



Atlantic Concrete Association • Association béton Atlantique

# READY MIX NEWS

A SUPPLEMENT TO THE ATLANTIC CONSTRUCTION &amp; TRANSPORTATION JOURNAL

## Establishing concrete's contribution to a low carbon community

Can the concrete industry be environmentally sustainable and still produce a quality product?

It's a question representatives from the Cement Association Canada are answering through a series of seminars and meetings with municipal leaders, architects and engineers. They feel they have a role to play on the road to a prosperous, low carbon future.

The exercise began last fall when the association began working collaboratively with its concrete allies, fanning out across Canada to deliver its message at 230 meetings and more than 2,200 people.

Unlike the last program in 2012, this one focused on deepening the industry's reach into towns and cities, going beyond elected officials to include senior and technical staff.

Across the region, meetings were held in various locations and were attended by elected officials and senior municipal officials.

Feedback from these meetings was positive, with

attendees saying their impression of the industry's role in reducing greenhouse gases and transportation and infrastructure costs has improved.

Some even went as far as to commend the industry for keeping sustainability and lifecycle assessment on the front burner.

Several more recommended additional meetings with their colleagues and requests for information spanned a wide range of topics including sustainability reports on buildings and pavements, alternative bids, availability of Contempra, pervious concrete, improving freeze-thaw durability of concrete pavements, concrete intersections and lifecycle assessments for buildings and municipal concrete pavements.

Cement and concrete industry representatives also gained fresh insights into the priorities, constraints and concerns of many of its stakeholders, something that will lay new groundwork for deeper, more productive relationships going forward.

Along with these meetings, the industry had a strong presence at the 2015 Transportation Association of Canada Conference in Charlottetown.

The program included sessions on various aspects of concrete while a reception hosted by the Cement Association of Canada was attended by approximately 150 delegates.

To reach architects, developers and structural engineers, the Concrete Council of Canada sponsored the Material Selection Matters Seminar Series - a component of the 200 Meetings program for the Cement Association of Canada.

The series was co-funded by members of the Concrete Council of Canada, including the Cement Association of Canada, the Canadian Ready Mixed Concrete Association, the Canadian Precast/Prestressed Concrete Institute and the Canadian Concrete Masonry Product Association.

Fifteen seminars were presented across the coun-

try by Dr. John Straube, principal of RDH Building Science Consulting and a professor of building science in the Civil Engineering Department and the School of Architecture at the University of Waterloo.

In his presentation, Dr. Straube provided the latest building science information about material selection and how to apply building science principles to construct resilient, durable, energy efficient and healthy buildings.

In Atlantic Canada, a seminar was held in Halifax where it was hosted by the Atlantic Concrete Association which attracted 30 participants.

Across the board, this national seminar series garnered extremely positive feedback from attendees.

These outreach programs have laid critical new groundwork for the cement and concrete industry's continued endeavors to establish the sustainability of concrete.

*Submitted by the Cement Association of Canada*

## Atlantic Concrete Association celebrates golden anniversary

The Atlantic Concrete Association celebrated its 50th anniversary at ConAtlantic '16.

More than 120 members and delegates travelled to St. John's, NL to take part in the festivities from February 18-20th.

Highlights of the event included a casino royale, the association's annual general meeting, technical sessions, and lots of networking opportunities.

Delegates and spouses spent Saturday afternoon sightseeing and taking in a brewery tour followed by an evening enjoying the famous George Street hospitality.

Several past presidents attended the celebration. The ACA also honored Earl Casey of Casey Concrete, Dave MacKenna of Municipal Ready Mix and Lloyd Bonang of South Shore Ready Mix for their commitment to the association as founding members. Earl, Lloyd and Dave were each presented with an honorary lifetime membership to the association.



ACA board of directors. Front row from the left are: Jamie Reid, Paul Miller, Kevin Nickerson, Chris Miller, Scott Flemming and Bernard Keefe. Back row: Darren Cross, Alex Kennedy, Steven Peters, Mark Munro, Jason Coish, Kent Nickerson and Jessica Waite.



