

ASPHALTopics

SUMMER 2020 | VOL33 | NO2



ONTARIO ASPHALT PAVEMENT COUNCIL

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Oliver Road, Township of Oliver Paipoonge, west of Thunder Bay. (Pioneer)

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CHAIR'S CORNER

Ivan Levac
Chair

Redefining essential

I will begin by stating how fortunate I am and what an honour it is to represent OAPC'S directors, members and associates as the 2020 chair.

This has quickly become an unprecedented year, and there are some obvious challenges to our industry with the restrictions due to the COVID-19 pandemic. That said, it is important to point out the good. Our industry is comprised of motivated, hardworking and skilled individuals who never cease to rise to a challenge.

Over the past two months, our industry has clearly demonstrated a tremendous ability to quickly adapt and react to a situation not previously encountered. Our increased focus on safety over the past several decades has put our members in a position where identifying, eliminating and mitigating unsafe situations through the development of safe work practices and safe job procedures have kept the vast majority of our workforce less affected than other industries.

OAPC has worked collectively with ORBA to provide constant and aligned messaging to the asphalt and roadbuilding industry. We have been quick to develop best practices and communicate through webinar sessions to provide support

to our members throughout this pandemic. I truly hope that all of our members have been able to benefit from these sessions and that they have helped you to carry on through these uncertain times with some certainty that we can do so while keeping our employees safe.

Our multiple committees have continued working towards improving our industry by adapting to web-based tools to ensure ongoing communication with all stakeholders, including the MTO. In fact, the MTO was quick to reach out to ORBA/OAPC as an industry partner to establish a weekly conference call to monitor the impact of COVID-19 on the road building industry. The efforts put forth by the committees and ORBA staff have continued to be commendable.

I will close off by giving credit to our workforce. The vast majority of the employees in our industry do not have the benefit of working from home. You proudly come to work every day to build and maintain municipal and provincial infrastructure so that all of society can benefit from its use. The work you perform has been deemed essential and that is a testament to the significance of the great work you do. To all of the employees in our industry who come to work every day, while confronting the inherent risks of our work, THANK YOU! ■



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OPERATIONS CORNER

Ashley Manson
Manager, Governance Administration

Adapting during a global pandemic

In the midst of the COVID-19 global pandemic, daily life as we know it has taken an unprecedented turn and operations at OAPC have not been exempted from the new, physically distant way of doing business.

Since the onset of escalating COVID-19 concerns, our top priority has been to provide direction on health and safety best practices, as well as develop, monitor and communicate relevant industry-wide updates to our members. As the council moved to exclusively remote operations mid-March, our mission has remained to provide quality support, advocacy, research, education, and collaboration.

There is no question that adaptability has been a necessary tool in navigating this new reality. We've been able to leverage already existing modes of communication, such as timely and regular bulletins and website advisories, while enhancing capabilities for virtual and digital programming

like townhall meetings, interactive webinars and video conference calls. All council and committee meetings have successfully transitioned to video conference formats which have enabled the council's governance mandates to be maintained.

Unfortunately, the much-anticipated Spring Operations seminar was the first event to be cancelled in early March. On the program this year was a panel session to share insights and perspectives on some of the production and placement challenges with polymer modified asphalt mixes and the use of release agents. Instead, panelists were interviewed and are featured in this issue of *ASPHALTopsics*. Be sure to check that out!

For the first time in history, OAPC's annual Partners in Quality (PIQ) road tour was offered via complimentary webinar on May 11 with a total of 287 registrants. Those who participated were able to receive quality updates

on operational and industry impacts through the seven stakeholder presentations.

We have continued to adapt by successfully developing the Asphalt Technical Symposium into a full-day webinar on June 16, providing a valuable program to our members with practical solutions and insights widely shared through relevant and stimulating presentations.

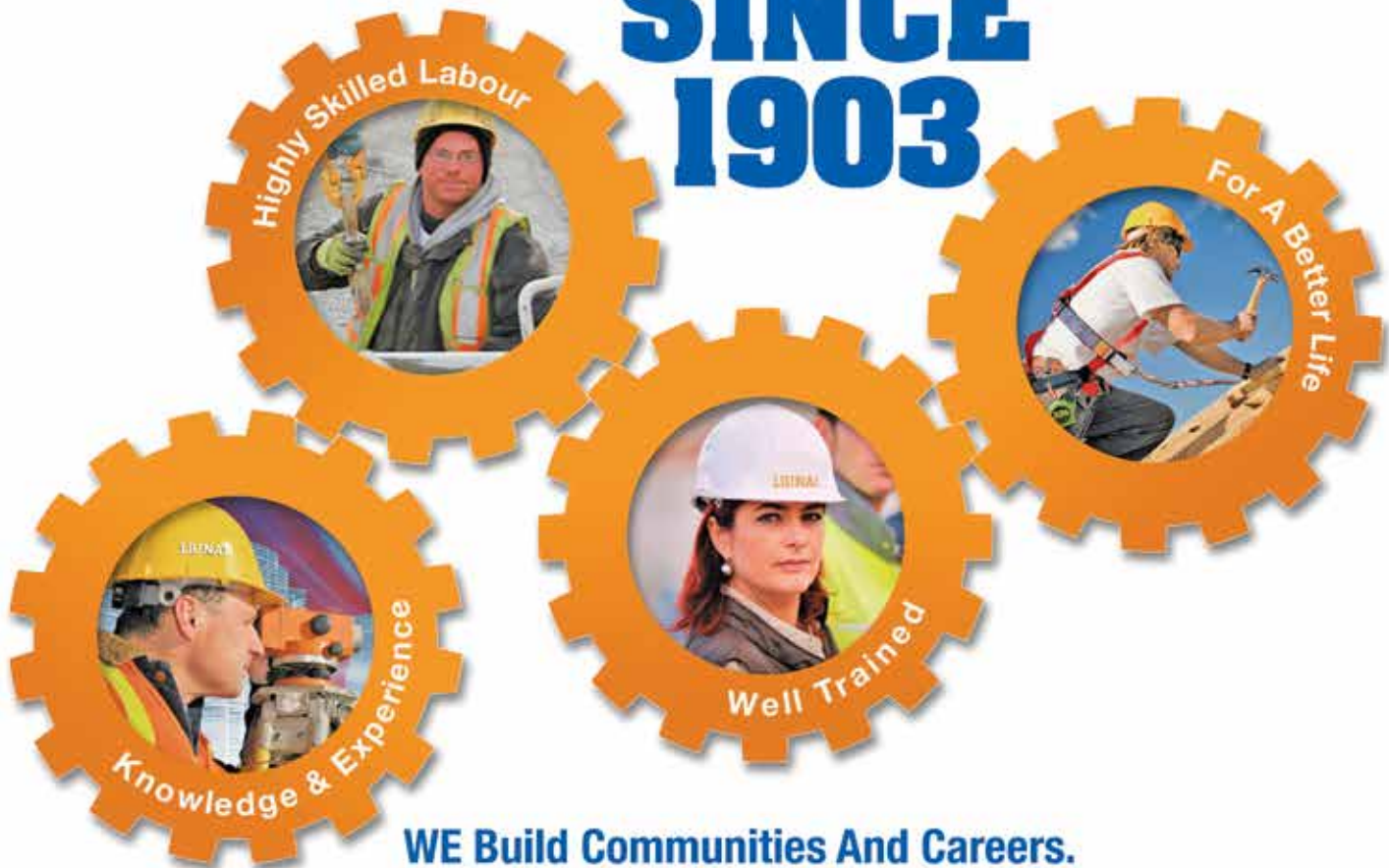
The ORBA-CPATT-AI partnership to offer the **National Binder Technician Training Course** was tentatively scheduled for July 7 - 10 at the University of Waterloo. However, this has been postponed and an update will be provided as soon as details become available. Still to come this summer is the **Asphalt Operations Webinar**, the "summer edition" of the Spring Operations Seminar on July 15.

As we move into the late summer and fall months, we will continue to communicate any potential changes to our events schedule. We understand how much our members anticipate events such as the annual golf tournament (August 27 at Cardinal Golf Club in King) and the Fall Asphalt Seminar (November 26 at the Toronto Marriott Airport Hotel), and it is our hope that they will take place as planned.

In the meantime, we would like to thank you all for your continued patience and understanding as we work diligently to navigate operations during these unique times. Please continue to check the www.orba.org and www.onasphalt.org websites regularly for updates, and reach out to staff with any questions or concerns you may have. We look forward to resuming more familiar operations as conditions improve.

We will continue to navigate this new world together. Stay safe. ■

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MARCOM MATTERS

Abigail Wright Pereira

Marketing and Communications Director



On April 24, we began hosting monthly Member Town Hall Meeting webinars at which senior ORBA Board of Directors and ORBA staff discuss pandemic-related issues impacting the road building industry and provide an overview of ORBA's advocacy initiatives. The Member Town Hall meetings will continue and past Town Hall recordings are available for members only on ORBA's website.

Additionally, a weekly COVID-19 Response Special Bulletin is now sent out each Friday afternoon to members, providing a summary of ORBA led initiatives and information on events and resources related to COVID-19. These bulletins can be found on ORBA's website under Communication/Bulletins.

The photo in this column is of the ORBA staff doing a team huddle on February 2, 2020, the first day of ORBA's 93rd annual convention that took place at the Fairmont Royal York Hotel in Toronto. Little did we know at that time that in just a few short weeks, there would be a seismic shift in our lives. There would be no team huddles in the foreseeable future.

However, what hasn't changed is the fantastic collaboration and feedback we have received from our members and the ongoing teamwork that continues to provide our industry with support, tools, communications and resources. If you have ideas for webinars and programming, or have expertise you would like to share as we enter the recovery and reopening phase of our economy, please reach out to me at abigail.wright@orba.org. We are here for you. ■

Necessity is the mother of invention

When I wrote the last Marcom Matters column over four months ago, plans were underway to hit the road from April 7 to 16 for the annual Partners in Quality Road Tour. A week after the spring edition of *ASPHALT* Topics was published in March, our world changed. The COVID-19 pandemic forced us to quickly hit the brakes, cancel events, and make a U-turn in our approach in how we deliver value to our members and stakeholders in the midst of this crisis.

It is said that necessity is the mother of invention and we knew we needed to develop new programs and ways of communicating. Once the lockdown in Ontario was in place in mid-March, we launched a COVID-19 Member Impact Analysis survey to better understand what our industry was facing and what they needed from us. By the beginning of April, a plan was in place to deliver the information and resources to our members and stakeholders to help them navigate through this uncharted territory.

The Partners in Quality Road Tour Seminar became the Partners in Quality Webinar which brought together 287 participants (read more about the webinar on page 38). Our Spring Operations Seminar, originally scheduled for March 26, became the Asphalt Operations Webinar scheduled for July 15.

Additionally, the ORBA team developed a two-month long weekly webinar series, COVID-19 & the Road Building Industry. The complimentary series ran from May 1 to June 26 and featured expertise from health and safety, technology, human resources, legal and financial sectors to assist the industry as it manoeuvres through the rapidly changing business landscape. These webinars are available to download from ORBA's website under Events. Based on member feedback, we soon decided after the launch of the first webinar that we will continue to offer webinars and online-based learning opportunities. Details on upcoming programming will be coming soon.



SUCCESSFUL PARTNERSHIP AT HEART OF MUNICIPAL PAVING

Preparing the shoulder prior to paving the rural highway section. (Pioneer)



PS

The quality of collaboration between asphalt producers/pavers and their municipal government partners can make the difference between an adequately executed road construction project and a highly successful one.»

