate our roads and those who build them. ■



COLLABORATION



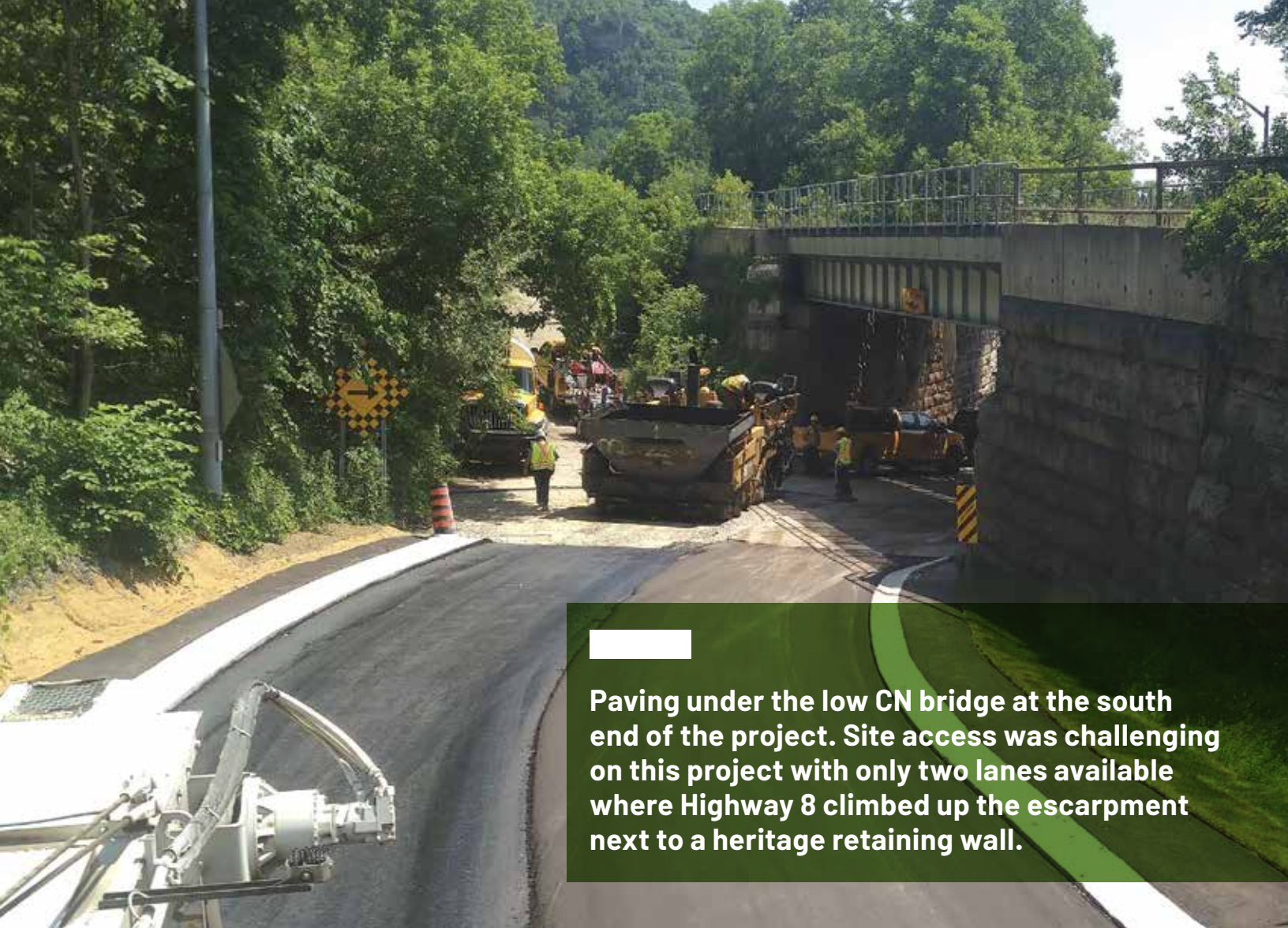
DRIVES EXCELLENCE IN MUNICIPAL PAVING AWARDS

by James Careless

Even the COVID-19 pandemic couldn't compromise the quality of work delivered by asphalt producers and their municipal government partners in 2020. This commitment to excellence was spotlighted at the fourth annual Municipal Paving Project of the Year Award presented virtually at the Ontario Good Roads Association (OGRA) conference on February 23, 2021.

This year's winner was Steed and Evans Limited/City of Hamilton for the reconstruction of Highway 8. The two finalists were Coco Paving/County of Simcoe for Simcoe County Road 6, and R.W. Tomlinson Ltd./Town of Smiths Falls for the revitalization of Beckwith Street.

The Municipal Paving Project of the Year Award promotes and recognizes the successful collaboration between municipalities and asphalt producers for excellence and innovation in Ontario paving projects. All entrants are assessed on the finished pavement's conformance to the project's specifications, visual appearance, overall quality, innovations, and considerations such as tight schedules and dealing with traffic flows, among others. »



Paving under the low CN bridge at the south end of the project. Site access was challenging on this project with only two lanes available where Highway 8 climbed up the escarpment next to a heritage retaining wall.

STEED AND EVANS' RECONSTRUCTION OF HIGHWAY 8

Rebuilding a well-travelled road is difficult enough. Rebuilding one that traverses a very steep incline and is fronted by fragile historical properties only adds to the challenge.

These were just some of the issues faced by this year's award winner, Steed and Evans, as they served as paving subcontractor to Deso Construction on the rebuild of Highway 8 in Hamilton, Ontario, from Park Avenue to the CN Railway Bridge in 2020. The project area is the main access road from Dundas, Ontario, to Greensville and Highway 5.

The overall \$3,719,900 rebuild project, which included the steep rise from Lake Ontario up and over the Niagara Escarpment, required 14,800 square metres of road reconstruction, 990 linear metres of storm sewer replacement, and 1,800 linear metres of curb reconstruction. Five hundred and sixty square metres of concrete-lined ditch and 230 linear metres of ditch lined with riprap were also factored into the contract, along with repairs to a retaining wall.

As executed by Steed and Evans, the repaving of Highway 8 was done in two phases. The first phase ran from the CN Rail bridge to Hillcrest Avenue (starting April 2020), while the second phase went from Hillcrest to Park Avenue (starting June 29, 2020).

Each section of Highway 8 was paved with two lifts of binder at 60 mm each and then paved the following day with a 50 mm surface course. 4,165 tonnes of Superpave 19.0 (Traffic Category D) PG 58H-28 asphalt cement was used for the two binder lifts. The surface course was made up of 1,815 tonnes of Superpave 12.5 FC2 (Traffic Category D) PG 58H-28 asphalt cement. "The City of Hamilton chose to go with a bigger aggregate because Highway 8 through Dundas is a highly travelled road," notes Mike Cripps, Steed and Evans Project Manager.

When it comes to the challenges associated with this project, "the biggest problem was that Highway 8 goes down the escarpment," says Tyler Renaud, the City of Hamilton QA Project Manager in charge of materials testing. "It meant that we had to deal with a steep slope while working with the Niagara Escarpment Commission to preserve this UNESCO-designated World Biosphere site. We also had to ensure that the reconstruction did not damage three historical sites that front Highway 8; namely the retaining wall, a heritage building, and an antique horse watering trough."

Steed and Evans used a number of strategies to address these challenges. For instance, "a Material Transport Vehicle (MTV) was used to feed the paver for all lifts of asphalt," Cripps says.



Avenue, its trucks had to enter the job site from the south and exit at Brock Road due to the road only being two lanes wide. There was no other option, because the company could not have its trucks backing up from one end of the site to the other. The trucking pattern resulted in loaded asphalt trucks crossing over the centreline joint to back into the MTV. "As a result, we needed to ensure that we had great compaction so that the joint would not roll on us," says Cripps.

Despite these and other challenges, Steed and Evans and general contractor Deso Construction completed the Highway 8 rebuild in line with the contract. This was due in part to the duo's close working relationship with the City of Hamilton and everyone's willingness to co-operate — such as the city agreeing that the escarpment hill portion would not be paved in echelon as had been originally required.

"Dennis Sousa and his team at Deso completed the job well ahead of schedule and did a magnificent job bringing it all together," Cripps says. "The Halton asphalt plant provided our paving crew with great quality material to pave with, so it was just another day at the office for our team."

"Every day our crews set out to do exceptional work," he concludes. "We are very grateful for them to be recognized through this award, and very grateful to everyone else who was involved that made this project award-worthy."

COCO PAVING'S RESURFACING OF SIMCOE COUNTY ROAD 6

The 6.3 km stretch of Simcoe County Road 6 between County Road 27 and the south limits of Wyevale was one of three projects that Coco Paving completed for the County of Simcoe in 2020. Coco Paving started work after Roto Mill Inc. had prepared the sub-base using the Cold in Place Recycling with Expanded Asphalt Mix (CIREAM) method.

Designed to resist reflective cracking caused by cold weather, the CIREAM method led to the existing asphalt being reclaimed to a maximum depth of 85 to 100 mm. The existing pavement was milled, crushed, mixed with an expanded asphalt, and then repaved and recompact to provide a stabilized roadbase for new surface material.

"CIREAM avoids the need to bring in new materials to rebuild the road base, such as importing limestone and/or Granular A & B from quarries and pits," says Luke »

"This played a key role as the MTV can continuously move and fill the paver — taking the burden of the trucks backing into it while pushing them up the steady incline and allowing the paver to lay a continuous mat."

Traffic management was also an issue during this contract, so much so that the associated access restrictions affected the paving process. These restrictions were unavoidable. "Highway 8 is the major thoroughfare between Dundas and Greenville," says Renaud. "We had to put two long major detours in place as a result."

Steed and Evans felt the impact of these restrictions. "Due to some of them, we were unable to pave the road in echelon as the trucks would have had to back down or up the hill to feed the MTV," Mike Cripps explains. As well, when Steed and Evans was paving Phase 1 of the project between the CN Rail bridge and Hillcrest

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MacDonald, Coco Paving's Estimator and Project Manager. "It's a much more green solution to rehabilitating a road as it utilizes 100 per cent of the existing roadbase with minimal importing requirements. The CIREAM base constructed from recycled materials is comparable in strength to those made from virgin aggregate."

Coco Paving resurfaced the prepared County Road 6 with hot mix asphalt (HMA) under a \$1.2 million contract. The company first laid down 6,500 tonnes of Superpave 19.0 (Category C) with 58-34XJ asphalt cement to a depth of 50 mm for the new base layer. It then finished County Road 6 with 5,800 tonnes of Superpave 12.5 (Category C) 58-34XJ for a 40 mm lift.

This contract required Coco Paving to do the job entirely during June 2020. Add in the need to keep traffic moving through the area plus the physical distancing protocols of COVID-19 for the crew, and this was not an easy project to complete on time.