Participants take in the technical sessions during ConAtlantic '16



Guests enjoying the festivities at the President's Dinner.



ACA honours lifetime members Lloyd Bonang, left, Dave MacKenna and Earl Casey. The three were among the ACA's original board of directors.



Board Member Mark Munro presents ACA President Scott Flemming with the Errol Praught Memorial Hockey Trophy on behalf of the Producers who skated to victory over the Associate Members this year.

**Atlantic Concrete Association**  
**Association béton Atlantique**

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# Celebration time

## 2015 ACA Safety Award Winners

The Atlantic Concrete Association is very pleased to publicly recognize excellence in the results of the efforts of several ready mixed concrete producers to promote safe workplaces. These members have made us proud of their commitment to their communities, their people, and their operations.

The safety award for producers of between 0 and 6,000 cubic metres of concrete this year goes to Warren Ready Mix of Rexton, New Brunswick. Warren Ready Mix had no compensable accidents reported to the WCB out of 6,500 total hours worked.

The safety award for producers of between 6,000 and 15,000 cubic metres of concrete this year goes to Concrete Products of St. John's, Newfoundland. Concrete Products had no compensable accidents reported to the WCB out of 15,821 total hours worked.

The Safety award for producers of over 15,000 cubic metres of concrete this year goes to Humber Ready Mix Inc. of Deer Lake, Newfoundland. Humber Ready Mix had no compensable accidents to report to WCB this year and their employees worked a total of 47,411 hours.



Jason Coish, right, of Capital Ready Mix accepts the ACA Safety Award from ACA Safety Committee chairman Paul Miller.



Jason Coish, right, of Capital Ready Mix accepts the ACA Environmental Award from ACA Environmental Committee chairman Travis Smith.



Darren Cross, right, of Humber Ready Mix Inc. accepts the ACA Safety Award from Paul Miller.



Paul Miller of Warren Ready Mix accepts the ACA Safety Award from Michelle MacMullin of the Atlantic Concrete Association.

# Capital Ready Mix takes home Environmental Award

A St. John's company picked up a significant honour recently at ConAtlantic '16.

Capital Ready Mix was presented the Atlantic Concrete Association 2015 Environmental Award.

The company's most notable step last year was initiating the development of an Environmental Management System based on the ISO 14001 standard.

This system will assist with continually improving environmental performance, while ensuring compliance with

any applicable legislation. It also allows Capital Ready Mix to set its own targets and performance measures, with the 14K standard serving to assist in meeting objectives and goals, as well as the subsequent monitoring and measurement of these objectives and goals.

As a part of this EMS, the company is developing a new environmental sustainability policy that outlines plans for sustainable development – sustaining economic growth without harming the planet or exhausting its resources, while improv-

ing the quality of life for its current and future inhabitants.

This policy will dictate how it continues to monitor the impact of operations on the environment and strive for continuous improvements.

It will also state that the health and safety of their employees, clients, neighbours, and stakeholders is paramount – as is their continued stewardship of the environment.

This past spring, they also continued with the annual tradition of a spring clean

up to recognize Environment Week in Newfoundland.

Staff and trades came together to make an afternoon of cleaning a problem area in one of their communities and the results were again amazing with two trucks of garbage removed from the area.

Throughout the year the company also changed its cleaning system and opted for an environmentally safe cleaner for trucks, therefore minimizing the risk of an incident.

# Halifax company putting the 'green' into concrete



The new home of Ambassatours in Halifax was the first building in the world to be made with ready mix concrete products using CarbonCure. Inset, the CarbonCure system injects liquefied CO2 from a pressurized tank into the concrete mix. - Submitted photos

## Process takes carbon dioxide from smoke stacks and puts it back into the concrete

By CHRIS MUISE

Carbon dioxide has long been an accepted byproduct in concrete production.

One Halifax company wants to take the CO2 out of concrete, however – or, rather, they want to put it back in.