G AWARDS

by James Careless



Top coat paving of Area 2. (Pioneer)

The third annual Municipal Paving Project of the Year Award, presented to Pioneer Construction at the OGRA Conference Awards Luncheon in Toronto on February 25, 2020, specifically recognizes the successful collaboration between municipalities and asphalt producers for excellence and innovation in Ontario paving projects.

Award-winner Pioneer Construction Inc., plus finalists Miller Paving Ltd. and Coco Paving Inc., all made their marks by working closely with their clients. Here's how they did it.

PIONEER CONSTRUCTION'S WIDE-RANGING OLIVER ROAD PROJECT A WINNER

The \$4.27 million project that won this year's Municipal Paving Award for Pioneer Construction covered a 9.6 km stretch of Oliver Road in the Township of Oliver Paipoonge west of Thunder Bay. The project was broken into three areas: The Hamlet of Murillo, 8.1 km of rural highway between the two settlements, and 800 m of roadway adjacent to Kakabeka Falls. It was completed in two phases during the construction seasons of 2018 and 2019.

"The actual project was first conceived in 2017 through our Asset Management Program," says Chris Bowles, Director of Operations for the Municipality of Oliver Paipoonge. "Council and administration had many options to consider with this project. Outside of overall performance and longevity, safer pedestrian movements and increased roadway capacity upon completion were of utmost importance."



Area Two was finished in August 2019. (Pioneer)

This was a project that had everything as far as a paving contractor is concerned. "It was a combination of in-town paving with curb work for 700 metres in the Hamlet of Murillo at the east end of the project, plus 8.9 kilometres of mainline highway paving between Murillo and the Village of Kakabeka Falls at the other end," says Matt Olinski, Pioneer Construction's Project Supervisor. "This led to three kinds of paving that had to be done — township paving with two lifts of new asphalt, highway paving with a lift of EAS (expanded asphalt stabilization) surfaced with a lift of new asphalt, and a small portion of highway paving with a RAP base layer (recycled asphalt pavement) and two lifts of new asphalt."

Throughout the project, Olinski worked collaboratively with Bowles along with several representatives from Stantec, the municipality's engineering consultant. "We had regular meetings with the client and their consultant which allowed us to resolve issues quickly whenever they arose," says Olinski. "Whenever things in the field were different from what we'd planned for, we brought this up with the municipality and Stantec and they came up with the best solution for us to pursue. It helped that Chris Bowles has the experience and engineering knowledge to make these decisions in the field."

This kept the project moving and avoided delays that could have added weeks to the project."

Phase One of the Oliver Road project took place during the summer/fall of 2018. Running from the Murillo railway crossing along Oliver Road for about 700 metres (Area 1), this project encompassed full depth asphalt removal, the removal and replacement of paved curbs and gutters, and the upgrade of catch basins and manholes. Pioneer Construction also laid down additional granular base for cross-fall correction (reducing slope grades), and two 44 mm lifts comprised of new SP 12.5 mm mix.

In 2019, Pioneer Construction initiated Phase Two of the Oliver Road project in Areas 2 (8.1 km of highway between the villages), and Area 3 (last 800 m to Kakabeka Falls).

In Area 2, the company carried out full depth reclamation with expanded asphalt stabilization (EAS) of the existing road to a depth of 110 mm (~54 mm of surfacing and ~56 mm of underlying granular) as the first lift. The roadway was also widened to allow pedestrians on both shoulders. This was topped with a new 50 mm lift of SP 12.5 mm mix. »



We were able to mix the reclaimed asphalt and underlying aggregate with asphalt cement to create a new base for Oliver Road – an eco-friendly solution good for the budget and timeline.

| MATT OLINSKI, Pioneer

"Most of our residents commute to the City of Thunder Bay daily and this route is the main artery," explains Bowles. "The project also considered the ever-expanding commercial and industrial sector in the municipality. We had to ensure that the needs of our business for 12 months a year and full loading were considered. When you share a roadway with larger vehicles and pedestrians, both needs have to balance."

The weather was also an issue during Phase 1. "We lost a lot of time due to rain delays in 2018," says Olinski. "Another challenge was that the cross-fall corrections were quite substantial at the Kakabeka end of the job where the existing grade was up to five per cent. We pulverized and placed two lifts of asphalt instead of using the EAS process because steep road gradients are prone to shoving when subjected to high traffic."

Challenges aside, Pioneer Construction finished the Oliver Road project in 2019, bringing what was a worn-out roadway back to optimum driving conditions.

"As I said before, this was a job that had everything to it," says Matt Olinski. "But thanks to our close working relationship with the municipality, the engineering services of Stantec, and the hard work of our people and our sub-contractors, the job was completed successfully."

"The job was completed on time and on budget through the efforts of Matt and Pioneer," Chris Bowles says. "The municipality looks forward to the project living out its entire life expectancy as designed."

In Area 3, the project team pulverized the existing roadway to make a RAP lift with two SP 12.5 mm lifts of 40 mm depth with tack coat between the layers. The crews added aggregate as required for cross-fall correction, curve realignment and vertical grade control. Speed signage was added, along with guide rail replacements and upgrades to a CN Railway crossing that included a new pedestrian walkway.

Pioneer Construction handled the management/scheduling as well as asphalt paving on the Oliver Road project. Roto-Mill Inc. completed the EAS process. The concrete work was done by NST Contractors. Asphalt removal, aggregate hauling/placement, and drainage work was done by Chaschuk Enterprises. The aggregate came from a municipally-owned pit about 8 km from the centre of the project. Fine grading prior to paving was performed by Main Excavation & Grading, with the tack coats between lifts being laid down by Bruno's Contracting.

The use of on-site materials for EAS and RAP is an outstanding feature of the Oliver Road project. It reduced material usage and hauling costs for the project while speeding up the repaving of Areas 2 and 3.

"We were able to mix the reclaimed asphalt and underlying aggregate with asphalt cement to create a new base for Oliver Road," says Olinski. "This was an eco-friendly solution that was also good for the project budget and timeline. And when you get the mix rate right, you end up with a durable roadway that will last for years while using fewer new resources. A big thanks goes to Roto-Mill for their efforts. We have a close working relationship with them and they always deliver the highest quality for their work while keeping the project on schedule."

Of course, the Oliver Road project came with its challenges as all paving jobs do. "Traffic around Murillo was actually very busy," says Olinski. "I expected the Hamlet of Murillo to be fairly quiet due to its rural location, but the traffic was pretty constant throughout the day. This meant we had to work around people coming and going when we were working on the curbs or laying down asphalt."



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The project required echelon paving (three pavers wide) and the entire length had to be paved in one continuous pull with no transverse joints.

| RYAN COTE, Miller

MILLER PAVING'S VARIED TIMMINS PROJECT

Miller Paving's finalist entry for the 2019 Municipal Paving Award was certainly varied. The project was based on the company's contract with the City of Timmins for the Timmins Connecting Link — a 1.3 km stretch of Highway 101 within city limits. "It consisted of frost heaves, culvert changes, pulverizing, placing Granular A aggregate, paving, tack coat, line painting, rumble strips and new illumination," says Ryan Cote, Manager of Asphalt Operations for Miller Paving.

The timeline for the Timmins Connecting Link was tight. Miller Paving won the contract on April 10, 2020, and had to finish the work by August 30 of the same year.

Beyond being varied, the Timmins Connecting Link project was unique in many respects. "The paving was unique in the sense that it required echelon paving (three pavers wide) and the entire length had to be paved in one continuous pull with no transverse joints. The structure of the asphalt was also unique in that it used a SP 19.0 mm Rich Bottom Mix for the lower lift, two lifts of traditional SP 19.0 mm, and a surface lift of SP 12.5 mm," says Cote.

"All three materials had to use 58-34XJ PGAC and pass rut resistant testing," he adds. "To ensure there were no transverse joints, Miller utilized two asphalt plants, shuttle buggies, three pavers, and five rollers."

As for the Timmins Connecting Link project's contractor/client working relationship? "The City of Timmins is a tough client to work for in the sense that they have a very high expectation of quality as can be seen in the strictness of the specifications within their contract," says Cote. "At the same time, they were very fair. When situations arose that were unexpected, the city and Miller came together to find solutions that were mutually beneficial."

The City of Timmins' high standards combined with Miller Paving's professionalism paid big dividends on the Timmins Connecting Link project. "The project was completed ahead of schedule and below budget," Cote says. "The QA testing all came out very good and the overall project was a great success."

"This project proved the value of high quality PGAC in the mixes," he continues. "When the XJ (previously called EXR) asphalt cement was first specified in the City of Timmins' contracts, I was sceptical as to whether the performance would be worth the additional costs. However, four seasons of using this product have proven to me that it is well worth the additional cost." »



vivaNext transit station in Municipality of York. (Coco)

COCO PAVING'S MULTI-FACETED YORK REGION JOB

Coco Paving Inc.'s finalist-winning entry for the 2019 Municipal Paving Award focused on the company's work with York Region — along with other major contractors such as EllisDon — on a 14 km stretch of bus rapidway corridors and ten vivaNext transit stations along Highway 7, Centre Street and Bathurst Street in the Municipality of York (north of Toronto).

Coco Paving provided engineering oversight and management during this project's design phase. Once construction began, the company was responsible for red and black asphalt paving, bridge work over major highways, culvert repairs and extensions, earthworks, electrical/intelligent transportation systems, linear and structural concrete works, traffic management, and utility co-ordination and relocation.

"This was an extremely complex project," says Taylor Lefebvre, Asphalt Quality and Production Manager for Coco Paving Central. "It consisted of several different components split into many phases, with Coco Paving doing the roadworks, concrete and sewers."

To save time and money without sacrificing roadway quality, Coco Paving used CIREAM (Cold In-place Recycled Expanded Asphalt Mix) to rehabilitate the existing paved surfaces in the project area, an eco-friendly solution that kept the York Region project on schedule.

"In the past, York Region kept laying new roads on top of old ones," says Lefebvre. "To save time while creating a more durable roadway, we used CIREAM to grind up the old road first. This eliminated the problems of cracks in the old roadbed as we widened the existing highway to incorporate the new bus corridors. We did this by laying down aggregate on the highway's sides and paving it, then shifting traffic from the centre lanes to the side lanes and ripping out the centre lanes and redoing them."

To save time and money without sacrificing roadway quality, Coco Paving used CIREAM to rehabilitate the existing paved surfaces, an eco-friendly solution that kept the project on schedule.

Coco Paving puts a lot of effort into its client relationships. "We have worked with York Region on many projects in the past, and have a good working relationship with them," says Lefebvre. "We know their specifications for asphalt and how they like to get things done. This is why we consult with York Region closely when we work for them, and do our best to meet their specs each and every time."

In this instance, Coco Paving laid down a total of 280,000 tonnes of mix to meet York Region's paving needs. This total was made up of SP 12.5 mm Category E with PGAC 64-28XJ; SP 12.5 mm FC2 Category E with PGAC 70-28XJ; SP 12.5 mm FC2 Category E Red Asphalt with PGAC 70-28XJ; SP 19 mm Category E with PGAC 64-28XJ; and SP 25 mm Category E with PGAC 64-28XJ. Coco Paving also used 41,000 tonnes of CIREAM on the York Region project, and 155,000 tonnes of Granular A & B aggregate.