Coco Paving met its deadline by using its mainline paving equipment to do one lane (direction) of the road completely, followed by the other per lift. "We had our Caterpillar 1055 asphalt spreader out there fed by our shuttle buggy (MTV), and three of our asphalt rollers," MacDonald says. "We also flagged and barrelled the entire site to keep traffic moving safely. Depending on the volume from either the north or south, we had to alter our traffic control operation to ensure minimal driver frustration."

Both the project and the finished product satisfied Greg McGrath, Construction Superintendent for the County of Simcoe. "We have a great collaborative working relationship with Coco Paving with good two-way communication. The work was completed within the scheduled timeline and on budget."

R.W TOMLINSON'S REVITALIZATION OF DOWNTOWN SMITHS FALLS

Ottawa's R.W. Tomlinson Ltd. spent almost all of 2020 completely rebuilding 320 metres of Beckwith Street (part of Highway 15) in downtown Smiths Falls.



Simcoe County Road 6. (Coco Paving)

The overall \$8.1 million Beckwith Street Revitalization project transformed the downtown core from its traditional angled-parking layout to a multilane system that added parallel parking, physically-separated bikes lanes, broader sidewalks, and a much more logical traffic flow to this heritage community.

Paving isn't all R.W. Tomlinson did on Beckwith Street. "We also rebuilt or replaced all of the underground utilities, including a 1900s vintage sewer, and added three new lit intersections, new street lighting fixtures, new interlock paving, concrete sidewalks — the whole shebang," says Robert Enright, one of the company's project managers. R.W. Tomlinson also worked closely with local contractors who were working to restore and renovate the entrance of Beckwith Street's historic Rideau Hotel, built in 1901, into an apartment building.

The Beckwith Street Revitalization wasn't easy to execute. Beyond doing the project during COVID-19 with all of its health safeguard issues, the scope

of the transformation upset some Smiths Falls residents who were attached to the street's angle parking. "There was quite a bit of vocal opposition to the changes early on," says Troy Dunlop, the town's Director of Public Works and Utilities. "Nevertheless, the town council was very committed to advancing a progressive street design that would serve future generations."

After excavating the original pavement from Beckwith Street, R.W. Tomlinson laid down 898 tonnes of Superpave 19.0, Category D (PG 64-34) HMA in a 50 mm lift. This was covered with 846 tonnes of Superpave 12.5 FC2 Category D (PG 64-34) HMA in a lift of 40 mm. The bike lanes were paved with 133 tonnes of HL3F (PG 58-34) HMA.

To manage traffic flows without compromising quality, the company paved first one side of Beckwith Street and then the other. This was done by an eleven-person crew using a Caterpillar 3000 Series paver and a Roadtec shuttle buggy to keep it loaded. They were



Beckwith Street, Smiths Falls. (Tomlinson)

followed by a steel drum roller, a rubber tire roller, and finally a finishing roller.

R.W. Tomlinson was the sole bidder for this project, helping the Town of Smiths Falls to cut its tendered price from \$8.4 million to \$7 million. "We sat down with the town and found ways to knock down the cost," Enright says. "It helped that we were able to start work in January when crews were plentiful, and that the pandemic helped reduce the cost of materials during its early phases."

Today, the Town of Smiths Falls has a brand-new main street that is modern and yet in line with Beckwith Street's heritage character. "R.W. Tomlinson did a great job and were very responsive to everyone's needs," says Dunlop. "The feedback we're getting from business owners and residents about the revitalization has been very, very positive." ■

James Careless is an Ottawa-based freelance writer with credits in the National Post, Toronto Star, and AI's Asphalt magazine.



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PHASED APPROACH KEY TO AMBITIOUS PROJECT

TIMMINS



The original Timmins Airport paving contract with the City of Timmins was set at \$7,587,712. Funded by Transport Canada's Airports Capital Assistance Program (ACAP), this money was sufficient to remove and pulverize five inches (~125 mm) of weathered asphalt surface on the two runways and two taxiways, distribute the pulverized RAP onto the airport's ancillary roads, and then replace the removed surfaces with four inches (~100 mm) of hot mix asphalt (HMA). This was the job that Miller Paving began work on in July 2020.

This proposal didn't sit well with David Dayment, the airport's manager. "Transport Canada said four inches (~100 mm) of new asphalt would be sufficient for Bombardier Q400 turboprop aircraft that fly here regularly, but not Boeing 737s and larger planes that

come here from time to time – and that we want to be able to service to boost passenger traffic," he explains. "The federal government wouldn't budge from this position, so Timmins City Council voted to accept my recommendation to pay \$1,949,547.48 out of our own pockets so that we could put down a full five inches (~125 mm) and not limit our options."

To satisfy the city's desires, Miller Paving prorated its original contract to factor in the additional one inch of pavement – boosting the hot mix asphalt (HMA) total depth to 125 mm. In doing so, they had to juggle a number of challenges to meet their first year goal of rehabilitating runway 03-21 (6,000' by 150'/1,829 m by 45.7 m) and Taxiways A/B in a climate where freezing temperatures can arrive in mid-October. (Runway

by **James Careless**

Miller Paving is in the second year of rehabilitating the two runways (with intersection) and two taxiways at Timmins Victor M. Power Airport in Timmins, Ontario. It's an ambitious project that balances the need to completely remove and repave the facility's asphalt surfaces with the airport remaining in service, compounded by the challenges of working in a cold northern climate, safety issues related to arriving/departing aircraft, and COVID-19.



10-28, which measures 4,907' by 150'/1,495 m by 45.7 m is scheduled to be rehabilitated in 2021.)

A total of 57,000 tonnes of HMA was laid down during this phase of the contract along with some Granular A aggregate to improve the base after Miller Paving had excavated and pulverized 180,000 square metres of original tarmac. The bottom lift was 75 mm in depth, while the surface lift was 50 mm.

FINDING THE RIGHT MIX

By itself, laying down asphalt pavement in Timmins was no big deal for Miller Paving. "We specialize in paving in a northern climate," says Amanda Swan, Quality Control Technical Advisor for Northern Operations. "It is what we do every day."

However, the specific asphalt requirements of the Timmins Airport job did pose some challenges. "We conducted more than 15 lab trials to find the right HMA composition to meet the project specifications during the mix design phase," Swan says. "The project's specifications were based on aggregate as defined by the MTO Designated Sources for Materials (DSM) list, but there are no approved sources near the Timmins area because the highways in that region do not typically use FC1 or FC2 mixes. Meanwhile, Marshall mixes are not commonly used in that area as the municipality and most private work in the region use Superpave." »

In addition, the Timmins Airport contract included specific mix requirements with aggregate gradations for HL4 and HL8 mixes. It also called for additional aggregate physical property requirements, plus modified mix requirements that included increased minimum asphalt cement (AC) contents, increased minimum Marshall stability, and using performance-graded AC that met municipal testing requirements.

"The combination of these requirements created a challenge for our mix designer because the mixes for this project were specialized designs," says Swan. "We ended up upgrading the AC from 58-34J to a 64-34J to allow for higher AC contents with increased stability. Meanwhile, there was some specialized aggregate testing for polished stone value on this project that couldn't be performed in Canada. So we had to ship aggregate samples to Ireland for testing."

The mixes didn't have specific names, Swan adds. Miller Paving called them HL8 (base) and HL4 (surface layer), but they were not true HL4 or HL8 mixes because of the additional requirements for aggregates, AC content, and stability. "But since the aggregate gradation met HL4 and HL8, and the lab testing during production was that of a standard Marshall mix, we referred to them internally as HL4 and HL8," she says.

Miller Paving's HL8 base course had an AC content of five per cent and a minimum stability of 12,000 newtons. Their HL4 surface mix had 5.3 per cent AC content and a stability of over 14,000 newtons. A typical HL8 has 4.7 per cent minimum AC while a standard HL4 mix requires 5 per cent minimum AC content.

FIGHTING THE CLOCK

The HMA mix research was conducted under the terms of the original Timmins Airport contract. By the time the project scope was expanded to add an additional one inch (~25 mm) to the runway depth, Miller Paving had solved the issues associated with the HMA mix design and was now preparing its paving materials. This allowed the company to increase the production of paving materials without disrupting the existing work schedule which included the five days when the airport was to be shut down for the rehabilitation and repaving of the intersection between runways 03-22 and 10-28.

"This closure date was set in stone," says Ryan Cote, Regional Manager of Hot Mix for Miller Paving Northern. "Our time to pave the intersection was timed down to a couple of hours: There was no flexibility to accommodate delays."

TAKING A PHASED APPROACH

The removal of materials and subsequent repaving of Runway 03-21 and Taxiways A/B was an intricate, delicate dance. The need to keep the airport open meant that Miller Paving's equipment and work crews had to be choreographed to ensure that they didn't interfere with the safe passage

The project was done in nine phases to allow airport operations to continue except for five days when aircraft were redirected to other airports for paving the runway intersection.



Paving in echelon on Runway 03-21.



Paving in echelon on the taxiway.

of aircraft and ground support vehicles at any time. This detailed management even ensured that no stray Tim Horton's coffee cups were dropped on the runway where they could end up as FOD (Foreign Object Debris) that could be sucked into an aircraft's engine. The emphasis on safety was intensified by the need for physical distancing and other health measures due to the COVID-19 pandemic.

It was for these reasons that the 2020 Timmins Airport project was done in nine carefully planned phases to allow airport operations to continue unimpeded while the work went ahead. The only exception to this plan was the five days set aside to pave the runway intersection where aircraft were redirected to other airports. That closure took place from September 8 to 12, 2020.

"We did Taxiway A in stages followed by Taxiway B in stages, and then we closed Runway 03-21," says Cote. "We did each end of the runway, which was followed by the five day closure for the intersection with Runway 10-28. We extended our work into fixing the centre stretch of 10-28 so that when we started up again in 2021, we wouldn't have to close down 03-21 at all to finish the job."

To do this work in 2020, Miller Paving employed an 18-person crew. They first used a large 2.2 m grinder to remove the asphalt to the full depth of five inches, and trucked the pulverized rubble away to be laid down on the airport's roads. After patching and smoothing out the base with »

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a grader, the company laid down the new asphalt in echelon using two ten-foot pavers and a Material Transfer Vehicle, two steel rollers, two rubber tire rollers, and a tack truck.

"We were fortunate in that the base was actually in very, very good shape and didn't require a lot of Granular A," Cote says. "So we were able to basically regrade the existing compacted aggregate and then be ready to pave it."

The intersection between the two runways was a bit more difficult. Within the five day closure window, Miller Paving had to remove the original asphalt, place approximately 3,000 tonnes of Granular A to raise the crown of the intersection by about 100 mm to improve drainage, then place 125 mm of HMA in two lifts (75 mm

and 50 mm) followed by line painting and ramping.

"The five day closure was the toughest to deal with," Cote explains. "We completed the work with about four hours to spare. But the situation could have been worse — it started to rain about an hour after we finished. Had the rain begun earlier, it could have delayed our completion by days."