“We are leading an initiative to reduce the carbon footprint of the concrete industry,” says Christie Gamble, director of sales and marketing for CarbonCure.

CarbonCure was founded in 2007 with the goal of creating technology that allowed recycled CO2 harvested from smoke stacks to be used to strengthen concrete’s compressive strength, and eliminate the CO2 gas in the process by turning it into a nano calcium carbonate mineral.

“This calcium carbonate mineral actually acts to improve the compressive strength of the concrete itself,” says Gamble. “Because it’s now a mineral, the CO2 gas doesn’t exist anymore. It will never go back up into the atmosphere.”

The technology allows for even more carbon efficiency than just what is used in concrete production. Since the technology allows a concrete mix to reach its desired compressive strength with less concrete,

there’s less waste from concrete production on the other end, as well.

“Because we’re helping to improve the compressive strength, we’re also able to help concrete producers optimize their process. When they optimize their process, that can actually result in further environmental savings,” says Gamble, who says concrete’s chief ingredient, cement, is responsible for five per cent of the world’s greenhouse gasses. “The less cement you use, the less carbon that was emitted throughout the life cycle of this product.”

CarbonCure’s technology became ready for commercialization last autumn, partnering with long-time research partner Quality Concrete to install the system in their plant. Not long after, the new Ambassatours building by the Windsor Exchange – built by B.D. Stevens Ltd. – became the first building ever made using the technology for ready-mix concrete products.

“That’s never been done before - this is a brand new innovation,” says Gamble, who says some concrete masonry products had used the technology before then. “From a ready mix perspective, they were the first.”

For contracting companies like B.D. Stevens, the

ability to offer clients an environmentally friendly option is the chief benefit of employing the CarbonCure product.

“It’s a nice option to offer clients,” says Tracey Tulloch, a communications professional with B.D. Stevens. “With Ambassatours, the green-conscientious element is at the forefront for them, because they have all those buses, so they impact the environment in one way. If they can look at how they can save the environment in another way, that was appealing for them.”

“When you’re in construction, and in an industry that there’s a lot of waste, any way you can recycle and cut down on emissions, it’s a good thing,” adds Tulloch.

Gamble says that, by using CarbonCure technology, the Ambassatours project used and/or negated the production of 1,000 lbs worth of CO2. And since the Ambassatours project’s launch earlier this year, more buildings have been constructed using the technology, mostly in the form of residential buildings in the southeastern United States.

But even though their current scope is focusing on growing the technology across Canada and in the U.S., there’s already a lot of local interest in the

product, as well.

“Locally, we’ve received lots of calls from concrete producers that are here in Nova Scotia, and we’re currently in discussions to see where we’d like to grow it,” says Gamble.

Tulloch says B.D. Stevens will likely continue to use the product as long as there are clients with an ecologically conscious heart that will see it as a boon.

“If a client is interested in that, and making that kind of impact, then we’re always offering our clients whatever options are out there,” says Tulloch.

Gamble says that the company’s biggest motivator isn’t necessarily the bottom line, but rather, the hope that the technology will leave a major mark on the world in terms of getting more and more CO2 out of our atmosphere.

“First and foremost, this is a business-oriented company, but at its heart, we’re all a bunch of environmental hippies,” says Gamble, who says the ultimate impact this technology could have is in the millions upon millions of pounds of CO2, if CarbonCure were adopted as the global standard. “We’re really excited about the carbon footprint reduction.”

# New executive director selected to help steer the course for ACA

By **SCOTT FLEMMING**  
Atlantic Concrete Association president

This will be an exciting year of transition for ACA. As you probably know, our hiring committee has been searching for someone to take the helm of our association over the past number of months. I am delighted to announce that Pam Woodman has recently joined our team in the role of executive director.