Given the volume of traffic that flows through York Region, and the fact that some of the construction work was done around the clock, this project was very challenging for Coco Paving to execute. But the company pushed ahead with the project, meeting deadlines and keeping York Region's personnel happy as the work progressed.

"We really learned the importance of solid project planning on this one," says Taylor Lefebvre. "We knew this before,

but the York Region project really drove this home. The client set high standards that required a lot of preparation to meet given how many jobs were associated with this work. We did our very best to meet and exceed these standards wherever possible. ■

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

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**CONTINUES
SUCCESS
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by **Steve Pecar**

Opportunity doesn't knock every day, but when it does, you have to be ready to seize upon it. While this may be a simplistic version of how a successful business begins, for the principals of BCX Environmental Consulting, it was a jumping off point for what has become an Ontario success story.

The Newmarket-based company is now enjoying its tenth year of operation, one that has grown steadily as it recognized the need for client-focused, expert air quality services, especially assisting those in the aggregate business. By specializing in areas of permit applications, dust and odour mitigation, management planning, and advanced air dispersion modeling to support air quality impact assessments, as well as land use compatibility studies and peer reviews, BCX is now a recognized force in the industry with a future that will grow alongside the needs of its clients.

"It has worked out well for us," confesses Bridget Mills, founding partner of BCX Environmental Consulting and Senior Environmental Engineer. "We were confident that the time was right when we created this company, and here we are, ten years later and still growing."

After starting her career at a large engineering consulting firm, Mills then found herself working at smaller, more focused air quality consulting firms and on projects specifically in the aggregate sector. "I started to do work for some of the big aggregate companies and dealt with quarries, hot mix plants, ready mix plants, and cement plants. That is where I developed an in-depth knowledge of the business, and I enjoyed that," Mills says.

After years of establishing herself and her expertise in the industry, she decided the next step was to branch out on her own. But she knew she couldn't do it alone. That's where Christina Wright and Xiaoxi (Winnie) Song came in. Both with extensive backgrounds in consulting and the environment, they too saw the opportunity of creating their own company and quickly formed a partnership with Mills which became BCX, a name derived simply by using the initials of their first names.

Wright, Senior Environmental Scientist with the company, has a unique background in both environmental consulting and as an environmental co-ordinator in industry. She is an expert in interpreting legislation and can help BCX's clients navigate complex environmental regulations in a practical way. "As a scientist, I sometimes have a different perspective from the engineers in our office," Wright says.

As a member of OAPC's environmental committee, Wright's contributions to the industry were recently recognized through the King Beamish Excellence Award. She received the honour for her work in interpreting and implementing environmental regulations for council members and providing leadership in the development of the Environmental Practices Guide as well as being an advocate for OAPC with the provincial government.

Song, a Senior Environmental Engineer, is currently taking a step back in her role as a partner with the firm to spend more time with family. She continues to lead the advanced air dispersion modeling team and train staff. This is a key role to ensure continued excellence at BCX.

According to Wright, the three women understood the risks of starting their own company, but envisioned the potential that awaited them. "The opportunity was there and we recognized it," Wright says. She believes that while the team has similar backgrounds and experience, the specialized skills each bring to the table have made it all work. "We all had a lot of experience in air quality and we could see where we would fit together. Combined we have a good team, a lot of dedicated people, and we continue to grow."

Mills believes that because the three partners were all well established in their careers when they launched, »



they were able to provide a stability to the company based on goals and values. The partners pride themselves on establishing a company philosophy that embraces positivity, teamwork and respect.

She says this mindset has played an important role in the way the team of ten scientists and engineers go about their jobs as well as how BCX relates to its clients. "Everyone involved in the process knows that we have high standards and a commitment to doing what is right and important," Mills says. "And that's good for everyone. Our team knows what we stand for and so do our clients."

The commitment has paid off. BCX works with about 70 per cent of hot mix plants in Ontario, a significant market share that drives the company's strong reputation. Other key industries that BCX serves include recycled metal facilities, foundries, fabricated metal product facilities, metal mining and processing facilities, and energy from waste facilities.

Mills believes the key to the ongoing success and growth of BCX is to "be there" for clients on an ongoing basis, to offer advice, and to make sure support is available when it's asked for.

"It's important for our clients to rely on us; it's what builds relationships," Mills says. "They are in the business of what they do, whether it's a hot mix plant or any type of company, and they focus on what they do best. They call us to do what we do, which is to advise, guide or help them plan for any situation that is outside their area of expertise. We are called in to deal with real issues that affect their business."

Because most of BCX's work centres primarily on air quality, the firm has intentionally cultivated relationships with other specialized firms so that BCX can easily bring in other consultants if the issue is outside their realm of expertise. "We like to work with boutique companies like ourselves, ones that are highly experienced and highly technical in certain areas," says Mills. "This is what separates us a little bit from our competition."



BCX has made it their business to be the air quality experts for their clients, guiding them through often complicated regulations.

The core work that BCX does is to help clients obtain an air/noise permit. This is needed for any facility that emits an emission of either air or noise. The work involves visiting the facility, identifying sources of emission, calculating what the emissions are, and modeling the predicted impact of the emissions off-site. The results are compared to Ministry of Environment, Conservation and Parks' limits. If they meet the limits, the company can move forward with an application; if not, BCX works with the company to determine options for compliance.



*Christina Wright and
Bridget Mills, two of the
founding partners of BCX.*

"Flexibility is essential for many companies," says Mills. "Part of the service we offer is to try to make the permit as flexible as possible, while ensuring they meet the limits."

The second main area BCX puts much of its energy into is assisting clients fulfill their annual reporting requirements on emissions to the provincial and federal governments. Finally, and very importantly, BCX assists clients with environmental complaints, such as dust and odours. These can come from the public or from the government, and require in-depth knowledge of both facility operations and environmental regulations to effectively resolve.

Ultimately, BCX Environmental Consulting has made it their business to be the air quality experts for their clients, guiding them through the often tough and complicated regulations that exist in the province, regulations that must be adhered to and are necessary to protect human health and the environment.

As Wright points out, "What it comes down to is compliance and how we help our clients achieve that. It has to all come together and we help make that happen." ■

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

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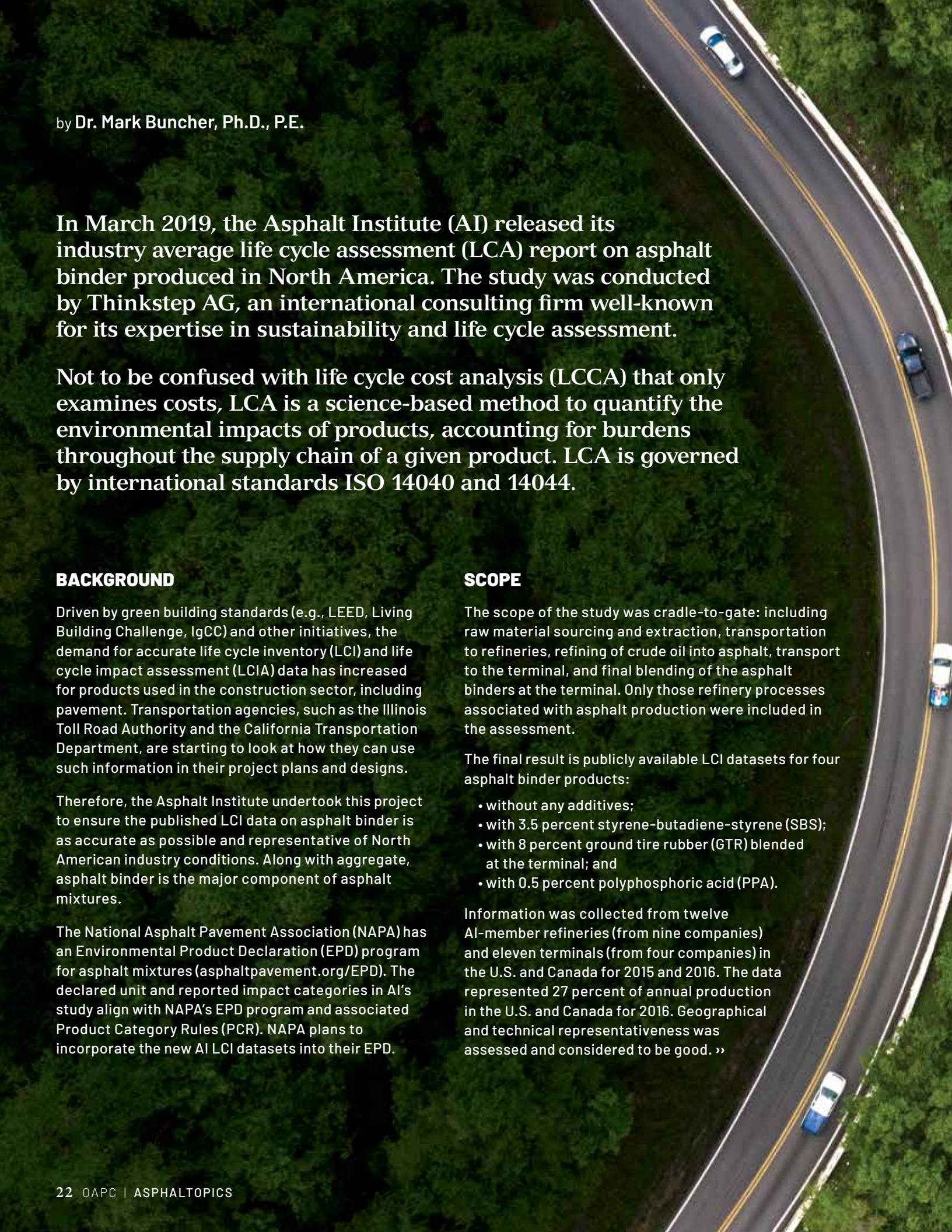
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ONTARIO

ALBERTA



by Dr. Mark Buncher, Ph.D., P.E.

In March 2019, the Asphalt Institute (AI) released its industry average life cycle assessment (LCA) report on asphalt binder produced in North America. The study was conducted by Thinkstep AG, an international consulting firm well-known for its expertise in sustainability and life cycle assessment.

Not to be confused with life cycle cost analysis (LCCA) that only examines costs, LCA is a science-based method to quantify the environmental impacts of products, accounting for burdens throughout the supply chain of a given product. LCA is governed by international standards ISO 14040 and 14044.

BACKGROUND

Driven by green building standards (e.g., LEED, Living Building Challenge, IgCC) and other initiatives, the demand for accurate life cycle inventory (LCI) and life cycle impact assessment (LCIA) data has increased for products used in the construction sector, including pavement. Transportation agencies, such as the Illinois Toll Road Authority and the California Transportation Department, are starting to look at how they can use such information in their project plans and designs.

Therefore, the Asphalt Institute undertook this project to ensure the published LCI data on asphalt binder is as accurate as possible and representative of North American industry conditions. Along with aggregate, asphalt binder is the major component of asphalt mixtures.

The National Asphalt Pavement Association (NAPA) has an Environmental Product Declaration (EPD) program for asphalt mixtures (asphaltpavement.org/EPD). The declared unit and reported impact categories in AI's study align with NAPA's EPD program and associated Product Category Rules (PCR). NAPA plans to incorporate the new AI LCI datasets into their EPD.