Towards the end of Miller Paving's 2020 efforts, Timmins' northern climate began to become an issue. "This area may not be that far north, but it is very windy," says Cote. "This wind would cool down the asphalt very quickly. It was a problem because the delays to the mix design meant that we weren't able to start paving until mid-August, when the best part of the summer had already passed. We paved until the end of September, at which point the winds and falling temperatures were having a real impact."

RESULTS TO DATE

Despite the many challenges encountered in 2020, the Timmins Airport project hit its goals. Airport manager David Dayment credits this success to Miller Paving's willingness to work closely with the City of Timmins, plus the paving company's tenacity in getting things done.

"The guys were very attentive to our operational needs," says Dayment. "They worked through some weekends to stay on schedule. They were prepared to work evenings and into weeknights if they had to, but fortunately things never got that far. Meanwhile, the runway and taxiways got paved and restored to peak condition — and ready to accommodate 737s and other large aircraft."

As for 2021? "The last phase of the Timmins Airport paving project consists of the ends of Runway 10-28, which includes the removal of existing asphalt, regrading and placing approximately 14,000 tonnes of asphalt as well as line painting," Cote says. "Just the ends of that runway — everything else has already been done!" ■

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PARTNERS IN QUALITY

paves the way with winning formula by Steve Pecar

An expert panel of speakers and a diverse range of topics proved to be a winning combination at this year's Partners-in-Quality (PIQ) Road Tour presented virtually by OAPC.

In the first presentation, Dr. West of the National Center for Asphalt Technology (NCAT) at Auburn University in Alabama outlined the basics of balanced mix design (BMD) and how agencies across the U.S. are looking to embrace the concept because many are dissatisfied with the performance of their current mix designs. He believes the same issues exist in Canada.

His presentation focused on what needs to happen long before the final product is put down on the road. He stressed that BMD has to undergo vigorous testing to make sure it withstands the usual conditions for a greater length of time. As a result, the process to finding the correct BMD can be a long and sometimes frustrating experience, but the result — longer lasting and better roads — is a goal worth achieving.

The theme of testing to achieve better performing asphalt was continued by Michael Simons, Technical Director of Surface Tech. Speaking on the topic of asphalt mixtures with higher RAP contents, Simons discussed various testing methods as a necessary step in the process to achieve better roads.

"Performance testing on asphalt mixes that we consider to be functioning at an acceptable level of service allows us to create benchmarks that can be used to define performance levels," Simons said. "These performance levels can then be used in the design of new asphalt mixes to set minimum requirements to be met or exceeded by new, higher RAP content mixtures." Ultimately, the objective is to create an asphalt mixture that delivers performance while maximizing the RAP content.

Simons discussed one of the newer methods of performance testing, the IDEAL CT. He said this newer test method is gaining acceptance, particularly in the U.S., due to its relative simplicity and correlation

with field performance in terms of fatigue, reflective cracking and thermal cracking.

"It is a simple, quick, repeatable test that is sensitive to key asphalt mix components and volumetric properties such as RAP and RAS content, asphalt binder type, binder content, aging conditions and air voids," Simons explained.

However, he continued, producing and testing a viable mix design is only part of the process, as once the asphalt has been produced, it must be placed and compacted. Whatever new technologies are used in a modified asphalt mix, careful attention to proper placement and adequate density are essential to the performance of any mix.

Simons closed his presentation by saying that performance tests allow for the engineering of asphalt mixtures containing higher RAP content without sacrificing pavement performance when compared to lower RAP content mixes, and that combining different tools and technologies allows for the varying of the asphalt mix components to create a BMD that provides the best performance.

Gelu Vasiliu, head of the bituminous section of the Ministry of Transportation, provided

an update and in-depth look into new specifications and other initiatives from the ministry's perspective and also touched on the topic of mix performance testing.

In his presentation, OGRA/ME Member Services Coordinator, Amin Mneina, gave his 2021 Local Municipal Forecast which looked at how the pandemic has been affecting the industry and the cost impact on municipalities.

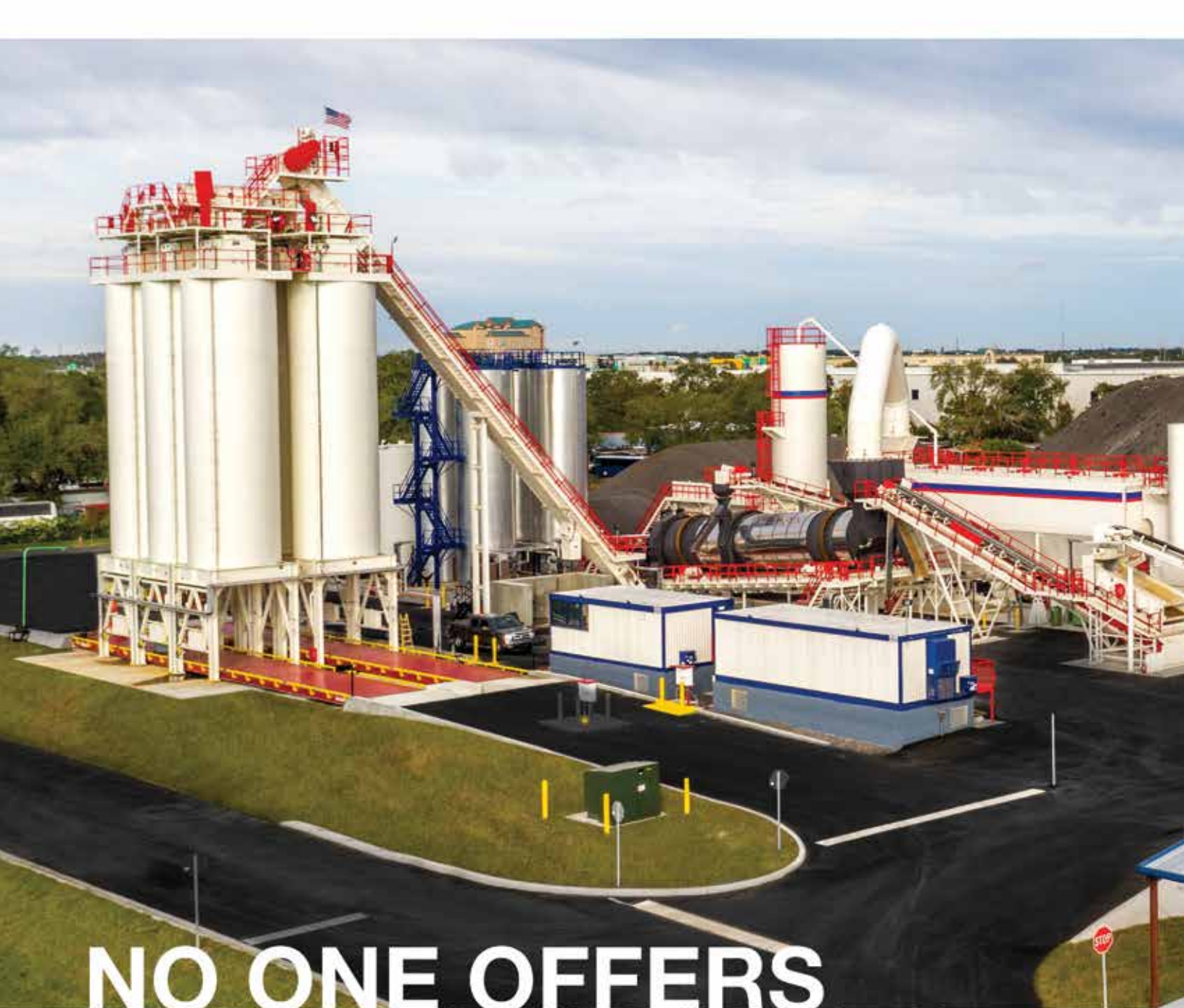
The technical portion concluded with Dr. Haleh Azari, President of Pavement Systems LLC. Her presentation on Improved Test Methods for Low-Temperature PG of Binders looked at the iCCL test, its applications and operation, and its cost-saving ease of use.

The Road Tour concluded with a presentation by Abigail Wright Pereira, Director, Marketing & Communications for ORBA, who outlined some of the initiatives planned for the rest of the year. Presentations, as well as a recording and transcript from the webinar, are available on the [ORBA website](#). ■

Steve Pecar is a Mississauga-based writer, editor and designer.

FEATURED TOPICS AND GUESTS THIS YEAR WERE:

- **NCAT's Experiences: Mix Performance Testing & Balanced Mix Design**
Dr. Randy West, Director and Research Professor, NCAT at Auburn University
- **Engineering Performing Asphalt Mixtures with Higher RAP Contents**
Michael Simons, Technical Director, Canada, Surface Tech
- **MTO Bituminous Specification Updates & Other Initiatives (MERO)**
Gelu Vasiliu, Head, Bituminous Section, MTO Bituminous Representative, MTO
- **OAPC/OGRA Liaison Report and 2021 Local Municipal Forecast (OGRA/MEA)**
Amin Mneina, Member Services Coordinator, OGRA/MEA
- **Improved Test Method for Low-Temperature PG of Binders**
Dr. Haleh Azari, President, Pavement Systems LLC
- **ORBA/OAPC Marketing & Communications Initiatives**
Abigail Wright Pereira, Director, Marketing & Communications, ORBA



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STRONG ASPHALT OFFERING SPELLS *success* AT THIS YEAR'S ACADEMY

by Steve Pecar

The challenge of any industry is to stay ahead of the curve not only when times are good, but also when faced with uncertainty. But if there is one thing the pandemic has taught us, it's that the pavement industry is up to the challenge in preparing for what comes next.

That made the 2021 ORBA Road Building Academy program all the more imperative. Despite a challenging year, road builders remain eager to be engaged and ready to meet the road ahead, and the Academy helped lead the way.

This year the Academy was held as a virtual event from February 22 to 26 and featured twenty-six courses in the areas of management and leadership, business and professional, technical and safety, and law and legal matters.

Three asphalt-focused courses were offered: a new course, Fundamentals of Asphalt Plant Operations; Practical Solutions in Hot Mix Technology 2.0; and, for the second year in a row, the Asphalt Institute's Paving Inspector Course.

"The Road Building Academy was launched in 2007, so it has been around for quite some time," says Abigail Wright Pereira, ORBA's Director of Marketing and Communications. "It is an important part of what we do and gives us the opportunity to show that we are at the forefront of the industry, leading the way and providing world-class instruction to participants by giving them the tools they need to adapt to current challenges."

She says courses are designed for everyone in the industry and geared to exploring hot topics as well as providing a foundation to building a career. Each year, ORBA's Education Committee determines what courses are offered based on industry trends and surveying members on their requirements for how best they can do their jobs. This year's Academy also included a University of Waterloo project management certificate course. Wright Pereira says although the virtual setting provided a different atmosphere this year, the courses were no less challenging for the 222 participants.