Pam led the Landscape Nova Scotia Horticultural Trades Association since 2008 and worked previously as Program Director for the Environmental Services Association of Nova Scotia for 11 years. Pam brings over 20 years of experience working with not-for-profit organizations, specifically with industry associations. She holds a diploma in architectural technology and another in community and environmental planning and has been designated as a registered Canadian professional manager with the Canadian Professional Manager's Association.

Pam has been in the position for only a couple months and is already working closely with board and committee members to help chart a new course for the association. If you are in the Halifax area, I encourage you to drop by our office at 301-3845 Joseph Howe Dr. and introduce yourself to Pam.

Our dedicated board of directors and committee members continue to meet on a regular basis, working diligently to address current issues and to

anticipate the future direction of regulatory and economic forces on our industry. Membership with such a strong association has many benefits indeed, and I'm looking forward to expanding on our offering under the direction of the board and guidance from our new executive director.

I am very fortunate to have such a great team of volunteers to work alongside, always willing to step up and contribute their valuable time and expertise towards the betterment of our industry. It is truly a team effort at ACA. Along with Pam, I am also excited to represent the Atlantic region at the national level as a voting member of the Canadian Ready Mix Concrete Association and to continue to work closely with our friends at the Cement Association of Canada.

Finally, we have some great upcoming ACA events and we hope you can find time out of your busy schedule to join in the fun. Coming off our tremendously successful annual general meeting in St. John's, we now have our sights set squarely on August for our family weekend and board meeting at the Atlantica Oak Island Resort on the beautiful south shore of Nova Scotia. Our very popular ACA Golf Tournament will follow in September at the lovely Royal Oaks Golf Club in Moncton. Both are top-notch events that are not to be missed. I wish everyone a safe and successful construction season and thank you again for all of your support.

## Ready Mix Briefs

### New position announcement to association

The Atlantic Concrete Association would like to congratulate new member, Mark Munro of McInnis Cement. Munro is now Atlantic Canada territory manager for McInnis.

### Casey, Coffey take over as chairmen of association committees

Casey Concrete's Bruce Casey will now take over as chairman of the Atlantic Concrete Association's membership committee.

Also taking on the role of chairman of an association committee is Dan Coffey of Shaw Resources. He will head the marketing committee.

### ACA past president dies

We are saddened to announce that Keith White, president of the Atlantic Concrete Association from 1986-87, passed away in February.

### Congratulations to the Rice family

V.J. Rice Concrete Limited celebrated the addition of a new member to the family. Mila Anne Rice was born Dec. 18, 2015. She is the daughter of Jason and Ashley Rice, granddaughter of Tom and Debbie Rice and great-granddaughter of V. Jaffray and Janet Rice of Bridgetown, N.S.

## Dates to remember:

**August 19 to 21st, 2016** – ACA Summer Meeting & Family Fun Weekend – Atlantica Hotel, Oak Island Resort, N.S.

**September 15th, 2016** – ACA 21th Annual Golf Tournament – Royal Oaks Golf Course, Moncton N.B.

**October 19th, 2015** – ACA Fall Board Meeting – TBA – Halifax, N.S.

**December 5th 2016** – ACA Dementfest Concrete Mixer – Garrison Brewery, Halifax, N.S

**February 23-25, 2017** – ConAtlantic '17, The Hilton, Saint John, N.B.

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Due to a publishing error in the winter edition of the Ready Mix News, the back page did not feature our Associate members as it usually does. The Atlantic Concrete Association would like to apologize to our members for the error. We have included a complete listing of the associate members in this issue and we encourage you to think of our members first when making purchasing decisions for your organizations.