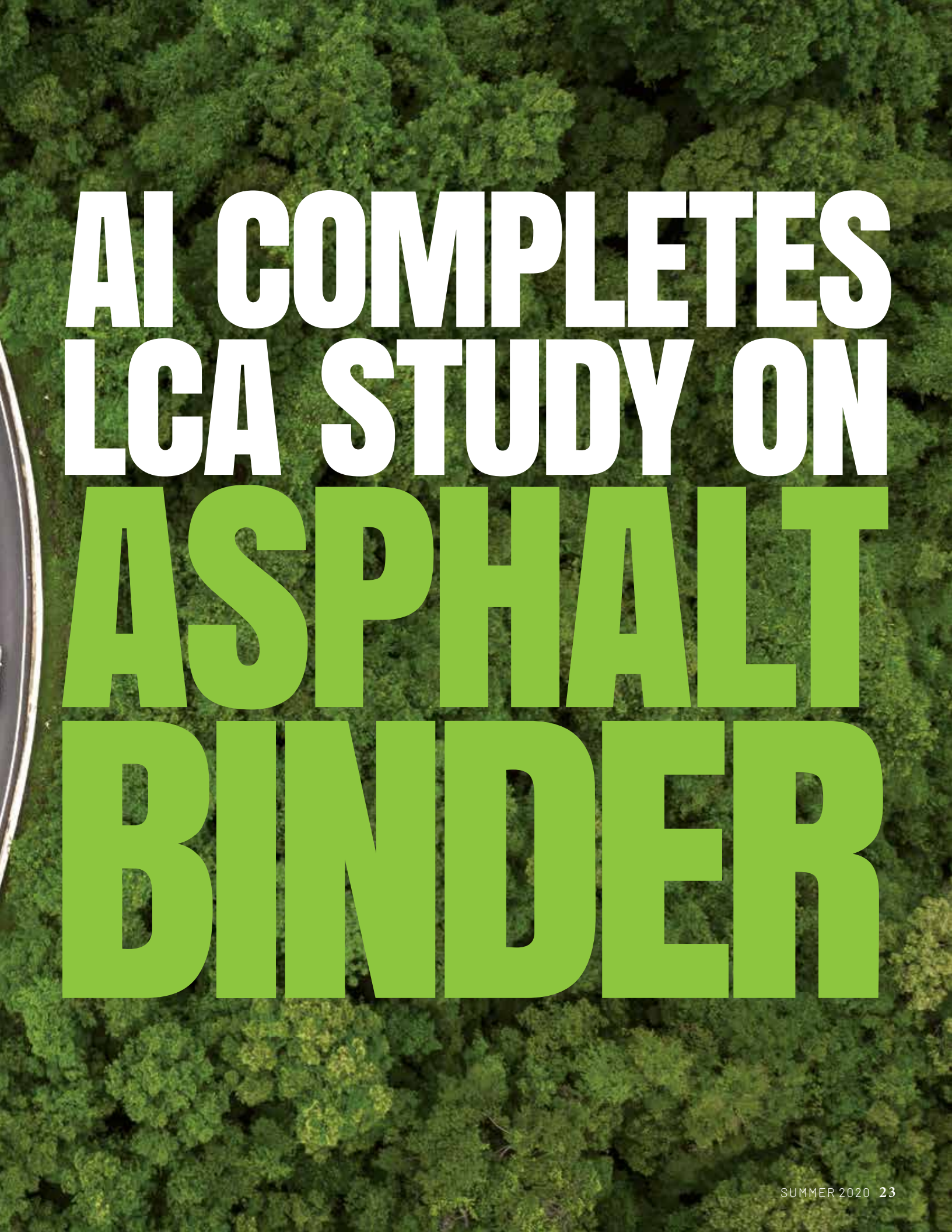
SCOPE

The scope of the study was cradle-to-gate: including raw material sourcing and extraction, transportation to refineries, refining of crude oil into asphalt, transport to the terminal, and final blending of the asphalt binders at the terminal. Only those refinery processes associated with asphalt production were included in the assessment.

The final result is publicly available LCI datasets for four asphalt binder products:

- without any additives;
- with 3.5 percent styrene-butadiene-styrene (SBS);
- with 8 percent ground tire rubber (GTR) blended at the terminal; and
- with 0.5 percent polyphosphoric acid (PPA).

Information was collected from twelve AI-member refineries (from nine companies) and eleven terminals (from four companies) in the U.S. and Canada for 2015 and 2016. The data represented 27 percent of annual production in the U.S. and Canada for 2016. Geographical and technical representativeness was assessed and considered to be good. »



AI COMPLETES LCA STUDY ON ASPHALT BINDER



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ALLOCATION

Since asphalt is only one product stream in a complex multi-product system (refinery), it is crucial that the allocation methodology appropriately captures only that share of the total impacts of the system that can be attributed to the asphalt binder. For this study, the main material and energy inputs that needed to be allocated were crude oil input, thermal energy consumption (including associated emissions) and electricity.

Mass allocation was selected for the electricity because the density of products is directly related to the electrical demand for pumping the products. Energy content of the co-products (using the net calorific value a.k.a. lower heating value) was selected as the allocation methodology for crude oil input, as it accounts for the fact that the majority of co-products are used as fuels. The thermal energy demand for asphalt production was calculated based on the sensible heat of asphalt in the system, i.e., based on the temperature differential between the crude tank and the asphalt going to storage in combination with the specific heat capacity of the asphalt.

Finally, the total direct emissions of thermal energy production were allocated based on the ratio of thermal energy use (excluding recovered heat) calculated for asphalt production and the refinery’s total thermal energy consumption during asphalt runs only.

CRUDE OIL SLATE

The production stage starts with the extraction of crude oil and delivery to the refinery. Crude oil was modeled based on Thinkstep’s crude oil supply model, which considers the whole supply chain of crude oil (i.e., extraction, production, processing, the long-distance transport and the regional distribution to the refinery) and forms the basis of all refinery product inventories in their GaBi databases.

Companies were asked to provide crude name, the region of origin, extraction technology and mode of transportation. In many cases, primary information on the extraction technology was not available, in which case it was selected and modeled based on the crude name. When the name alone did not provide enough information to select an extraction technology, it was modeled using the region of origin’s average crude slate mix as a proxy.

The resulting average crude oil slate for North American asphalt binder was used and represents a mix of conventional (primary, secondary and tertiary production) and unconventional (oil sands, in-situ) extraction technologies (Table 1).

CATEGORY OF EXTRACTION TECHNOLOGY	PERCENTAGE (by mass)
Crude from oil sands	44%
Primary extraction	22%
Secondary extraction	16%
Tertiary extraction, steam injection	15%
Tertiary extraction, CO ₂ injection	1%
Tertiary extraction, nitrogen injection	1%
Tertiary extraction, natural gas injection	1%
Other (refinery products)	<1%

Table 1: Crude oil extraction method of AI asphalt binder

AI member’s asphalt binder products are manufactured in Canada and the United States, with 85 percent of crude oil sourced from those nations.

ASPHALT PRODUCTION

Crude oil refinery activities begin with the input of crude oil. Crude is fed to the desalter where it is partially heated and mixed with water to dissolve salts. The water is separated and removed. The crude oil then enters the atmospheric distillation unit, where it is heated and distilled. All products lighter than heavy gas oil vaporize and the energy required for vaporization is fully attributable to those lighter products. The residue from the atmospheric distillation is introduced to the vacuum distillation unit. The atmospheric residue is heated and further distilled under a vacuum, vaporizing all gas oils and any remaining diesel, with asphalt remaining as a hot liquid in the bottom of the vacuum distillation tower.

The hot asphalt passes through heat exchangers alongside other refinery feeds, mostly in the crude and vacuum distillation units, to return heat to the process, before going to asphalt storage.

While process-specific electricity, thermal energy, water usage and emissions would have been preferred, these data points were not available. Therefore, refinery-level data were collected for site-wide consumption of electricity, thermal energy, and water as well as direct emissions and allocated to the asphalt product as described earlier.

ASPHALT TERMINAL

The processes within each refinery were vertically aggregated first and then combined into one production-

AI'S LCA STUDY ON ASPHALT BINDER AND WHAT IT MEANS TO CANADA

The Canadian paving industry has historically relied heavily on asphalt as the building material of choice to keep our expansive infrastructure network connected. Asphalt provides a smooth durable surface that can last a lifetime if designed, installed and maintained properly. Its ability to be adaptable to various climate constraints is critical to Canada's diverse geography. Once on the road, asphalt can be considered 100 per cent recyclable which can set it apart from its competitors as a sustainable pavement choice and provide environmental benefits.

So why would anyone question the positive impacts of using this product? With the increasing focus over the past few years on climate change, and asphalt binder being a petroleum product, it became important to understand what possible impacts asphalt binder production has on our environment. Agencies and owners in various industries have already been under pressure to be environmentally accountable for the materials they choose in their projects which could add concerns to suppliers over meeting those standards.

Creating an LCA on asphalt binder is a way for our industry to understand these environmental impacts in a science-based approach that allows us to bring these findings to agencies and owners using proven international standards, not assumptions. It can act as a tool to better understand the potential impacts of asphalt over alternative paving options, like concrete.

Completing an LCA is not an easy task, both in effort and cost, but the North American asphalt industry, united under the Asphalt Institute (AI), funded and developed a detailed plan on completing this endeavour. To have our industry come together to undertake such an initiative will ensure our local agencies and owners can take full advantage of these findings for use in their project designs, while industry can be sure that the data inputs are as accurate as possible.

A big part of this study was supported by Canadian AI members, including Imperial Oil, who helped to provide funding, data and industry expertise in the development of this robust and independently-reviewed report. The study covers the important steps that asphalt binder takes in its life cycle from crude oil extraction through to finished asphalt terminal storage using various methods throughout the flow. This helps to make sure that the LCI data created is rigorous enough for our industry to rely on in the years to come.

Chris Campbell is Americas Asphalt Technical Advisor for Imperial Oil and chair of the AI Canadian Committee.

weighted average. This average asphalt production process then provided the input of asphalt to the average terminal process.

At the asphalt terminal, hot liquid asphalt is stored, additives (GTR, SBS, or PPA) are mixed or milled into the asphalt, and the asphalt is then stored. The terminals consume electricity (mainly used for milling) and thermal energy (used for storage). Terminals can be either co-located with the refinery or off-site. For the study, all participating companies were located off-site. Inbound transportation from the refinery to the terminal is a production weighted average of the distances and modes collected from the companies.

RESULTS

The reported impact categories represent impact potentials, i.e., they are approximations of environmental impacts that could occur if the emissions (a) followed the underlying impact pathway and (b) met certain conditions in the receiving environment while doing so. In addition, the inventory only captures that fraction of the total environmental load that corresponds to the chosen functional unit (relative approach). »

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EASTERN CANADA

ONTARIO

IMPACT CATEGORY	UNIT	ASPHALT BINDER, NO ADDITIVES	ASPHALT BINDER, WITH 8% GTR	ASPHALT BINDER, WITH 0.5% PPA	ASPHALT BINDER, WITH 3.5% SBS
IPCC AR5					
Global warming potential [GWP100]	kg CO ₂ eq	0.637	0.621	0.654	0.765
Global warming potential [GWP20]	kg CO ₂ eq	0.766	0.745	0.786	0.918
TRACI 2.1					
Acidification potential (AP)	kg SO ₂ eq	1.78E-03	1.69E-03	1.96E-03	2.12E-03
Eutrophication potential (EP)	kg N eq	1.66E-04	1.57E-04	1.69E-04	1.82E-04
Smog formation potential (SFP)	kg O ₃ eq	0.0360	0.0347	0.0365	0.0427
Fossil fuel consumption (FF)	MJ (NCV)	5.32	4.98	5.36	5.66
Total use of non-renewable primary energy resources (PED)	MJ (NCV)	53.2	52.2	53.5	55.2
Use of net fresh water (excl. rain water)	L	1.01	0.92	1.06	1.44
Use of net fresh water (incl. rain water)	L	1.68	1.57	1.76	2.40

Table 2: Impact assessment, per kg (IPCC 2013, EPA 2012)

Results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks. Table 2 presents the total cradle-to-gate environmental impact results for all four products.