TECHNICAL AND SAFETY

FUNDAMENTALS OF ASPHALT PLANT OPERATIONS



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TECHNICAL AND SAFETY

PRACTICAL SOLUTIONS IN HOT MIX TECHNOLOGY 2.0



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SINA VARAMINI
Ph.D., P.Eng., Research
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TECHNICAL AND SAFETY

PAVING INSPECTOR COURSE



AMMA WAKEFIELD
Canadian Regional Engineer,
Asphalt Institute



H. WAYNE JONES
P.Eng., Regional Engineer,
Asphalt Institute



"All of our instructors are at the top of their field; people used to solving problems and determining what is coming next in the industry," she says. "And they challenge you. It is not a passive learning experience; there is a lot of give-and-take. It was virtual this year, but we did everything we could to keep it engaging and make it interactive. It didn't matter if you were learning from home – you were called upon, you were interacting, and you were going to get the knowledge and training that you could take right away and apply to your job."

Doubra Ambaiowei, ORBA's Director of Technical Services, was one of the instructors involved in teaching two of the three sessions focussing on asphalt including Fundamentals of Asphalt Plant Operations. This new course was designed to generate interest in the job and promote quality work, as well as bridge the gap in the industry between workers who are transitioning out of the workplace and those who are coming in.

"Under our current system, there are a lot of older workers running the plants and, as they retire, there are concerns about who is going to take on these jobs," says Ambaiowei. "The transfer of knowledge to the younger generation is important, so the course deals with that challenge by teaching the fundamentals of producing hot mix asphalt in the plant and the maintenance and operational requirements of running the plant."

Practical Solutions in Hot Mix Technology 2.0 was designed for those who are familiar with hot mix asphalt paving operations, and provided a platform to share and discuss practical experiences with the product and the technology.

Ambaiowei says the shared knowledge that was presented at this session was invaluable as it addressed many of the challenges everyone faces.

"There was a timely discussion on warm mix asphalt and some of the barriers that we encounter," he says. "By having the discussions with the participants and hearing what they have to say, we have something that we can now go back to MTO with and tell them about the issues we face."

With regard to the Asphalt Institute's Paving Inspector Course, offered for the second year in a row, Ambaiowei stresses its importance, saying qualified people are needed to watch over the quality of asphalt once it is on the road, especially since it has become an issue with the stakeholders. "We want qualified inspectors who can say what they expect during the production or the placement of the mix and let people know the key things they should be looking out for."

Ambaiowei says the asphalt courses were a valuable learning experience for all who attended, providing students with fresh insight and knowledge from those who have been in the business for many years. "The objective is to provide not only quality instructors, but also to have a quality program in place that will help to provide a better quality pavement in the industry," he says. "I think we achieved that."

As for next year, Wright Pereira says ORBA is planning for the 2022 Road Building Academy to return to formal in-class training at the BMO Institute for Learning in Toronto. If not, the experience of 2021 shows that a virtual experience can be successful and will be welcomed by an audience willing to learn. ■

COMMUNICATION AND TEAMWORK BEST PRACTICES AT SPRING OPERATIONS SEMINAR

by Lara Henry

Anyone who has watched the Apollo 13 movie knows that the 1970 mission to the moon almost ended in disaster for the three astronauts when an oxygen tank exploded two days after launch. Incredibly, after four days of herculean effort, the astronauts splashed down safely in the Pacific Ocean. This remarkable achievement could not have happened without the exceptional communication and teamwork between the people on the ground and the crew in space.

While a paving project may not be on the same scale as a mission to the moon (although it may sometimes feel like it), communication and teamwork are just as critical to ensuring a successful outcome. That was one of the key messages at OAPC's Spring Operations Seminar held virtually on March 25.

From paving with PMAC to staying safe on the job, the more companies and industry work together and discuss issues, the more they can work on solutions to problems. Communication and teamwork also encourage the sharing of best practices and provide an opportunity to develop innovative products and techniques.



Night paving in echelon with PMAC on Highway 407 West. (Yellowline)

PANEL DISCUSSION ON POLYMER MODIFIED ASPHALT CEMENT MIXES

MODERATOR: Mike Deckert, Flo Components

PANELISTS: Paul Holroyd, Multisolv Inc. • Donn Bernal, Corfinium Solutions • Kent MacCaskill, R.W. Tomlinson Ltd. • Tim Roussy, Astec • Kyle Martin, Fermar Paving Ltd. • Steve Gostis, Toromont Cat

Polymer modified asphalt cement, or PMAC, is a value-added formulation that incorporates synthetic polymers into the binder to produce a high performance mix. Specifications are starting to specify the use of PMAC because of its effectiveness with extreme temperature fluctuations and resistance to wear and tear.

With the greater use of PMAC, contractors are learning new and different ways of handling this unique mix. The panelists discussed PMAC at the plant, how it affects storage and handling, and its tendency to stiffen up as it cools. They looked at the increased power usage and wear and tear on the machinery, and what to do with the potential issue of blocked pipes, valves and gates.

Next the discussion turned to PMAC at the worksite, particularly in regard to transporting and handling the asphalt through to the paving train. Panelists considered the best way to maintain temperatures through the whole process, and the use of release agents. They weighed in on how to mitigate rubber tire pickup and shared machine maintenance best practices when using polymer asphalts.

The panelists concluded that there will always be change, and with every new product the industry will need to adapt. They stressed that communication is key when dealing with these new products, and recommended asking the plant operators, roller operators, mechanics, and crews in the field for their input. Their suggestions for changes could have a big impact and significant cost savings.

Key takeaways from the PMAC session:

STORAGE AND HANDLING AT THE PLANT

PMAC should not be stored for an extended period of time and ideally should be used that day. Consider having just-in-time delivery of PMAC from the asphalt cement terminal.

If it does have to be stored overnight, PMAC has to be kept at a higher temperature, especially in colder weather. However, too much heat can reduce the performance of the product.

At the asphalt cement terminal, a cross linker is added in with the polymer during the production process. The cross linker keeps the polymer suspended within that asphalt cement. But separation is possible if it is kept too long which is why just-in-time delivery of PMAC is advised.

It's important to have polymer screens in the unload pumps. All piping and pumps should be insulated.

Operators may have to increase the size of lines to accommodate polymer modified cement. Another tip is to simplify the lines from the storage tank to where the AC is mixed with the aggregate to reduce the chance of the lines plugging up.

A good practice when loading the trucks in the morning is to load 1 and 2 and move them to the side, then load 3 and 4 and send them to the job site first. They will have the mix from the hottest part of the silo. That will help the equipment on the paving train get everything up to temperature and make it easier to keep things clean.

DEMANDS ON EQUIPMENT

It is important to have the right wear plates, and AR400 steel is probably the most preferred for any wear items even in asphalt plants. The extra torque it takes to run this product is going to find those weak points at the plant. From an operational standpoint, it's important to make sure everything is well maintained and looked after. Pay attention to motor start-up as well.

RELEASE AGENTS

Release agents should only be sprayed onto the active surface of the tires, and the spray bar should be as close as possible to the tires.

It's important to read the label to know whether it's recommended to cut the release agent. There are three different types of release agents: soap, active release agents, and the barrier types. Cutting a soap release agent is simply diluting it. The active and the barrier agents are more difficult to cut because they are far more prone to separation.

To select a release agent, first test it to make sure it won't affect the AC or tires.

RUBBER TIRE PICKUP

The best practice is to look at the rubber-tire roller and make sure everything is being done to keep the tire temperature close to the mat temperature. Maintaining proper temperature, both of the tire and the mat, is critical for avoiding pickup. The skirting should be properly installed with no gaps and at the right height to the ground. Temperature sensing systems for the tires and pavement can also help.

Proper tire pressure is important. Sprayers need to be correctly positioned. Fogging nozzles rather than spray tip nozzles may be helpful. Release agents also help. Most operators will need to tweak their systems to find what works.

MAINTENANCE AND CLEANING OF EQUIPMENT

Ongoing preventative maintenance on equipment is key, and tires and hoses may need to be changed regularly. Infrared heaters can also affect the water spray systems. Rinsing after the job can reduce surfactant damage.

It is important to thoroughly clean equipment at night and especially in the fall before putting equipment away, and it needs to be scheduled in. There is more clean-up required with PMAC at the end of the shift to make sure the equipment is ready the next day.

For more information and tips for working with PMAC, please refer to the summer 2018 and summer 2020 issues of *ASPHALTopics* available on the OAPC website.

2021 LABOUR, TRAINING AND SKILLS DEVELOPMENT UPDATE

Matthew Neundorf, Provincial Specialist, Ministry of Labour, Training and Skills Development (MOLTSD)

On February 2, 2021, the MOLTSD launched the *Stay Safe All Day* COVID initiative. The campaign focuses on compliance with COVID precautions particularly with safety during lunch and breaks, and before and after shifts.

From January 1, 2016 to December 31, 2020, over 2,500 orders were issued by the ministry, with 25 per cent (and the most prevalent) of all orders pertaining to Traffic Protection Plans (plan not developed, not communicated or not implemented). There were 383 stop work orders issued with non-compliant traffic protection plans as the most common reason, followed by equipment operation, fall protection, excavation compliance and guardrail compliance.

The frequency of critical injuries across all three industries remains fairly constant with an average of 4.8 number of critical injuries per sector per year for asphalt paving, 4.2 for bridge construction, and 10.8 for highway and road construction. In addition, over the same time frame 13 members of the public were killed around these projects as reported to the ministry. This needs to change. A safety culture is the most effective way to ensure everyone feels and is safe.

OAPC COVID-19 ASPHALT INDUSTRY BEST PRACTICES GUIDE

Doubra Ambaiowei, Director, Technical Services, ORBA

In June 2020, OAPC developed the *COVID-19 Asphalt Industry Best Practices Guide* in response to the impact of the COVID-19 pandemic. The guide emphasizes what to know and do to reduce any health and safety risk related to COVID. It includes examples of enhanced safety protocols such as using electronic ticketing where possible, as well as developing company plans and policies for risk mitigation and tracking and managing infections.