Atlantic Concrete Association Associate Members 2016	
Organization	Province
Aberdeen Paving Ltd.	NS
All Weigh Systems (2002) Inc.	NS
AMEC Earth & Environmental	NL, NS, NB
Arrow Construction Products Limited	NB, NL, NS
Association of Canadian Industries Recycling Coal Ash	QC
Atlantic Underground Services	NB
Balances Peninsula	NB
BMH Systems	QC
C & CS Atlantic Inc	NB
Cement & Albany Cartage Co. Ltd.	NS, NB
Cement Association of Canada	ON, QC
Ciment Quebec Inc. (CQI)	QC
Command Alkon	Alabama
Component Repair & Supply	NB
Conquest Engineering Ltd.	NB
Construction Association of NB	NB
Construction Association of NS	NS
Construction Association of PE	PE
CRH Group Canada Inc.	NB, NL, NS, QC
Credifax Atlantic Limited	NS
Dalhousie University Civil & Resource Engineering	NS
Eastern Infrastructure Inc.	NS
Euclid Admixture Canada Inc.	NS, QC
Fleet Harmony Inc	NS
Gallant Aggregates	NS
GCP Applied Technologies	NS
GCR Tire Centres	NS
Gemtec Ltd.	NB
Goodyear Canada Inc	NB, NS
Hi-Tech Scales Ltd.	NL
Hoskin Scientific Limited	ON
J.W. Bird and Company Limited	NB, NL, NS
JETCO Contracting Inc.	NS
Lafarge Canada Inc.	NS, QC
Landscape Nova Scotia Horticultural Trades Association	NS
Lockhart Truck Center	NS
London Machinery	ON
MacKay's Truck & Trailer Center Ltd.	NS
Marcotte Systems Ltd.	QC
Maritime Fence	NS
Mclnnis Cement	QC
Merit Contractors Association	NB, NS, NL
Modern Enterprises Limited	NB

MPAQ Automation	ON
New Brunswick Home Builders Association	NB
New Brunswick Power	NB
New Brunswick Road Builders & Heavy Construction Association	NB
Newfoundland Styro Inc	NL
NFM Consulting Inc.	NS
Nova Scotia Home Builders Association	NS
Parts for Trucks Inc.	NB, NL, NS, PE
Peri Formwork Systems Inc.	NS
Pinnacle Agencies Ltd.	NB, NL, NS
Pompaction Inc.	QC
ProAll International Mfg. Inc.	AB
Pumprite Ltd	NB
S.W. Weeks Construction Ltd	NS
Separation Technologies LLC	NB
Shaw Resources	NS
Sika Canada Inc.	QC
Simard Suspensions Inc.	QC
Stanhope Simpson Insurance Ltd.	NB, NS
Stantec Consulting Limited	NS
Top Construction Ltd.	NS
Trimac Transportation Services Ltd.	NL
TrueFoam Ltd	NS
University of New Brunswick	NB
Truckers Association of Nova Scotia	NS
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# Safety more than just buzzwords on company vehicles

*Focus on health and safety has to be more than on loss time*

By **KODY MESSENGER**  
Safety Supervisor  
Ocean Contractors Limited

With the recent passing of the National Day of Mourning and statistics stating that approximately three people die at work every day in Canada, safety is, and very much should, be at the forefront of everyone's mind, regardless of what industry they operate in.

Buzzwords and catchphrases abound. "Target zero", "beyond zero" "we're diligent about safety" are seen all over company vehicle and mixer trucks, but are we really grasping the importance of this or are we just trying to save face?

For the majority of the ready mix industry I'd like to say yes, we are grasping the importance, however we all have a long ways to go.

Consider your own safety program and culture; is your focus really on protecting your people? Or is your focus on just reducing loss time incidents to reduce your WCB premiums, and to keep your good standing up?

As ready mix providers – and any other industry for that matter – the secret to our success is our people, while safety strategies that focus on the numbers are altogether helpful. Health and safety at its roots is about the people.

As an industry, we all need to refocus and ensure our efforts are on protecting our most valuable assets, our people. When we consider this we have to remember we are not only legally obligated to protect them but we are morally obligated to do this as well.

Imagine if you will for a moment, the death of your youngest, least experienced mixer driver. Aside from the potential legal implications of this, what are the moral implications? How are you and your workforce going to cope with this loss? You've now not only lost a valued employee, but someone has lost a friend, someone's dad, someone's son, because of the work, you sent them to do. It should be a terrible and terrifying thought indeed.