Figure 1 presents the relative results of asphalt without additives leaving the terminal, broken down by crude oil extraction and transport refinery operations, and terminal operations (including transport to the terminal).

A critical review of the completed study report was conducted by a panel of three outside experts. Their findings were that:

- the approach, described in the report, used to carry out the LCA is consistent with the ISO 14040:2006 principles and framework and the ISO 14044:2006 requirements and guidelines;

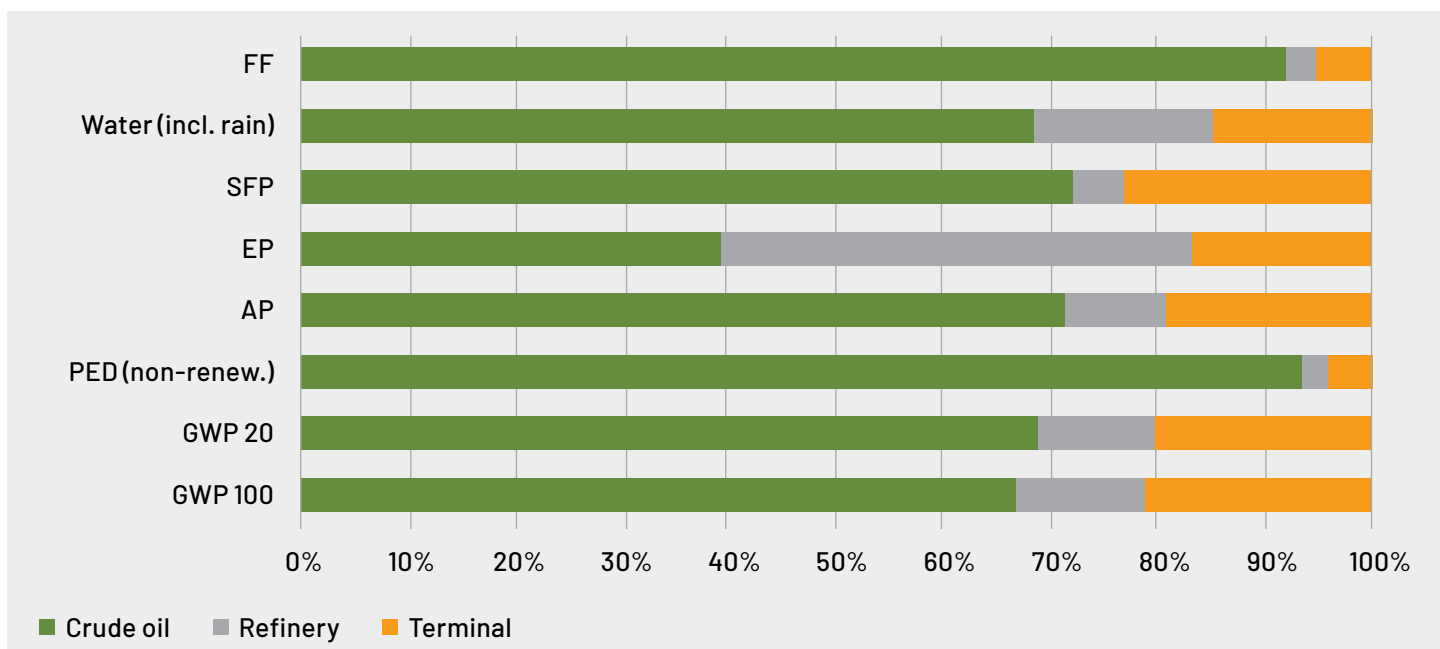


Figure 1: Overall impacts of asphalt binder, no additives [TRACI 2.1, except PED (non-renew.) and Water (incl. rain)]

- the methods used in the LCA are scientifically and technically valid as much as the peer-reviewers were able to determine without having access to the LCA model and the data collection information;
- the interpretations of the results reflect the limitations identified in the goals of the study; and
- the report is transparent concerning the study steps and consistent for the purposes of the stated goals of the study.

This study achieved its goals in creating an LCI that fairly represents the asphalt binder industry in North America.

CONCLUSIONS

The extraction of the crude oil is the primary driver of all potential environmental impacts, due most significantly to the use of crude oil from oil sands or crudes extracted via a tertiary method. At the refinery itself, electricity is the most significant single driver of impact followed by on-site thermal energy generation and associated direct emissions. Terminal operations can contribute up to 20 percent of potential environmental impacts without additives, driven primarily by thermal energy and inbound transport of the asphalt.

This study achieved its goals in creating an LCI that fairly represents the asphalt binder industry in North America. By combining the primary data collected from participants with the secondary data available through the GaBi database, the Asphalt Institute and Thinkstep have created the most accurate and representative LCI data for the region available at the time of the report publication. Updates to these datasets are expected on a periodic basis. ■

Dr. Buncher is Director of Engineering for the Asphalt Institute.

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WORKING SUCCESSFULLY WITH

PMAC

by James Careless

Polymer-modified asphalt cement (PMAC) produces a high performance mix that delivers on performance and durability. Over the last few years, the Ministry of Transportation as well as many regions and municipalities have started to specify PMAC for certain projects, particularly in areas with extreme temperature fluctuations or heavy traffic loading.

While there's no doubt PMAC is here to stay, it's also clear that working with a high performance material can require new or different ways of doing things. Before the arrival of COVID-19, OAPC had planned a Spring Operations panel session to discuss the production and placement

challenges of working with PMAC. The pandemic led to that event's cancellation, but the participants have since spoken with *ASPHALT*Topics to share their views on working with PMAC and the factors to keep in mind for its successful use. »



A live bottom truck reduces segregation and temperature loss of PMAC. (Yellowline)



Paving in echelon with PMAC on Winston Churchill Blvd. in Mississauga. (Region of Peel)

AT THE PLANT

Some challenges of working with PMAC at the asphalt production plant include the absence of dedicated storage tanks, incompatibility with other binders, and PMAC's tendency to stiffen as it cools, which may block pipes. At this stage, it is important to maintain good control of the plant process to minimize temperature variations.

"Storage of PMAC can be a challenge because the product may separate," says Ed Lawlor, Asphalt Plant Superintendent at R.W. Tomlinson Limited. "If that happens, it causes greater maintenance to the storage tanks and a rejectable mix that is very costly."

"When using PMAC mixes, it is not recommended to store the mixes for extended periods of time; for example, more than 8 to 12 hours," says Donn Bernal, General Manager at Yellowline Asphalt Products Ltd. "It is even more important not to store SMA mixes more than three hours due to the mainly coarse aggregate structure giving it higher cooling rates in the silo."

PMAC's unique handling characteristics compared to non-PMAC mixes puts extra demands and wear-and-tear on the plant's infrastructure. "We know there is increased stress on the plant," says Kyle Martin, Equipment Manager at

Fermar Paving Limited. "When running the drag conveyors, we see higher amperage draw when the higher polymer mixes are running. The motors, pumps and boilers are all working harder to keep the plant moving with higher polymer."

There can also be unpleasant odours associated with higher-grade PMAC. "Especially with the 70-28 grade, we have to be cautious of which way the wind is blowing to be mindful of our neighbours," Martin says.

CLEAN-UP CONCERNS

Cleaning up after PMAC poses serious issues for asphalt plants due to the stickiness and stiffness of PMAC residue. "We have tried everything from beet juice to vegetable oil," says Martin. "Diesel works the best as a release agent, but it is not allowed for obvious environmental reasons."

"Today we use a water-based release agent," says Chris Kollar, R.W. Tomlinson Limited's Equipment Manager. "The use of environmentally-friendly release agents at the plant is even more important now," agrees Bernal. "Believe it or not, certain brands of dishwashing detergents work well when added to the water that is sprayed on the asphalt rollers on the paving site."

There is some debate around PMAC release agents and whether or not they can be cut or diluted. "At Tomlinson, we use our water-based release agent uncut," Kollar says. "We have found if you dilute the product it will separate. The straight, uncut version works best."

This isn't the case with all PMAC release agents advises MultiSolv president, Paul Holroyd. "The key to making the right cut/don't cut decision is to read and follow instructions on the product labels and technical documents," Holroyd says. "Different types of release agents react in unique ways to being cut. For instance, cutting soap-based release agents will have a far more detrimental effect at a far lower percentage of cutting than active release agents or barrier release agents."

LOADING AND TRANSPORTING

Maintaining correct temperature is important with asphalt cement to achieve density, but with PMAC it is critical, including during delivery.

"PMAC's storage temperature requirements are typically higher than conventional binders," says Richard J. Schreck, Technical Services and Applications Director with Astec, Inc. "Some associated loading and transportation issues include keeping

PMAC's temperature up during transit, and off-loading stiffened PMAC which can be hard on pumping equipment and more susceptible to clogging filters."

"Ideally, PMAC should be heated higher than your neat AC to help it flow better and unload easier," says Bernal. "Having AC tankers that hold their heat and having properly sized pumps at the asphalt plant helps move the PMAC quicker."

AT THE WORK SITE

Once PMAC has arrived at the work site, a similar set of handling and cleaning issues arise that pavers have to contend with. It is also equally important to ensure that the mix is at the right temperature range for effective compaction operations.

"The increased stiffness of PMAC will find weak chains and other worn parts in MTVs, pavers, and plant drag and traverse conveyors," says Schreck. "It is recommended that clean stone be run through both at the end of the shift to clean out any buildup before shutting down for the day or night. Equipment must be cleaned and cleared of any buildup or breakage may occur at startup the following shift."

Whatever release agent is chosen, "it takes 50 per cent longer to clean plant and paving equipment that has used the higher polymer mixes," says Martin. "It is tough to track how much extra wear there is on equipment given that plant and equipment switch back and forth between PMAC and other materials on a daily basis."

There's also the issue of PMAC sticking to the rubber tires of rollers and other vehicles working on the job site which can damage the newly-paved mat and the tires in the process. "One way to reduce this problem is by running the rubber-tire roller up and down an area to warm up the tires," says Bernal. "This prevents the initial pickup of material at the start of the paving."

Proper tire pressure also plays a role in reducing PMAC pickup. "As a preventative measure, we have installed a pressure switch on to the park brake

circuit that will not allow the roller to move until the rubber tires are at their proper operating pressure," says Kollar. "That is really important."

"Good roller maintenance matters," says Steve Gostis, Paving Product Specialist with Toromont CAT. "This includes properly maintaining the skirting on the machine so that it is a good height from paved surface, the rubber is in good condition, the corners fixed together without gaps, and no tears or rips; a good working tire spray system; and monitoring the temperature of the asphalt to keep an effective working distance from the paver and breakdown roller while keeping the tires at the proper temperature. Cocoa mats and scrapers, if they are installed, must also be kept in good working condition."

Using the right PMAC release agents in the tire spraying systems certainly helps. But more can be done. "Tomlinson has enlarged the fogging nozzles on

the spray systems, installed better screens on the suction side at the tank, and installed a high pressure filter after the pump," Kollar says. "We have also installed pressure switches to better maintain the pressure to the nozzles, made up quick change mats that ride on the tires so that the product stays evenly applied, and ensured the entire system is cleaned and stays cleaned."