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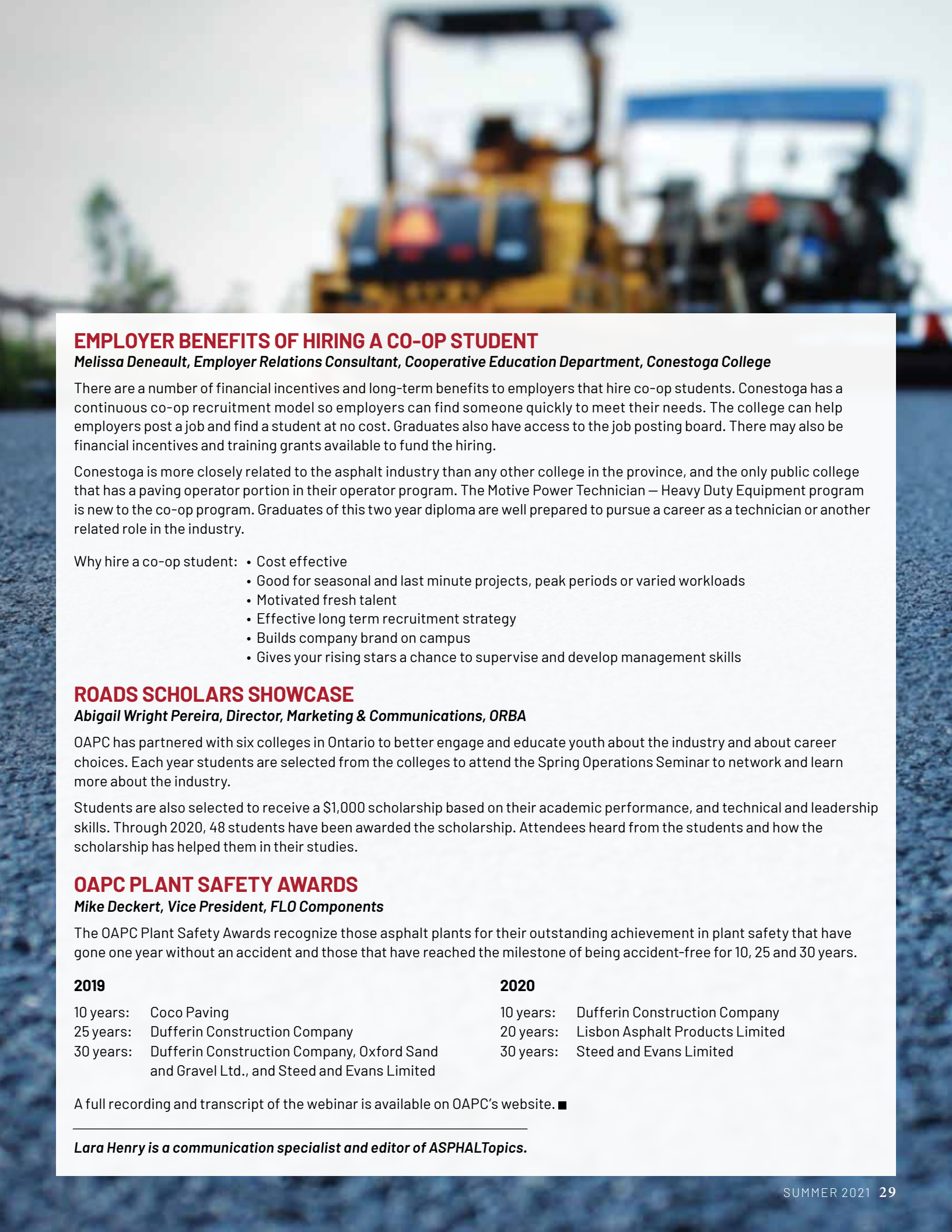
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EMPLOYER BENEFITS OF HIRING A CO-OP STUDENT

Melissa Deneault, Employer Relations Consultant, Cooperative Education Department, Conestoga College

There are a number of financial incentives and long-term benefits to employers that hire co-op students. Conestoga has a continuous co-op recruitment model so employers can find someone quickly to meet their needs. The college can help employers post a job and find a student at no cost. Graduates also have access to the job posting board. There may also be financial incentives and training grants available to fund the hiring.

Conestoga is more closely related to the asphalt industry than any other college in the province, and the only public college that has a paving operator portion in their operator program. The Motive Power Technician – Heavy Duty Equipment program is new to the co-op program. Graduates of this two year diploma are well prepared to pursue a career as a technician or another related role in the industry.

Why hire a co-op student:

- Cost effective
- Good for seasonal and last minute projects, peak periods or varied workloads
- Motivated fresh talent
- Effective long term recruitment strategy
- Builds company brand on campus
- Gives your rising stars a chance to supervise and develop management skills

ROADS SCHOLARS SHOWCASE

Abigail Wright Pereira, Director, Marketing & Communications, ORBA

OAPC has partnered with six colleges in Ontario to better engage and educate youth about the industry and about career choices. Each year students are selected from the colleges to attend the Spring Operations Seminar to network and learn more about the industry.

Students are also selected to receive a \$1,000 scholarship based on their academic performance, and technical and leadership skills. Through 2020, 48 students have been awarded the scholarship. Attendees heard from the students and how the scholarship has helped them in their studies.

OAPC PLANT SAFETY AWARDS

Mike Deckert, Vice President, FLO Components

The OAPC Plant Safety Awards recognize those asphalt plants for their outstanding achievement in plant safety that have gone one year without an accident and those that have reached the milestone of being accident-free for 10, 25 and 30 years.

2019

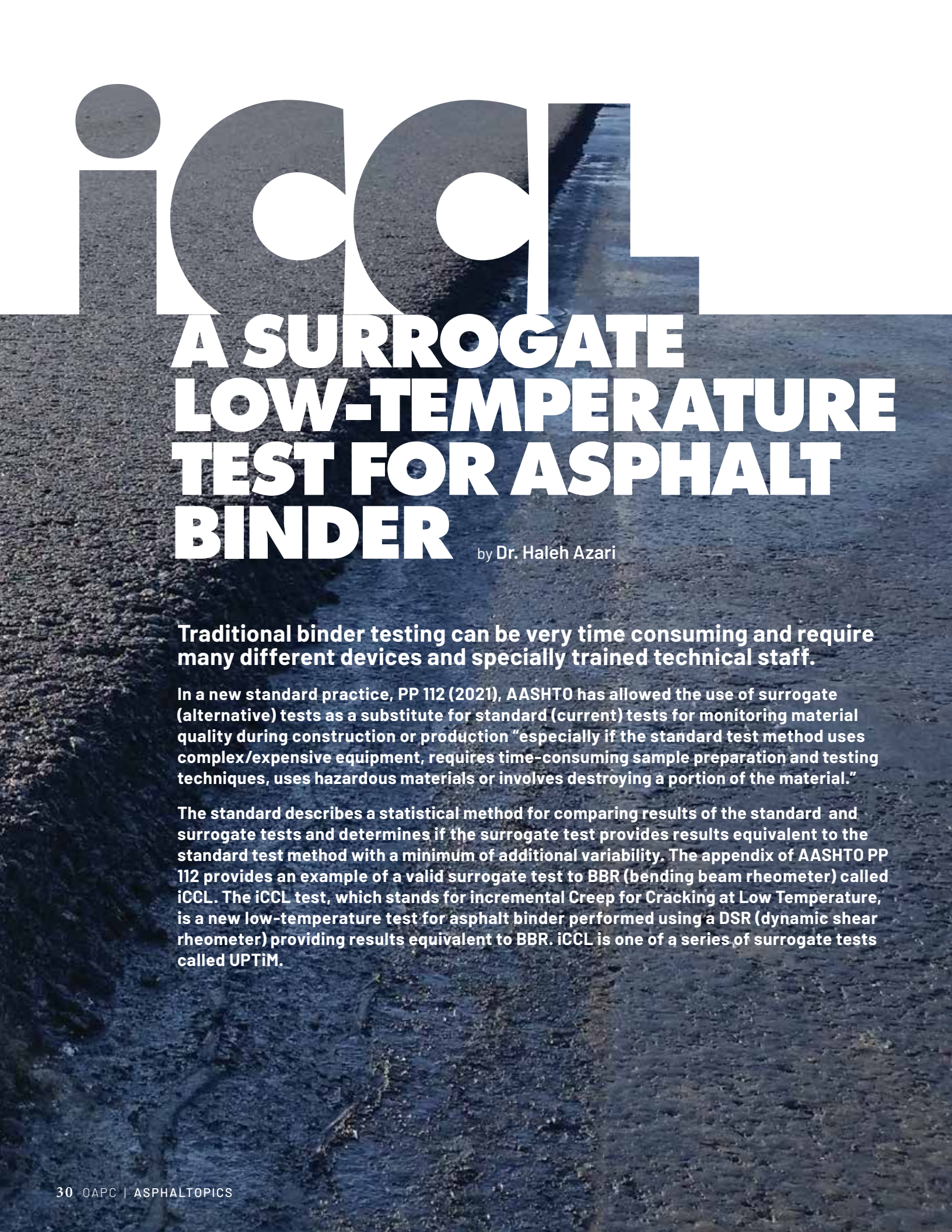
10 years: Coco Paving
25 years: Dufferin Construction Company
30 years: Dufferin Construction Company, Oxford Sand and Gravel Ltd., and Steed and Evans Limited

2020

10 years: Dufferin Construction Company
20 years: Lisbon Asphalt Products Limited
30 years: Steed and Evans Limited

A full recording and transcript of the webinar is available on OAPC's website. ■

Lara Henry is a communication specialist and editor of ASPHALTopics.



iCCCL

A SURROGATE LOW-TEMPERATURE TEST FOR ASPHALT BINDER

by Dr. Haleh Azari

Traditional binder testing can be very time consuming and require many different devices and specially trained technical staff.

In a new standard practice, PP 112 (2021), AASHTO has allowed the use of surrogate (alternative) tests as a substitute for standard (current) tests for monitoring material quality during construction or production “especially if the standard test method uses complex/expensive equipment, requires time-consuming sample preparation and testing techniques, uses hazardous materials or involves destroying a portion of the material.”

The standard describes a statistical method for comparing results of the standard and surrogate tests and determines if the surrogate test provides results equivalent to the standard test method with a minimum of additional variability. The appendix of AASHTO PP 112 provides an example of a valid surrogate test to BBR (bending beam rheometer) called iCCCL. The iCCCL test, which stands for incremental Creep for Cracking at Low Temperature, is a new low-temperature test for asphalt binder performed using a DSR (dynamic shear rheometer) providing results equivalent to BBR. iCCCL is one of a series of surrogate tests called UPTiM.

WHAT IS UPTiM?