How can we help to prevent this? By turning our organizations attention to the people and what they need to do their job safely.

Ready Mix as a whole is a surprisingly hazardous occupation, silica exposure, traffic, noise, truck tip overs, pedestrians, power lines and many other issues affect our people every day. So having a solid, comprehensive plan to deal with them is important. Consider looking at your training and educational programs, all employees have the right to know about the hazards in their work. Do your training and educational programs provide them with the information they need to do the work safely? Are they competent to do their jobs?

Consider your equipment you have them operating. Is it safe? Do you keep it well maintained and do you allow your people to inspect it? Or is it old and falling apart? Mixer drivers spend the bulk of their time in and around their trucks, are the trucks themselves safe and do you have a way of fixing them when they aren't?

We, as an industry have a long way to go before we can rest assured we've all done our best at keeping each other safe. If we continue to remember that we are all responsible for each other's health and safety, from the newest driver, to the most senior of management, we will all do well at keeping everyone at our workplace safer.



Participants review finishing techniques in the Gold Seal accredited flatwork course offered for members of the Nova Scotia Roadbuilders Association in Dartmouth.



Atlantic Concrete Association board member Kent Nickerson gets his hands dirty during the training at the 3 Day Concrete Basics Course.



Drivers taking part in the Halifax CDP course write their certification exams.



Participants at the 3 Day Basics Course in Halifax get some hands on education.



Shane MacDow reviews the product knowledge module with CDP participants in Moncton.



As well as some hands on work, attendees participated in a roundtable discussions with course instructor Norm MacLeod during the 3 Day Basic Course.

# GPS technology is not fleet management software

By **ROBERT MACKAY**  
President  
Fleet Harmony

Don't expect GPS to handle all fleet management needs.

GPS and similar kind technology are an important part of fleet management with many practical applications. However, claims these technologies can handle all fleet maintenance and management needs aren't true.

GPS is not fleet or heavy equipment maintenance software.

GPS technology can provide odometer and usage readings, positional tracking, and messaging. It can give reminders and alerts about when maintenance is due. But someone has to complete this maintenance and manage the associated information using internal documents, spreadsheets, procedures, and accounting software.

Reporting when maintenance is coming due is where GPS technology stops, and where fleet maintenance software begins. Fleet maintenance software allows the tracking, management and reporting of all details associated with scheduled maintenance and repairs, including where the repair was completed, the mechanic and his notes, parts and labour, and parts warranty.

It also allows users to log changes to the fleet such as when a unit was reactivated or when odometer and hours usage readings have changed.

These features are key in jurisdictions, where the activities of your fleet maintenance activities require in-depth transparency.

Fleet maintenance software also provides mainte-

nance specific reports to breakdown all costs including parts, labour, taxes, and fuel.

GPS Technology can't provide this information. It is however, a contributor to the unit cost.

Some GPS technology providers also claim to do IFTA reporting when they can only provide the mileage breakdown - and not the fuel purchases. Therefore, their IFTA software is only partially complete, and what remains can still be an administrative pain.

With some fleet management software the IFTA tax software is embedded with the maintenance scheduler. With one entry of a single trip in the IFTA calculator, it will not only handle the complete IFTA report, but it will also trigger any preset maintenance reminders, update actual odometer readings, and include the details in the driver mileage and fuel consumption reports.

For those companies where IFTA reporting is not a concern, the software allows them to maintain odometer and hours usage with a very easy to use screen that resembles a spreadsheet, but has all the edit checking controls built in specifically for fleet management.

The cost of GPS technology solutions has come down in price, but it's still not cheap, especially when the total number of units in the fleet is added up. Plus, there are data usage fees.

Companies need to think carefully about whether their needs and goals will be met by implementing these fleet solutions.

If the primary reason you are considering implementing GPS technology is to handle fleet maintenance, then think again, save yourself the money, and implement fleet maintenance software.



Dan Mace going over safety expectations for drivers at the Pump Operators Certification Course held in Halifax in March.