"Cleaning is a must," he adds. "We cannot stress it enough. It is the difference between PMAC working or failing."

THE TAKEAWAY

Polymer-modified asphalt cement delivers an improved product with an enhanced life expectancy and performance. While it certainly presents its own unique challenges, it's clear that thoughtful handling through the production to paving process can achieve favourable results with the fewest headaches. ■



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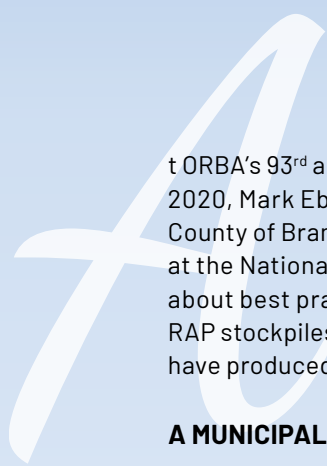


Paving the way to *Success* with **RAP**

High quality, high RAP pavement. (County of Brant)

by **Lara Henry**

On April 22, the world paused in the midst of a pandemic to mark the 50th anniversary of Earth Day. We are all familiar with the three Rs—reduce, reuse, recycle—as a way to minimize the effect on the environment from materials we use every day. From a pavement perspective, the use of RAP is a key component of the three Rs. In addition to environmental and sustainability benefits, recycled asphalt pavement or RAP offers economic savings and engineering benefits.



t ORBA's 93rd annual convention held February 2 to 4, 2020, Mark Eby, Director of Infrastructure for the County of Brant, and Jim Musselman, Senior Engineer at the National Centre of Asphalt Technology, spoke about best practices for using RAP and managing RAP stockpiles, and showcased Ontario projects that have produced quality asphalt pavements using RAP.

A MUNICIPAL PERSPECTIVE

Municipalities collectively use the most aggregate in the province and need to be leaders in the stewardship of that finite aggregate resource. In his presentation, Mark Eby explained how the County of Wellington saw an opportunity to increase the use of RAP in its mix designs. "As owners we have to manage the balance between having a quality, long-lasting pavement and the appropriate reuse of materials."

Through consultation with the Municipal Liaison Hot Mix Committee, Wellington's RAP specification was reviewed. The county mandates that all surface mixes have at least 10 per cent RAP and base mixes have 20 per cent RAP. It permits RAP up to 20 per cent in surface course mixes (HL-3 and HL-4) and 40 per cent RAP in medium duty binder mixes

(HL-4 and HL-8). The County of Brant also will be increasing the permitted RAP percentages to meet that of Wellington.

Eby stressed that the key to getting to the higher RAP percentages is trust. Owners and contractors need to work together to ensure that what is supplied and paved is a quality product. RAP needs to be processed to create a good, high quality product that can be added to new hot mix. He added that Wellington has had years of success with contractors paving with a 20 per cent RAP base and 10 per cent surface mix with no issues and no early failures. In fact, Capital Paving Inc. and the Murray Group Limited have successfully paved roads with greater than 30 per cent in the base and up to 20 per cent in the surface.

Eby concluded by urging urban municipalities to allow RAP to be used and in greater quantities, and to share the resource. When aggregate is shipped into the urban centres to make hot mix, that opportunity should be used to haul back RAP to the rural municipalities for inclusion in new hot mix. Bottom line: everyone needs to work together to make environmentally-responsible, quality pavements that last. »



Unprocessed RAP pile. (County of Brant)



Course/large fractionated RAP. (County of Brant)

RAP MATERIAL HANDLING BEST PRACTICES

Poor management of RAP stockpiles is commonly cited as one reason agencies are reluctant to increase allowable RAP contents in asphalt mixtures. Best practices in management must include a focus on inventory management, processing and stockpiling the RAP, and sampling and testing.

Jim Musselman explained that the first decision in good stockpiling practices is likely whether the stockpiles will be constructed from single sources of RAP or combined into a multiple source stockpile for later processing. In either case it is important to avoid any contamination from dumping unwanted materials in the stockpiles

For single source RAP piles, the goal when processing and crushing RAP is to create a uniform stockpile of material. For millings it is considered best practice not to further crush them, but to use the millings as is in mix designs. It is still necessary to screen the millings to remove oversized particles. For multi-source RAP piles, the key to achieving a consistent RAP is careful blending as part of the processing operation. A decision about whether to fractionate the RAP also needs to be made depending on plant capabilities and market requirements.

Musselman stressed that stockpiling best practices should be used at all times to minimize segregation and maintain quality. Stockpiles should be built in layers and good aggregate stockpiling practices used. Ideally, stockpiles

should be covered to minimize moisture, but if this is not feasible then at least the fine piles should be covered. It is also beneficial to build the stockpiles on a sloped, paved surface to minimize moisture.

Sampling is also important to evaluate the material's properties and samples should be taken from throughout the stockpile. Musselman recommends a minimum sampling frequency of 1 per 1,000 tons with a minimum of 10 samples. Samples can then be analysed and compared to recommended tolerances. It is also good practice to recover and continuously grade the RAP binder if mixes with more than 20 per cent RAP are planned.

The message is clear: using RAP responsibly produces quality pavements that conserve aggregate, preserve the environment, and reduce costs.

The presentations can be found on ORBA's website under Events/ORBA Annual Convention and AGM. More information on RAP is available in the *ABCs of RAP* on OAPC's website under Publications & Education/OAPC Publications/OAPC's ABC Series, as well as in *Technically Speaking's* Use RAP Responsibly published in the spring 2020 issue of *ASPHALT* Topics. ■

Lara Henry is a communication specialist and editor of ASPHALT Topics.

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OAPC PARTNERS IN QUALITY WEBINAR BRINGS TOGETHER 287 PARTICIPANTS!

by Abigail Wright Pereira

For the first time in 23 years, the Partners in Quality (PIQ) road tour seminars went off the road and online via the Partners in Quality webinar which took place on May 11, 2020. Plans to take the seminar on the road to Kingston, North Bay, Sarnia and the GTA were cancelled when Ontario declared a state of emergency due to the COVID-19 pandemic.

The annual event offers a unique opportunity for asphalt producers, contractors and suppliers and municipal and provincial owners to come together to discuss what all sides are doing to achieve the common goal of producing quality asphalt pavements. We needed to quickly think outside of the box to provide the same quality program virtually.

On April 15, OAPC announced that it was offering the PIQ seminar via webinar for free with the hope that the webinar would reach as many if not more members and stakeholders as past seminars. The webinar was a success bringing together 287 participants! Of these

participants, 202 were members, 26 were from the MTO, 48 were municipal stakeholders, seven were from Ontario universities, two were from associations, and another two were international. Comparatively, the 2019 PIQ Road Tour had a total of 193 participants.

"The PIQ webinar presentations provided great value to our members and stakeholders," says OAPC Chair Ivan Levac. "Considering the challenging situation that we have been living in the past couple months, this webinar demonstrated that our industry has the ability to overcome challenges and come together as a community."

Whether Partners in Quality will be online or on the road again next year remains to be seen. However, one thing that will not change is OAPC's commitment to provide valuable programming and an opportunity for industry and stakeholders to come together to discuss industry challenges and what we are doing to bring about solutions. ■

THE PIQ WEBINAR FEATURED THE FOLLOWING PRESENTATIONS:

JOHN MacKAY, General Manager-GTA Construction, Aecon Construction and Materials Limited - *Should Municipalities Pave More with Stone Mastic Asphalt (SMA)? A Review of SMA Design & Construction Challenges.*

GELU VASILIU, Head, Bituminous Section, MTO - *MTO Bituminous Specification Updates & Other Initiatives (MERO)*

AMIN MNEINA, Member Services Coordinator, OGRA/MEA - *OAPC/OGRA Liaison Report and 2020 Local Municipal Forecast (OGRA/MEA)*

AMMA WAKEFIELD, Canadian Regional Engineer, Asphalt Institute - *The ABCs of Recovered Asphalt Binder Testing*

AMIN MNEINA, Member Services Coordinator, OGRA/MEA - *Ontario Provincial Standards: Past, Present & Future*

DOUBRA AMBAIOWEI, Technical Director, ORBA/OAPC - *OAPC Top 10 List #2: Encourage Mixes That Have Higher AC Content*

ABIGAIL WRIGHT PEREIRA, Director, Marketing & Communications, ORBA/OAPC - *ORBA/OAPC Marketing & Communications Initiatives*

The PIQ webinar recording and presentations are available for downloading on the OAPC website.

UNSUNG HEROES

by
Steve Pecar

Amos keeps the float moving for Fermar



Dave Amos

There are many components needed to keep an asphalt construction operation running smoothly, but not all are so readily recognizable.

The value of a float operator can be overlooked as they work so often in isolation, spending long hours on the road and putting plenty of distance between destinations. But ignoring these workers would be a mistake, because if their job isn't done right, there may well be no job at all.

"Make no mistake, the work a float driver does is an important part of the process," says Corey Furlong, Logistics Manager of Fermar Paving Ltd. "The business relies on these guys — they make it happen." Furlong knows what he is talking about because he has had one of these unsung heroes working with him: Dave Amos.

There aren't too many plaudits left on the table when Furlong starts talking about Amos. He says his colleague has been both a friend and a mentor over the years, one who has provided insight and knowledge that comes only from on-the-job experience.

Furlong says that when he was just nineteen, Amos took him under his wing, offering tips and advice to assist with his career while at the same time ensuring that Fermar was getting its money's worth. "I started out 13 years ago and Dave has always looked after me and anyone else that was first starting out," says Furlong "That's just part of his makeup."

Part of that makeup also includes a tireless work ethic. Co-workers at Fermar marvel at his non-stop ability that goes well beyond picking up, transporting, and dropping off equipment. They say Amos considers downtime as non-existent, as time

wasted, and if it does occur, he picks up a tool to tighten a bolt or a cloth to polish his truck.

"I've never seen a person work as hard as he does; he's non-stop all day long," says Furlong. But it's not just a physical thing for Amos. Workmates also praise him for his fresh approaches and ideas, a brain power that allows him to think outside of the box and find solutions. For his part, Dave Amos says his job habits are ones that have come naturally and while he appreciates the admiration, he says it is all just part of a day's work.

His career began right after high school when he started out running the equipment that he now delivers. By 1992, Amos had taken over driving the float and he has been at it with Fermar ever since. He believes he has always had a knack for the job and understands how important it is to the operation.

"Once the work season begins, it's 'go go go' and that is what I do," Amos says. "Getting the equipment out to the crews is the top priority and that is what I try to do each day."

Amos rejects any suggestion that his work can be lonely or even tedious by saying there is always something that has to be looked after. He says he bounces around a lot during the day, keeping busy and always looking for new ways to improve the operation. As well, he feels compelled to help train those who follow in his footsteps as he believes what he does is a good career and one that is worth embarking on.

"What I do is great. I love it and I can't think of anything else I would rather work at," Amos says. "But I realize that this won't last forever so the least I can do is share some of my knowledge and help anyone else that is interested in carrying on." ■



TECHNICALLY SPEAKING

Doubra C. Ambaiwei
Technical Director

Encourage mixes that have higher AC content – Top 10 List No. 2

Improvements in both aggregate quality and requirements, as well as a performance-based testing and grading system for asphalt binders, have played a major role in addressing asphalt pavement performance problems. However, with some of the methodologies that have been adopted, many agencies are beginning to see the “balance” tip too far in the other direction, and are experiencing asphalt pavement durability problems. The durability of an asphalt pavement is its ability to resist factors such as aging of the asphalt, disintegration of the aggregate and stripping of the asphalt film from the aggregates.