UPTiM stands for Unified Performance Testing using incremental Method. The UPTiM tests are performed using MCR (modular compact rheometer) UPTiM from Anton Paar and UPTiM software. UPTiM tests are for low, intermediate (fatigue), and high temperature properties of asphalt binder, emulsion, and composite mastic. The tests are based on a unified concept of incremental testing, meaning that they are conducted in several increments of stress or temperature. In other words, multiple tests are performed on one sample. All UPTiM properties, including iCCL low-temperature properties, are determined using m^* , which is the permanent strain rate at the steady state of deformation.

iCCL TEST DESCRIPTION

Similar to BBR, iCCL is a creep test, performed on a DSR. It uses an 8 mm plate and 0.5 mm gap and is performed at a fixed temperature of -5°C . Using a library of 30,000+ iCCL results at multiple stresses/temperatures as a reference database and optimized Artificial Intelligence Neural Network (ANN), iCCL creeps are built at critical temperatures of PG+10 and PG+4 $^{\circ}\text{C}$. Using another large dataset of iCCL and BBR results for over 1,500 binders and the ANN process, BBR creeps are built for the same critical temperatures. AASHTO T 313 and R 29 formulas are then used to calculate m-value, S, PG and Delta Tc from the BBR curves. »



Figure 1. UPTiM device

FEATURES OF THE iCCL TEST

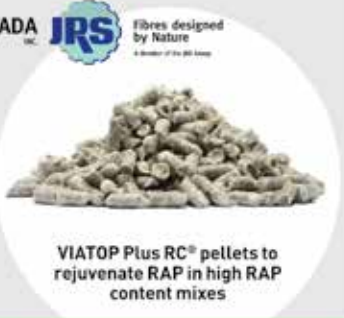
iCCL HAS SEVERAL USEFUL FEATURES FOR IMPROVED SAFETY, COST-EFFECTIVENESS, TIME-SAVING, AND PRODUCTIVITY IN MATERIALS TESTING:

- iCCL provides continuous low-temperature PG (LTPG), as well as m-value, S, and ΔT_c .
- Results of iCCL are statistically equivalent to BBR (AASHTO T 313, R 29, ASTM D6648, D7643) as verified using the ASTM E2935 and AASHTO PP 112 (2021) Standard Practices.
- iCCL is at least two times more precise than BBR as shown from the test precision estimates determined from a round robin testing in seven laboratories.
- iCCL is significantly faster since test results are ready in about half an hour.
- iCCL is significantly safer since chemical solvents are not used for cleaning.
- Sample preparation is easy since samples do not need to be molded/demolded or degassed.
- iCCL can be performed on a variety of materials (aged or unaged binder and mastic).
- iCCL is suitable for screening, quality control and quality acceptance (QC/QA), purchase specification, field testing, as well as research.
- All steps of the tests including sample trimming/mounting/conditioning and data postprocessing are automated for reduced time and increased precision.
- Performing the iCCL test requires minimal training and does not need trained technicians.
- iCCL is cost effective – savings from using iCCL are estimated to be \$50K/year.

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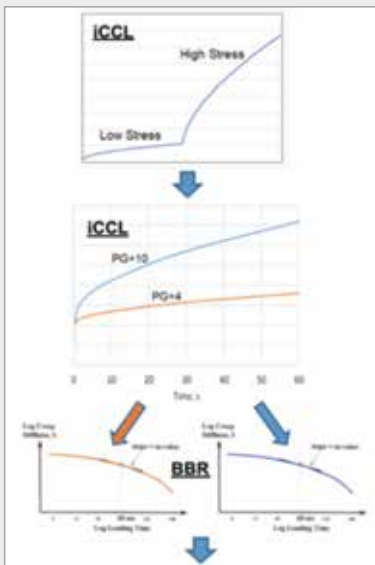
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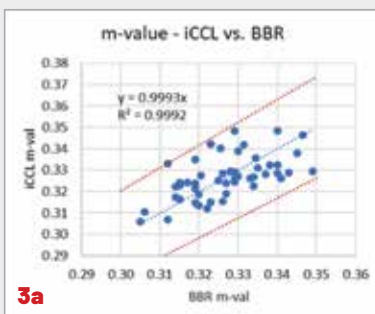


*m1, S1, m2, S2, PG(m), PG(S),
Continuous PG, Delta Tc*

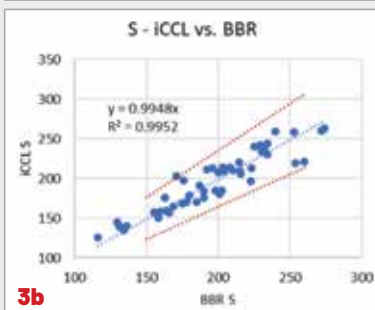
Figure 2. iCCL process to provide equivalent results to BBR

Binder PG	Number of Binders
58-28	10
58-34	1
58H-28	1
58H-34	3
58S-28	1
64-22	13
64-28	9
64E-22	2
64H-22	1
64S-22	1
70-22	3
76-22	5

Table 1. Round robin binders



3a



3b

Figure 3. Relationship of BBR and iCCL for (a) m-value and (b) for S

FEATURES OF MCR UPTiM

THE DSR FOR PERFORMING THE iCCL TEST HAS SEVERAL DISTINCTIVE FEATURES:

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- portable and can be used in a construction site
- ideal device for QC/QA and field use
- featured with an integrated light to notify when test is completed
- precise temperature control
- fully automatic temperature calibration
- suitable for testing at low temperature to provide results equivalent to AASHTO T 313 /ASTM D6648

Figure 2 (left) shows the process of determining the low-temperature properties from performing the iCCL test.

VERIFICATION OF iCCL TEST

The iCCL test has been developed and verified using a large number of binders. The LTPG of 583 binders from 30 agencies, covered over 100 crude sources and including all existing PG grades, were compared and iCCL has provided the same results as determined by BBR.

ROUND ROBIN TESTING OF iCCL

In 2019, a U.S. round robin study was conducted in seven laboratories using 50 binders, having twelve commonly used PG binder grades, from twelve different binder sources. The binders were received from the three state Departments of Transportation (DOTs) of Delaware, Minnesota, and Ohio, where BBR properties were determined. Seven laboratories of DeIDOT, INDOT, MnDOT, Rutgers University, Ingevity Lab, Mississippi DOT and Pavement Systems participated in the round robin study and performed the iCCL tests. Table 1(left) provides the binder grades and the number of each grade used in the study.

iCCL vs. BBR: m-value and S

Figure 3a and 3b (left) show the m-value and S results from the round robin study. As shown from the figures, iCCL and BBR results for both m-value and S are very well correlated. Also shown from the graphs, the difference between iCCL and BBR m-value or S does not exceed the AASHTO T 313 Multilaboratory d2s% limits, which are 6.8% for the m-value and 17.8% for S, shown as red dotted lines.

iCCL vs. BBR – PG(m) and PG(S)

Figure 4a and 4b (right) show the continuous performance grade determined from m-value, PG(m), and the performance grade determined from S, PG(S) based on the AASHTO R29 formulas and threshold values (Threshold of 0.3 for m and Threshold of 300 for S). As indicated from the figures, the CCL and BBR results for both PG(m) and PG(s) are very well correlated.

iCCL vs. BBR – ΔTc and Continuous LTPG

Figure 5a and Figure 5b (right) show the relationships of the BBR and iCCL ΔTc and continuous low-temperature PG from the round robin study. As indicated from the Figure 5a, the LTPG from iCCL and BBR are very well correlated, and the differences between the BBR and iCCL continuous low-temperature PG (shown as green dotted line) are within the calculated multilaboratory d2s% from AASHTO T 313 (9.6 %). Also seen from Figure 5a, the d2s% of iCCL (red dotted line) is about half of the d2s% of BBR (green dotted line). Figure 5b shows that the differences between the BBR and iCCL ΔTc reside within the iCCL Multilaboratory d2s of 1.33 °C shown as red dotted line.

iCCL LTPG PRECISION ESTIMATES

The multi-laboratory d2s for iCCL LTPG is 1.33°C. Comparison of the d2s for BBR, which is around 2.7°C from AASHTO T 313 and 3.9°C from ASTM D6648, indicates that iCCL is two to three times more precise than BBR.

OTHER APPLICATIONS OF iCCL

iCCL can be performed on a variety of materials for different applications and provide low-temperature properties equivalent to those from current test methods. Ultra thin film oven

(UTFO) aging is a new method of aging which is applied to the original binder at 150 °C for 45 minutes in the UPTiM DSR oven prior to the iCCL test. iCCL for original and UTFO binders is ideal for the terminals and refineries.

iCCL also has application for testing UTFO-aged residue of micro-recovered emulsified asphalt, where micro-recovery is conducted for one hour at 60 °C in the DSR oven prior to performing the UTFO aging and the subsequent iCCL test.

Another application of iCCL is testing composite mastic. Composite mastic is the fine portion of the mixture and is easily separated from the mixture. It has traces of mixture components

including RAP and any other additives. The results of testing mastic are equivalent to results from testing extracted binder.

The iCCL test on mastic can also be used for determining a grade loss of binders due to physical hardening. The iCCL results are well correlated with both BBR and extended BBR results of extracted binders of 67 mixtures from Ontario. ■

Dr. Haleh Azari is the president of Pavement Systems LLC, a research and development company in the field of pavement engineering and the developer of the UPTiM tests including iCCL as a surrogate to existing referee tests.

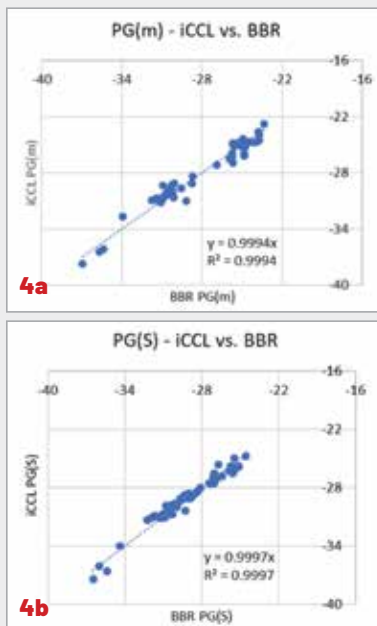


Figure 4. Relationship of BBR and iCCL for (a) PG(m) and (b) PG(S)

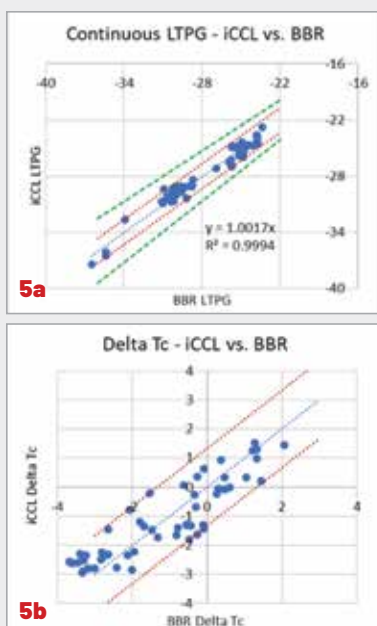


Figure 5. Relationship of BBR and iCCL for (a) continuous low-temperature PG and (b) Delta Tc