# Life is a (low carbon) highway

## How climate change is impacting road building

The way we design, build and maintain our roadways may have an impact on future greenhouse gas emissions.

Transportation accounts for about a third of all greenhouse gas emissions in Canada and in most provinces is the single largest source of emissions, followed closely by buildings and industry.

Cars and transport trucks together account for over 80 per cent of GHG emissions from this sector.

Any strategy to reduce greenhouse gas from transportation will have to place heavy emphasis on improving the carbon efficiency of on-road transportation as well as encouraging a switch to other less carbon intensive transportation options such as public transit and active transportation like cycling and walking.

Canada is on the verge of major investments in infrastructure with many provinces and municipalities looking to ensure that those investments support the long-term goal of creating low carbon communities as well as communities that are designed to weather changes in future climate.

Recent research suggests that road design, materials and maintenance can have significant impact on carbon emissions at all phases in their lifecycle.

But, in Canada very few governments even allow for alternative bid designs, meaning that road building contractors are artificially constrained from proposing innovations that could improve various qualities such as price, performance, or carbon-intensity.

On price alone, there is strong evidence an unconstrained tendering process, open to alternative bid design, can lead to significant savings.

Analysis of Oman Systems' bid tab information confirms that competition between industries involved in the production of paving materials has a significant positive impact on pavement unit prices and agencies' purchasing power.

More competition translates to more roadways paved, with the same investment.

The same holds true when comparing life cycle and initial costs. While initial cost has been the predominant factor in awarding road contracts, more and more evidence suggests that a life cycle approach to costing would lead to more efficient spending on road infrastructure.

For example, most municipalities currently construct flexible (asphalt) pavements for virtually 100 per cent of their roadway network. Although suitable for lower volume roadways, asphalt pavements may not always be the most cost-effective alternative when comparing life cycle costs, particularly given that even the initial cost of flexible and rigid (i.e. concrete) pavements have equalized in recent years.

More durable and long lasting rigid pavements can yield lifecycle costs savings on the order of 20 per cent, largely due to the fact that rigid pavements require less maintenance and last far longer before needing major rehabilitation.

Researchers at MIT have extended this life cycle analysis approach to the question of the carbon intensity of road infrastructure to answer the question "can we pave the way to greenhouse gas reductions?"

At the heart of this research are pavement-vehicle interactions and, in particular, how a pavement's stiffness impacts on fuel efficiency and therefore on the carbon emissions of combustion powered cars and trucks.

While research had already shown that smooth surfaces are more fuel-efficient for vehicles than

rough surfaces, early attempts to study pavement vehicle interactions were challenged by the ability of even today's most sensitive instruments to measure small differences in the field.

So MIT developed a computer model calculate excess fuel consumption due to the deflection of pavements.

MIT found that typical flexible pavements result in more deflection than typical rigid pavements. That is, the weight of a vehicle is sufficient to create a microscopic depression in flexible pavements "so that, to a very small extent, the car is always going uphill" and uses more fuel."

In contrast, "stiffer roads, such as those made from

concrete rather than asphalt, can ... provide a slight boost in efficiency."

This effect is more pronounced the heavier the vehicle and the softer the pavement, so the excess fuel consumption generated by deflection is greater for transport trucks than for cars, and can be exacerbated when temperatures are very high.

On average, stiffer pavements yield a three per cent improvement to fuel efficiency.

MIT predicts that, in the U.S. pavement network, stiffer pavements could reduce annual carbon dioxide emissions from cars and trucks by some 46.5 million metric tons.

More impressively, MIT has shown how department of transportation data on pavement material, condition, and traffic patterns can be mapped to identify greenhouse gas "hotspots" and prioritize road rehabilitation and material selection.

At the federal level in Canada, there have already been robust efforts to reduce the carbon intensity of cars by harmonizing with the new U.S. regulated vehicle efficiency standards.

*Reprint from ReNew Canada, The Infrastructure Magazine*



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