Asphalt pavements perform well when they are designed, produced and constructed to provide desired properties such as durability, impermeability, strength, stability, stiffness, flexibility, fatigue resistance, and workability. While these desired properties will vary depending on purpose and other project requirements, it is an established fact that the overall objective in the design of any asphalt paving mix requires economic determination of an appropriate blend of aggregate sources to produce proper gradation of mineral aggregates and selecting the type and amount of asphalt cement (AC) that yields a mix with¹:

- **sufficient asphalt to ensure durable pavement;**

Low AC content results in fatigue cracking, dryness or ravelling and a brown dull pavement appearance, while excess AC content leads to bleeding, fat spots and low skid resistance. For virgin mixes, low AC contents are typically caused by one of the following:

- asphalt absorption problems
- increase in dust content, thus decreasing VMA
- the loss of VMA during production and thus decreasing the AC content to meet the air voids requirement
- production automation problems: pumps, weigh bridge, asphalt meter, aggregate moisture, etc.

In recycled mixes, low AC contents can be caused by above-mentioned problems, but can also be related to:

- increased total dust percentages due to RAP fines, thus decreasing VMA
- improper RAP proportions due to inaccurate RAP moisture content
- high moisture contents in RAP, hampering the softening of the RAP binder required to blend with virgin binder, thus coating “black rocks” and reducing the total binder content for the recycled mix

¹ MS-2. “Asphalt Mix Design Methods — Asphalt Institute Manual Series, 7th Edition”. 2014.

² ORBA — Quality of Asphalt Review, KPMG LLP August 2018.

³ ORBA — A Review of Ontario Asphalt Industry Practices, TTI - Final Report, August 2018.

- **sufficient mix stability to satisfy the demands of traffic without distortion or displacement;**
- **sufficient air voids in the total compacted mix to allow for a slight amount of additional compaction under traffic loading and a slight amount of thermal binder expansion without flushing, bleeding and loss of stability;**
- **a maximum void content to limit the permeability of harmful air moisture into the mix;**
- **sufficient workability to permit efficient placement of the mix without segregation and without sacrificing stability and performance; and**
- **aggregate texture and hardness to provide sufficient skid resistance in unfavourable environmental conditions.**

To enhance durability vis-à-vis performance, general practice recommends¹:

- **designing the mix using a dense gradation of sound, tough, moisture-resistant aggregates;**
This enhances impermeability due to closer contact among aggregate particles. Sound, tough aggregates provide resistance to disintegration under traffic loading.
- **maximizing the asphalt film thickness on the aggregate; and**
Thick asphalt films do not age and harden as rapidly as thin films. Also, increased film thickness effectively seals off a greater percentage of interconnected air voids in the pavement, making it difficult for water and air to penetrate.
- **compacting the mixture to be impervious.**
As low as 5 per cent in-place voids, depending on Nominal Maximum Aggregate Size (NMAS) and gradation.

In response to pavement durability concerns in Ontario, the Quality of Asphalt Review (QAR)^{2,3} revealed shortcomings with design practices in gradation selection of specific

Superpave mixtures wherein, for economic end-goals and feasibility with local materials, some mix designers selected gradations where the aggregate occupied as much space as possible in the mixture, thus minimizing the amount of AC in the mixture.

This is illustrated in **Figure 1** where the “line of maximum packing” is shown in blue as a straight line extending from the ordinate to the largest sieve size. The gradation of the aggregate, shown in green, follows the line of maximum packing and there is little room left for the binder. This practice also allowed mix designers to sometimes bend the gradation to go below the line of maximum packing, effectively limiting room for the asphalt binder in the mixture, and leading to mixes that were more susceptible to premature cracking as in **Figure 2.** »

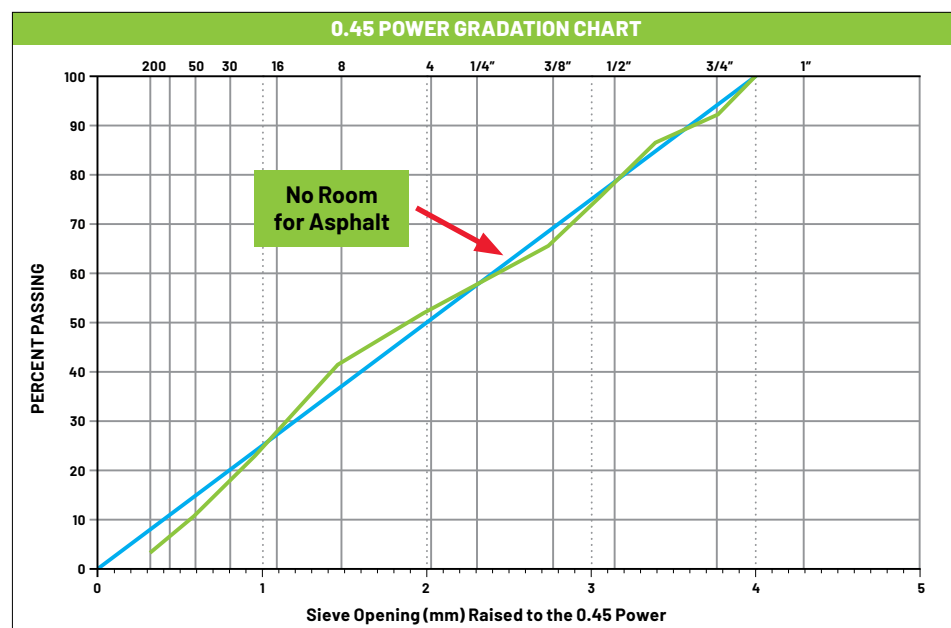


Figure 1 Example of Dense-Packed Gradation

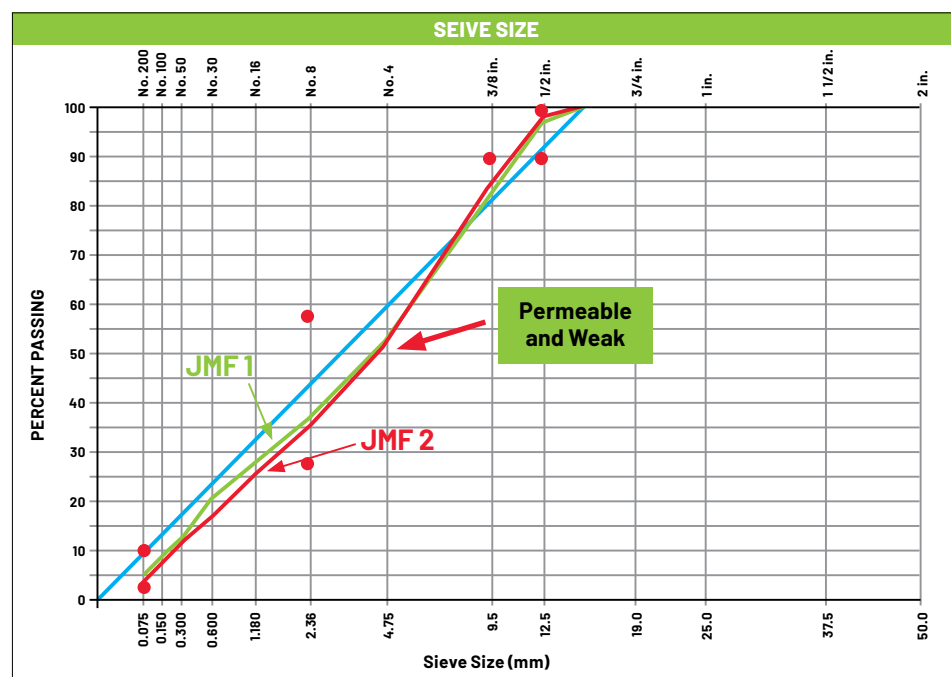


Figure 2 Example of Coarse Gradation

Mixes with insufficient AC content are unable to hold the aggregates together, lack cohesion and, through a combination of traffic and temperature changes, are prone to premature cracking. All the mixtures examined in the Quality of Asphalt Review had asphalt content values ranging between 4.5 and 5 per cent. For a cold climate like Ontario, the report expects to see asphalt contents of 0.5 to 1 per cent higher at least.

Some suggested options to address the issues with designing asphalt mixtures for improved durability include:

- **specifying a higher minimum AC content;**

Studies have shown that mixes with higher AC content outperform those with lower AC content. Higher AC content is largely driven by increasing the minimum requirements for Voids in the Mineral Aggregate (VMA) during design and/or production. Since the VMA available is controlled by the aggregate properties, blend gradation, mixture viscosity and the compactive effort, a key to achieving the correct increase in AC content is to ensure the correct aggregate bulk specific gravity (G_{sb}) is used in the mix design and during production.

- **lowering the Laboratory Compaction Effort (number of gyrations);**

Reducing the N_{design} requirement by 20 to 25 per cent depending on the design traffic is a proven strategy to obtain more AC in the mix, and has resulted in increased density in the field.

- **lowering the air void content of the mix to allow more asphalt;**

In this case, the design aggregate structure is selected based on 4 per cent air voids, but the final design AC content for that structure is selected at 3 per cent air voids by using the air void regression technique. This option is being evaluated in Ontario with recent modifications to BITU0025 (SP 103F03M) and BITU0026 (SP 111F06M).

- **introducing cracking testing on the asphalt mixes prior to finalizing a mix design; and**

This consists of designing the mix for intended application and service requirements then running performance tests on appropriately conditioned specimens that address multiple modes of distress taking into consideration mix aging, traffic, climate and location within the pavement structure. Some states such as Texas, Louisiana, California, New Jersey and Illinois have incorporated cracking and rutting tests into their specifications. Efforts are being made in Ontario towards better understanding of this option.

- **the Superpave 5 Volumetric Mix Design Method.**

This method requires that mixtures are designed to have the same density in the lab and in the field. Optimum binder content is chosen at 5 per cent air voids rather than the currently specified 4 per cent, thus decreasing the in-place air voids target from 7 to 8 per cent down to 5 per cent. To maintain the same volume of effective asphalt content, the minimum VMA requirement is increased by 1 per cent, and the design compactive effort is decreased to 50 gyrations. Ontario's experience with this method is limited.

In summary, increasing the AC content in asphalt concrete mixtures should be a high priority for improving pavement performance in Ontario. This can be encouraged by increasing the minimum VMA requirement, lowering the N_{design} requirements to increase in-place pavement density, exploring the air void regression mix design method, implementing mixture performance tests for "Balanced Mix Design" and quality assurance, or by advancing the Superpave 5 mix design system. Regardless of the method adopted, differences between the desired properties of the Job-Mix Formula (JMF) and the properties of the plant-produced asphalt mix **MUST** be checked and verified for compliance, and necessary adjustments should be made to minimize any variations and mitigate against consequent negative effects on the in-service pavement performance. ■



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ENVIRONMENTAL ESSENTIALS

Donn Bernal

Safety during our new normal

As we begin the asphalt and paving season in these unprecedented times, the idea of what is considered normal will probably change as the COVID-19 virus continues to be present in our society for some time to come.