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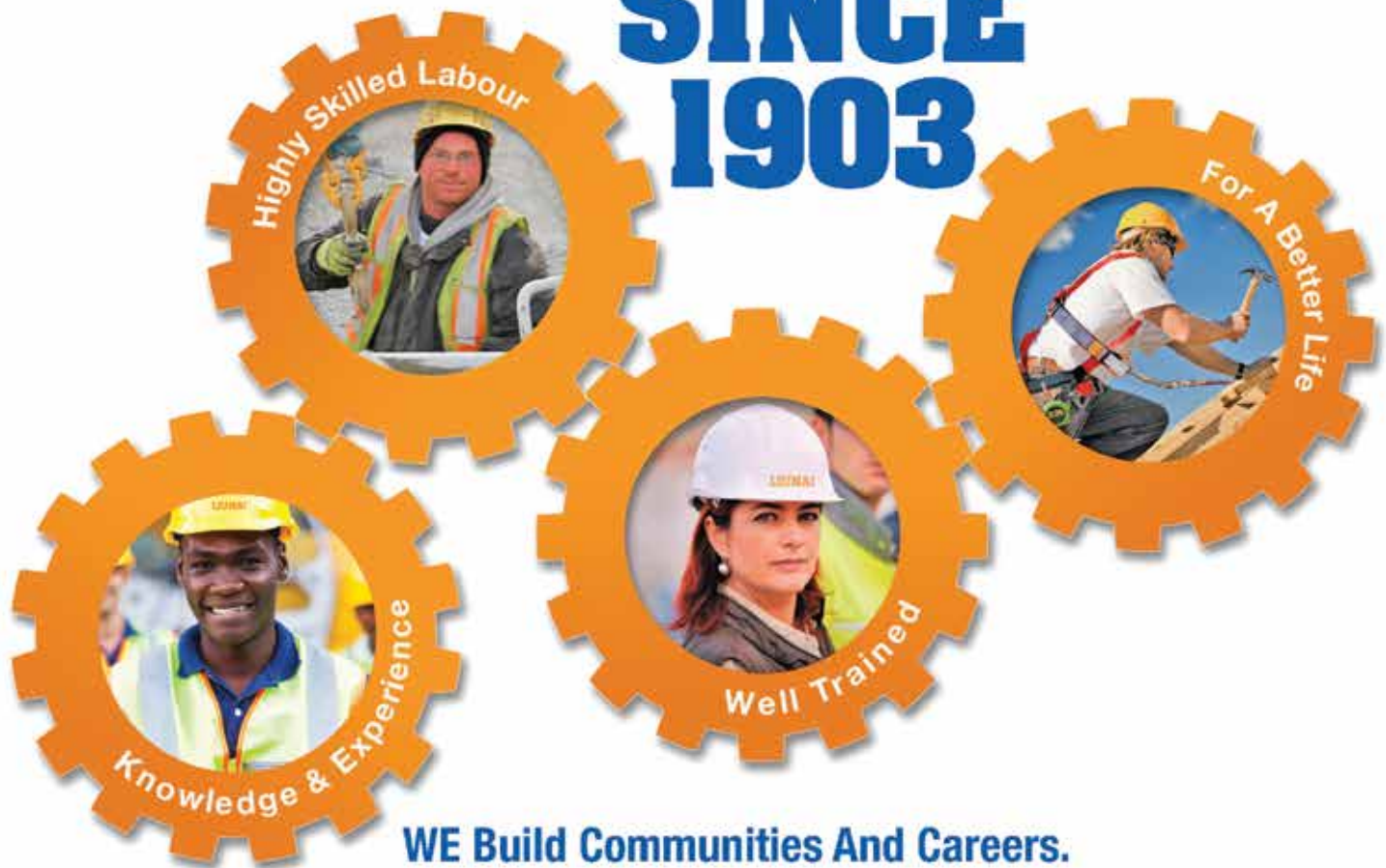
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George Aggio always on-call to fix it at Coco



George Aggio

At Coco Paving, when they call for the doctor it may be an emergency, but not a medical one. The doctor at Coco is George Aggio, and his nickname is well-deserved, because if something goes wrong, he is the man to fix it.

"Just like a doctor, you tell him what the symptoms are and he'll tell you what the problem is," says Site Superintendent Donato Rita. "I've never seen anyone like him. He always knows what to do."

As General Superintendent, Asphalt Plants, at Coco, Aggio has made it his business to make things right by ensuring that machinery runs properly, repairs are made, efficiencies achieved, quality is controlled and, ultimately, asphalt keeps flowing.

While 30 years of experience has helped Aggio learn how to figure things out and make things happen, his colleagues know there is much more going on than training and years of service. Some might even say it is organic.

"It's how his mind works," Rita continues. "He can see it all come together in his head. I might encounter a problem and be left wondering what to do. But when George tackles a problem he knows immediately what needs to be done. He really keeps things running and is always ready and willing to help out."

Aggio is humbled by the accolades, but chalks up his work ethic to his willingness to strive to do the best he can each day so that he doesn't let his employer, workmates and customers down.

Like many in the asphalt business, Aggio started off doing a bit of everything, but all the while he was watching what was happening around him and taking it all in. He says he was intrigued by how everything worked, whether it was the techniques and methods used by those with years of experience, or the innovations that were taking place at the time.

He was most captivated by the running of the asphalt plant, how the mix was made, and meeting the specifications that customers required. "I got to see that providing quality customer

service was one of the most important aspects of the job," Aggio says. "It all started from there."

To meet the demands of the customers, he began to learn all he could to deliver the right product. That often meant working late and doing whatever was needed to be done to get the job right. While some might consider the time and effort put in as work, Aggio has always regarded it as learning, which has driven him and provided the edge necessary to accomplish his goals.

"I spent a lot of my personal time studying the plants and operations," he says. "I studied the science of it, the aerodynamics and efficiency, how air flows, pneumatics and hydraulics and mechanical parts, but doing so to maintain customer relationships."

After 10 years in, Aggio found himself tearing down, building and running plants. "If something wasn't right, I wouldn't sleep at night. You get a lot of experience doing that. You learn the right way and the wrong way. But I try to avoid the wrong way. What I am saying is try to do it the right way the first time. It saves a lot of time and trouble."

Eventually more advancement came his way and although he was reluctant to accept, he was told if he didn't accept the promotions somebody less qualified would be hired to be his boss. "That was the selling point," he laughs.

Now, with about 30 plants in operation around the country, Aggio is kept pretty busy, going where he is needed, helping out when asked and generally fixing, maintaining and advising on any type of work that is needed to keep the operations running. And he's not finished.

"I've been around for 30 years and every day is like my first day because something else happens," he says. "I think that's probably the best thing I can say about this industry. It's like a never ending university. You always keep learning, and I like that." ■



TECHNICALLY SPEAKING

Doubra C. Ambaiowei
Director, Technical Services

Asphalt mix performance testing: A path forward for paving in Ontario

It is a known fact that a higher quality of any product has a positive impact on its performance. However, satisfying the quest for quality can add cost. To minimize or eliminate any negative cost associated with the quality of any product, it's important to get it exactly right the first time. Herein lies the challenge within the asphalt and/or road building industry, not only in Ontario, but the world over.

Stakeholders (owners and contractors) want to construct smooth and durable, long-lasting asphalt pavements. To increase the durability of an asphalt pavement, the mix design and production of the asphalt **MUST** ensure that the end product can resist factors such as age hardening of the asphalt cement, disintegration of the aggregate and stripping of the asphalt film from the aggregates, and ultimately rutting and cracking of the pavement. These coupled with placement best practices during new construction, rehabilitation, and/or maintenance of the pavement structure ensures that the desired quality and material properties such as impermeability, strength, stability, stiffness, flexibility, and fatigue resistance are maintained for long-term performance.

The asphalt paving industry in Ontario is keen on finding and implementing end-product performance measurements for hot mix asphalt (HMA). However, there are challenges and concerns surrounding a number of issues such as:

(1) measurement and/or evaluation of the properties of the mix; (2) measurement of properties of the constructed pavement to meet specification requirements; (3) implementation of performance specifications; (4) effect on current mixes; (5) cost; (6) production, and (7) constructability. These challenges remain areas for continuing dialogue, education and research.

Implementing performance testing in Ontario could be the next major step to ensuring reliability and fast-tracking innovation in mix design and construction practice given the variabilities associated with materials, traffic and the changing climatic conditions. It may also be the opportunity to switch the province completely from the older Marshall mix technology to Superpave, since controlling volumetric properties alone is not considered sufficient to ensure good performance. The question is whether or not mix design procedures require asphalt performance properties to be measured in addition to the usual volumetric properties, or if they would trigger a reduction on dependence on volumetric testing for acceptance.

The use of recycled materials is also an important consideration. Most stakeholders question if incorporating performance tests would permit for flexibility in asphalt

ADVERTISERS' *Spotlight*

mix designs, especially with the use of reclaimed asphalt pavement (RAP) and the innovative applications of other recycled materials such as crumb rubber and, in recent times, plastics. There is concern by owners that the high RAP mixtures would be possible in Ontario with the adoption and implementation of warm mix asphalt technology, use of rejuvenators and softer asphalt binders, and increased asphalt cement contents. By implementing performance tests, these techniques aimed at improving the durability of asphalt mixtures could be verified.

There are numerous performance testing methods to address the distress mechanisms in asphalt pavements. At this time, the Ontario Ministry of Transportation (MTO) has identified **three test methods as the three most promising approaches for performance testing in Ontario**. They are:

1. the Illinois Flexibility Index Test (IFIT) using the Semi-Circular Bend (SCB) test – reflecting performance at intermediate temperatures;
2. the Hamburg Wheel Tracking (HWT) test – reflecting performance at high temperatures; and
3. the Disk-shaped Compact Tension (DCT) test – reflecting performance at low temperatures.

While suitable tests, limits and Quality Assurance (QA) thresholds can be adopted from other jurisdictions with similar climate and traffic configurations, it is best to base performance criteria on the evaluation and understanding of the performance of local materials. Therefore, since selecting these tests, MTO has been engaging in post-production testing and evaluation of samples taken from actual projects towards developing QA acceptance criteria. The inherent variabilities within these test methods continue to be evaluated through in-house correlations. Monotonic loading cracking tests have been observed to have lower coefficients of variation, including SCB and the DCT tests.

Further to these efforts, OAPC continues to encourage MTO to include “**information-only testing**” in future contracts to help increase industry’s knowledge and potential investments in associated new testing techniques and equipment. Through various events and educational programs, OAPC also draws on the experiences of other departments of transportation to benefit members and the industry. It is hoped that the ongoing dialogue will enhance understanding and speed implementation.

In addition, through its recently formed Ontario Asphalt Expert Task Group (OAETG), OAPC is pursuing a five-year vision focused on three main goals:

1. Bridging the gap in knowledge in mix performance testing and acceptance;
2. Executing an industry exchange program on engineered mix designs/balanced mix designs; and
3. Adjustments to field evaluations and specifications. »

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The OAETG believes these initiatives will assist industry in having a better understanding of potential challenges and of how engineering material parameters can be achieved. This should lead to implementable approaches that can best ensure quality and safety for the user-public, as well as balance risks and save costs for the stakeholders.

In light of the above discussions, we can confidently say that Ontario is on the right path towards implementing performance testing for paving with asphalt mixtures. We must aim towards a structured, simplified system that is flexible in approach, measurable, and modifiable.

Stakeholders must continue to question and evaluate those strategies by ensuring that the approach for final implementation fits the situation. Fortunately, current efforts are taking the experiences of other departments of transportation into consideration. Stakeholders must continue to emphasize test simplicity, technician training, sample preparation, sensitivity to mix design parameters, correlation to field performance, ease of data interpretation and analysis, and equipment availability. Finally, contract language should clearly clarify the intent of the agencies, and define a contractor's liability. This builds and reinforces trust! ■



ENVIRONMENTAL ESSENTIALS

Steven Manolis

OAPC publishes Hot Mix Asphalt Safety Data Sheet

OAPC has published a generic Hot Mix Asphalt Safety Data Sheet (SDS) to assist members with health and safety compliance. A copy of the SDS may be found under the *Publications & Education* section of the OAPC website.

The SDS outlines safety information in sixteen sections that includes material and hazard identification, information on ingredients, first aid, and handling and storage. For example, under Section II: Hazard(s) Identification, the SDS notes that “HMA is not classified as dangerous for supply or use (not a known health hazard). However, contact with heated material can cause thermal burns.” Wearing various protective gear is advised.

The SDS is an integral part of the Workplace Hazardous Materials Information System (WHMIS) that is intended to support the communication of thorough and consistent health and safety information to employers and workers about the hazards or workplace

products they may be exposed to. WHMIS is a national standard across Canada that is governed by federal, provincial, and territorial regulations.

WHMIS requires that information on hazardous products be communicated in three ways:

1. Labels affixed to containers of workplace products that meet the requirements of hazardous products;
2. Safety data sheets; and
3. Education programs for workers.

WHMIS requirements transitioned to an updated WHMIS program called WHMIS 2015 over a three year period between 2015 and 2018. WHMIS 2015 adopted the requirements of the Globally Harmonized System for the Classification and Labelling of Chemicals (GHS) which has been implemented by many countries internationally including the United States and those in the European Union. The intent is that employers



and workers will receive standardized product hazard information even when products are imported or exported between countries.

Members are advised to seek professional guidance if necessary to ensure that their SDS or related information developed or used by member companies complies with WHMIS 2015 regulations. Additional information may be found at www.ontario.ca/page/workplace-hazardous-materials-information-system-whmis. ■

Steven Manolis is General Manager at Coco Asphalt Engineering and chair of the OAPC Environmental Committee.

INDUSTRY NEWS

Thank you to our 2021 virtual Spring Operations Seminar sponsors!

At the virtual Spring Operations Seminar on March 25, 2021, 92 attendees listened to industry leaders and stakeholders discuss the latest technologies and best practices to prepare for the paving season ahead. Please go to [ORBA's website](#) to download the recording of the seminar. We are grateful to our sponsors for their contributions towards the success of this event.

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CONGRATULATIONS 2021 CONESTOGA ROADS SCHOLARSHIP RECIPIENTS!

MAIYA GLASSER, Heavy Construction Equipment Operator Program, Conestoga College

"I chose this program to gain skills that I can use in the construction industry and in my military endeavours as a reservist combat engineer. I found the program very enjoyable and I learned a lot of useful skills. Being able to spend every day outdoors and learn hands-on made for a fantastic college experience. I hope to continue to work in the construction field and gain more experience and equipment time. I am thrilled and grateful to receive this award and I have put it towards supplies and school expenses."

TYLER PATCHELL,

Heavy Duty Equipment Technician Program, Conestoga College

"To be honest, receiving recognition for my hard work means a lot to me. The money will be used for tools to get me started into the trade. I'm honoured."

RYAN HUGILL,

Civil Engineering Technologist Program, Georgian College

"I am honoured to be a recipient of the Ontario Asphalt Pavement Council Award for Excellence. I am the first person in my family to attend college. Growing up in a single parent home has not only posed financial and educational challenges, but has also helped me become aware of the value of college education. Without the generous support of fellows such as your organization, my educational commitment would be conflicting with financial need and burden. Thank you for taking this opportunity to help me achieve my goals and fight to live a prosperous and happy life!"

NICHOLAS LANING,

Civil Engineering Technician Program, Georgian College

"I am honoured to be the recipient of this award and so proud to be viewed worthy of this award and what it represents. It has been a pleasure to engage with faculty and fellow students over the last two years. I feel as though I have learned far more than I could have imagined when I decided to come back to school. I have thoroughly enjoyed the experiences that have challenged me and am looking forward to upholding and passing on the merits that this award stands for. This award was a surprise and a huge encouragement after working so hard. I truly am grateful. Thank you!"

CONGRATULATIONS ON 30 + YEARS OF LEADERSHIP IN THE ASPHALT INDUSTRY!

Angela Wilson recently retired as Sales Manager from Canadian Asphalt Industries Inc. Throughout her career she has been a leader in the industry. Angela served as an OHMPA director from 2010 to 2015 and was on the Membership Committee from 2017 to 2020. She was the founding president of CAWIC - Canadian Association of Women in Construction in 2005 where she helped empower women in the construction industry and fostered a community of women working in the asphalt sector. OAPC congratulates Angela on her retirement and thanks her for her service to OHMPA/OAPC and ORBA and for her 30+ years of paving the way for women in the industry.

2021 OAPC AWARD NOMINATIONS DEADLINES

Do you know someone who makes a positive difference in the industry through their leadership, innovation and service? If you do, please consider submitting your nomination for the 2021 OAPC Awards.

**NOMINATION SUBMISSION
DUE OCTOBER 29, 2021:**

- Bleeds Black Award
- Dr. Norman McLeod Award for Innovation

NOMINATION SUBMISSION DUE NOVEMBER 12, 2021:

- OAPC Honorary Life Membership Award
- OAPC King Beamish Excellence Award
- OAPC Earl Kee Volunteer of the Year Award
- OAPC Joe Bunting Mentorship Award

Please go to the [OAPC website](#) for full details.



Thank you

to our 2021 virtual Partners in Quality Seminar sponsors!

One hundred and twenty participants from across the province gathered for OAPC's second virtual Partners in Quality Seminar which took place on April 29, 2021. Speakers, attendees, and sponsors engaged in the seminar to discuss the latest research and technologies to achieve quality asphalt pavement in 2021. A key to building quality roads is building a solid relationship and partnership between road owners and industry. Please go to [ORBA's website](#) to download the presentations and seminar recording. A big thank you to our sponsors for helping to make this event possible.

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UPCOMING TRILLIUM AWARD APPLICATION DEADLINE

Since 2002, the Trillium Awards have recognized those plants that go above and beyond the already gold standard required by industry regulations. The Trillium Award sets the standard by which all others are judged – good plant operators who are also good corporate citizens.

Trillium Award applications are due **October 29, 2021**. Please go to [OAPC's website](#) for more information.

#ONGREATROADS CAMPAIGN IS BACK!

From 2013 to 2016, OAPC launched its #ONGreatRoads campaign in the summer months. The campaign resulted in hundreds of entries from the general public who posted a photo of their favourite road and shared the story of that road. The campaign is back! From June 29 to August 3, you can post a photo of your favourite road and tell us why on ORBA and OAPC's Twitter, Instagram, Facebook and LinkedIn platforms. Each week of the campaign there will be a draw for one \$100 gas gift card. All five winners' photos and stories will be featured in the fall edition of ASPHALTTopics. Good luck!



ORBA WEBINARS

ORBA webinars feature a diverse range of topics and speakers to help you gain unique insights and perspectives on the transportation infrastructure sector. The series aims to provide the road building community with a virtual space to stay informed and connected. Please go to [ORBA's website](#) to view upcoming webinars and to download recordings of all ORBA webinars.

A LOOK AT BELLEVILLE: THE IMPORTANCE OF ROAD REPAIR

On April 8, 2021, ORBA Director of Technical Services Doubra Ambaiwei was a panelist on the Canadian Automobile Association's Town Hall – A Look at Belleville: The Importance of Road Repair. Doubra presented on *Solving the Premature Cracking Problem in Ontario* and emphasized the importance of investing in and maintaining our roads, especially during the pandemic in order to keep essential goods and services moving. Go to [CAA's YouTube Channel](#) to view a recording of the webinar.

APPLICATIONS ARE BEING ACCEPTED FOR THE 5th ANNUAL MUNICIPAL PAVING PROJECT OF THE YEAR AWARD.



Please go to the [OAPC website](#) to download the application. Applications must be postmarked by **December 17, 2021**.

SAVE THE DATE

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THE LAST WORD

Angela Wilson

A journey celebrated

I could never have imagined that I would spend 30-plus years in the construction industry, an industry that did not even cross my mind as a viable option as a career. However, looking back, it doesn't surprise me that I ended up where I did given that early on in my childhood I would accompany my father to his plumbing jobs and was taught the value of hard work and to work with my hands. I wanted a career in "something", but I wasn't sure exactly what that was.

The journey began with a part-time office job with Dufferin Construction while attending university, which eventually led me to a full time position in purchasing. Eight years and three children later, Dufferin Aggregates offered me a position with their sales team. It wasn't long before Dufferin Construction presented an opportunity to work on an initiative to stockpile, crush and sell recycled asphalt and concrete aggregates at their asphalt plant sites and later also take on the role of hot mix sales. My final destination saw me joining the Bitumar family as Ontario Sales Manager in 2009, where I continued through the merger with Canadian Asphalt.

With little practical experience and lots of enthusiasm, I knew I needed to learn the business of selling construction materials from the ground up and jumped at the chance to attend as many of the courses and seminars offered by OHMPA (now OAPC), where I also volunteered on committees and served terms as a board director. Attending OHMPA/OAPC events and volunteering was such a valuable experience, allowing me to meet professionals in our industry and create lasting friendships. I highly recommend it!

I also got involved with CAWIC (Canadian Association of Women in Construction) when I was asked to attend a meeting of the Toronto Chapter of the U.S.-based NAWIC (National Association of Women in Construction) in 2002. There I met a group of professional women, all working in different aspects of construction with a common goal: we believed in the idea of a Canadian not-for-profit organization dedicated to the success of women in construction. In October 2005,

CAWIC was incorporated and I was appointed its first president. Through its leadership, mentorship, membership and partnerships, CAWIC continues to encourage and support women seeking a career in construction.

I would be remiss if I did not mention those individuals who supported and encouraged me throughout my career, and saw in me what, at the time, I did not — a passion to learn and the drive to succeed. From Dufferin Aggregates/Construction: Bruce Simpson, Paul Ostrander, Lloyd Ferguson and Peter Gamble. From the Bitumar family: Marc Theriault, Jean Lussier and Angelo Guglielmo. After the merger with Canadian Asphalt, I had the pleasure of working with Bruce Armstrong, Fernando Magisano and Ross Marshall to make for a powerful team at the end of my construction career journey.

Without knowing it, the career in construction found me, and for that I am ever thankful. It was also where I met my husband Don, my strength and support throughout my career. My journey has allowed me to meet so many talented, extraordinary people who care about their work and this industry. This is a great industry and talent doesn't always carry with it a long list of academia. Sometimes it's in the enthusiasm and a chance to learn that brings out the brightest stars.

With the next life's journey ahead, I am looking forward to travelling with Don, upping my game in golf, and spending more time with family, children, grandchildren and friends. Anyone who knows me knows this is definitely not my last word! Thank you to OAPC for the privilege of telling my story. ■

Angela Wilson was Sales Manager at Canadian Asphalt Industries Inc. until her recent retirement.

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