Therefore, as we get the plants and terminals up and running, we can't just start the day or our shift with simply turning things on or having the typical daily safety huddle. Some new protocols have to come into play and our routines have to be adjusted. As we get deeper into the season and the production and activity ramps up, our place of work will become congested with more trucks, which means more people. There should be considerations for staggering of shifts or staggering of personnel at clock-in and clock-out as well as maintaining social distancing in the lunchrooms and plant control room. We will all need to rise to the challenge of operating differently while working to maintain peak production capabilities.

As this article is being written, there is an easing of restrictions in Ontario which should bring the economy back to some sense of normal. Fortunately, the road construction sector has not been hit as hard during this pandemic. However, we still have to ensure the health of our employees in order for our companies to continue to operate. Most companies will have strict protocols for their employees in maintaining physical distancing and proper

sanitizing procedures. Where we may have trouble is the interaction with our customers and contractors who may not be as mindful of the situation as we are. Therefore, it is important that we communicate with our customers and contractors about our procedures and expectations to ensure our plants and paving continue to operate.

Even though we are in the middle of this pandemic, we cannot forget the effect of climate change and the continued focus on the improvement of air quality and emissions for our workers and the public. This cannot be put on the back burner due to possibly lower productions or reduced budgets. This pandemic is providing us an opportunity to think innovatively and further advance our asphalt technologies for a greener future.

To further prioritize health and safety in the asphalt industry, the Plant and Paving Committee has developed a best practices guide which incorporates aspects from member submissions as well as some resources from NAPA. This guide is available on the OAPC website for your reference. ■

Donn Bernal is General Manager at Yellowline Asphalt Products Ltd.

INDUSTRY NEWS

CONGRATULATIONS ROADS SCHOLARSHIP RECIPIENTS!

Plans for graduation and award ceremonies and celebrations have been curtailed due to the COVID-19 pandemic. However, the OAPC Roads Scholarship program continues to award \$1,000 scholarships to students who demonstrate exemplary leadership within their respective programs and who express an interest in the asphalt paving industry. Scholarship recipients are selected by our partner colleges which include Algonquin, Canadore, Centennial, Conestoga, Georgian and Fleming Colleges.



SCOTT WOOD

Centennial College — entering final year of the Heavy Duty Equipment - Motive Power Technician program.

"I would like to thank you for recognizing my efforts and encouraging me to achieve my goals. I feel honoured and grateful to be the recipient of this award."



SANDI GRACA,

Conestoga College — entering final year of the Motive Power, Heavy Duty Equipment Technician program.

"I live in Cambridge and I plan to be a field service technician which I am sure will include road construction. I love that it's always different — no one issue is ever the exact same as another. The different aspects of the work are what I am really looking forward to. The scholarship has definitely helped me. Not having to stress about money and being able to just focus on school work has taken a weight off of my shoulders, and I am so grateful for that."



CHANCE McFARLANE,

Conestoga College — entering final year of the Heavy Construction Equipment Operator (HCEO) program.

"Receiving this scholarship looks great on my resume and it is a real blessing for my family and our new baby."



MICHAEL McCALLAN,

Canadore College — entering final year of the Welder-Fitter program.

"The scholarship has helped me in more ways than I can count, especially in purchasing various items for school that include things like text books, a toolbox, and part of my tuition. It has also given me a bit of financial peace of mind, I am very appreciative to the people that thought of me for this wonderful award. Thanks again!"

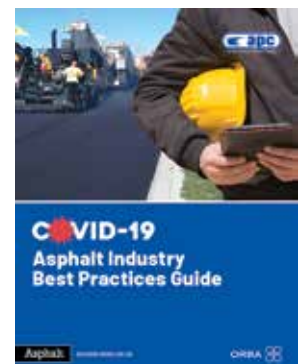


OAPC'S SECOND ANNUAL ASPHALT TECHNICAL SYMPOSIUM GOES VIRTUAL

Building on the success of the June 18, 2019 Asphalt Technical Symposium, OAPC presented its 2020 Asphalt Technical Symposium Webinar on June 16 to 81 participants. The program, generously sponsored by McAsphalt Industries Limited, Yellowline Asphalt Products Ltd. and Imperial Oil, provided a platform for industry and stakeholders to come together, albeit virtually, to focus on asphalt binder challenges and solutions, and pathways for mix performance testing in Ontario. From this symposium webinar, an Expert Task Group on "Asphalt Binder Testing" and "Mix Performance Testing" in Ontario was established. Presentations from the webinar and a recap of the symposium will be provided at the Fall Asphalt Seminar on November 26.

OAPC PUBLISHES COVID-19 ASPHALT INDUSTRY BEST PRACTICES GUIDE

Please go to OAPC's website to download under Publications & Education/Fact Sheets.





TAKE A GOOD NEWS BREAK!

As an industry, we are united together to help combat the COVID-19 virus. ORBA and the OAPC thank the companies who have donated their time, resources, and ideas to the front lines. To celebrate these good news stories, ORBA has created and dedicated a page to member companies highlighting their contributions to flattening the curve.

To view the page, please visit the ORBA website under Industry. Be sure to follow the #ONRoadstoGoodNews campaign on Twitter and LinkedIn which highlights member contributions and innovations.



OAPC PUBLISHES THREE NEW FACT SHEETS

OAPC has published three fact sheets from the Top 10 List – Ways to Get More Durable HMA Pavements. Fact Sheets #2 – Encourage Mixes that Have Higher Asphalt Cement (AC) Content, #5 – Include Adequate Surface Preparation in the Plans, and #9 – Use RAP Responsibly, are available for download on OAPC's website under Publications & Education/OAPC Publications/Fact Sheets and Informational Brochures.

OAPC developed the Top 10 List from results of the Quality of Asphalt Review which was completed in September 2018. Commissioned in the fall of 2017, the Quality of Asphalt Review was managed by KPMG and consisted of analysis conducted by Texas A&M Transportation Institute (TTI).

SAVE THE DATE

Due to the COVID-19 pandemic, there have been changes made to the ORBA and OAPC event calendar. Events have either been postponed or will be offered via webinar. Please go to the OAPC website www.onasphalt.org for the latest updates.

**OAPC FALL ASPHALT SEMINAR
NOVEMBER 26**



CALLING FOR 2020 OAPC AWARDS NOMINATIONS

OAPC's Awards Program celebrates the exceptional contributions of individuals in the asphalt paving industry who are making a difference, one road at a time.

The deadline for the OAPC Bleeds Black Award and Dr. Norman McCloud Award for Innovation is October 30, 2020.

Please go to the OAPC's website under Awards/OAPC Awards Program to download the nomination form and learn more about OAPC's Awards Program.

ASPHALT OPERATIONS WEBINAR – JULY 15

OAPC's annual Spring Operations Seminar was originally scheduled to take place on March 26 at the Scarborough Convention Centre, but had to be canceled due to the COVID-19 pandemic. Instead, OAPC offered the Asphalt Operations Webinar on July 15. Highlights from the webinar include presentations featuring the latest resources and initiatives from the Ministry of Labour, Training and Skills Development and the Infrastructure Health & Safety Association to keep workers and the public safe.

Presenting Sponsor:

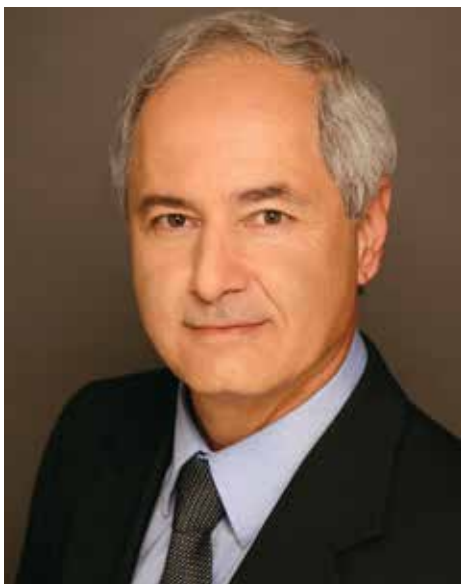


DR. SUSAN TIGHE appointed as McMaster University's Provost and Vice-President, Academic

Dr. Susan Tighe, University of Waterloo's Deputy Provost, Associate Vice-President, Integrated Planning and Budgeting, and Norman W. McLeod Professor in Sustainable Pavement, has been appointed Provost and Vice-President, Academic at McMaster University, effective July 1, 2020.

Dr. Tighe gained national and international recognition for her outstanding contributions to the development, design, and management of sustainable concrete and asphalt transportation infrastructure. She is a founding member of the Centre for Pavement and Transportation Technology (CPATT) at the university. Prior to assuming the CPATT's director role, which she held from 2010 to 2017, she served as the Associate Director of Research and Technology from 2005 to 2010. She is a past Canada Research Chair in Pavement and Infrastructure Management.

Dr. Tighe will retain an adjunct appointment in the Department of Civil and Environmental Engineering and will maintain research collaborations at CPATT. We congratulate Dr. Tighe and wish her all the best in this exciting new endeavour.



THE LAST WORD

Fernando Magisano

I've looked at life from both sides now

This will be a challenging year to say the least in both our personal and professional lives. I'm not sure what this season will look like in the end, but it will surely be one for the memoirs. Personally, I'm used to working from home, but this has been at a whole different level!

It's been nearly 39 years since I walked into the old Bayview Avenue offices of KJ Beamish Construction and made a hand shake agreement with Bob Graham to start my employment in the road construction industry. I never would have guessed that August day that I would be with the company for over three decades, both while it was a family-owned business and after its sale to Dufferin/CRH in 2017.

Last July, after contemplating my future direction, I started my current position with Canadian Asphalt Industries. This has turned out to be an awesome decision! I have

always had a great relationship with all our AC suppliers and wanted to work for a smaller outfit that would allow me to learn more about this fundamentally important product.

If there has been one constant element in my career development, it's my involvement with industry associations such as ORBA, OSSGA, CTAA and, of course, OHMPA/OAPC. Beamish was a founding member of OHMPA, so I was introduced to the association very early in my career. Mr. Beamish was a great supporter and believed that the company as well as individual employees gained from our involvement.

I was asked to join the OHMPA Technical Committee around 1985. That led to my being invited to sit on the Board of Directors and eventually fulfil my honoured role as OHMPA president in 2010. I was fortunate to be on the board during our critical amalgamation

talks with ORBA and the rebranding of our association as the Ontario Asphalt Paving Council. This was a bold move by our association and one that promises a better presence with MTO by leveraging our stronger connection to ORBA.

One of the first benefits of our amalgamation was to reconvene the MTO/ORBA HMA Technical Committee to reset and refocus the direction of the committee which now resides within the purview of the OAPC. I feel privileged to be the first co-chair of the new OAPC/MTO Hot Mix Paving Committee. After only two meetings with MTO, we have seen a renewed respect, positive dialogue and professionalism in our approach to the challenges still facing our industry.

Through my involvement with OHMPA/OAPC, I have gained a greater understanding of our industry and been introduced to some of the industry's technically brightest and most influential people. I've built a network of industry contacts including key people from our important associate members. I encourage companies to continue to send their up-and-coming employees to add their voice and experience to our associations and to share valuable knowledge that can't be easily gained by other educational means.

I still enjoy my involvement with this industry and would love to see us continue to evolve and improve. I equally enjoy my continued participation with OAPC and hope to see it continue to be *recognized as the authoritative voice of the asphalt producing industry in the province of Ontario*. And finally, in case anyone is still wondering, the answer is yes, I still bleed black! ■

Fernando Magisano is Senior Technical Adviser for Canadian Asphalt Industries Inc.



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