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National Ready Mixed Concrete Association 66 Canal Center Plaza, Suite 250 Alexandria, VA 22314 703-706-4800 www.nrmca.org

Michael Philipps President

703-706-4839 / mphilipps@nrmca.org Gregg Lewis, Executive VP, Promotion Strategy & Communications 540-529-3893 / glewis@nrmca.org

Frank Cavaliere, Director of Communications & Association Editor Managing Editor, Concrete InFocus 703-706-4841 / tcavaliere@nrmca.org

Buildings 847-918-7101 / llemay@nrmca.org Building Codes

206-913-8535 / tpeng@nrmca.org Engineering

703-706-4860 / clobo@nrmca.org Executive Office 703-706-4853 / hhouck@nrmca.org

Financial Activities 703-706-4832 / twaugh@nrmca.org

Government Affairs 703-706-4856 / atyrrell@nrmca.org Industry Relations

703-706-4858 / nmaher@nrmca.org Information Technology 703-706-4867 / lafable@nrmca.org

Marketing 703-706-4883 / hstuart@nrmca.org

Meetings 703-706-4852 / jwalgenbach@nrmca.org

Membership 703-706-4838 / bruffing@nrmca.org NRMCA Research Laboratory

703-706-4872 / ssherman@nrmca.org Safety, Environmental & Operations 703-706-4861 / gmullings@nrmca.org

Pavement 703-706-4892 / bkillingsworth@nrmca.org

Plant & Truck Certification 703-706-4868 / kbean@nrmca.org Publications

703-706-4865 / jjenkins@nrmca.org Regulatory Affairs

703-706-4861 / gmullings@nrmca.org State & Local Government Affairs

703-675-7603 / jloyer@nrmca.org Sustainability 412-420-4138 / jbogdan@nrmca.org

Training & Education 703-706-4854 / edickson@nrmca.org

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Challenging Times and Better Days Ahead



John Carew Carew Concrete & Supply Co.

arlier this year – in March actually, during NRMCA's annual convention in Las Vegas when our nation and world was undergoing quite a change – I was honored to be elected chairman of the Board of Directors of NRMCA. I'm part of a second-generation, family-owned ready mixed concrete producer from Appleton, WI, that has long valued our membership in NRMCA, believing that a strong national voice is imperative for the health of our business and the industry as a whole.

By the time you read this, I am hopeful that our country is at least slowly resuming business operations and has minimized to the extent possible the truly awful toll the coronavirus pandemic has taken on many of us. Like many of you, I have had to make adjustments in my personal and professional life, dealing with shifting priorities while always trying to focus on keeping myself physically and mentally sharp in order to help others. One slogan, if you will, that I found especially helpful came courtesy of a podcast I came across: Crisis = danger + opportunity. To survive, you must be resilient, and being resilient includes being creative, flexible and readily adaptive to changing situations. Fingers crossed again as I write this, that your businesses will be able to thrive for the remainder of 2020 after enduring such challenging months to begin the year.

I want you to know that I'll being working closely with NRMCA President Mike Philipps, helping in any way I can to guide the Association's efforts in supporting and servicing its members. Because of my longstanding involvement with many committees and staff members, I believe I have the knowledge base to serve as a valuable resource for current programs and lend some advice to keep our industry not just stable but moving forward.

Succeeding my friend and industry colleague Bill Sandbrook as Board chairman is no easy task. Like him and all current and past Board members, I chose to serve when asked. After all, it is an actively engaged industry combined with NRMCA's professional personnel across all Association departments that has kept NRMCA growing and prospering for 90 years.

Finally, I cannot end this column without thanking you for your support. The only way to successfully navigate these most challenging times is for the Association, its staff, Producer members, Associate members, state affiliates, and affiliated associations and organizations to work together to the best of their abilities. I look forward to playing a small role as Board chairman and working with you all. Please know that your work is needed and appreciated now more than ever. I truly hope that we come out of the year stronger as a nation and industry and, knowing many of you, I'm confident that will come to pass.

Sincerely, John

John Carew of Carew Concrete & Supply Co., Appleton, WI, is chairman of the Board of Directors of NRMCA. He can be reached at jcarew@carewconcrete.com.



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WHAT I LEARNED FROM 'FIELD OF DREAMS'



Jon Hansen NRMCA Senior Vice President, Local Paving

s I write this article in April for this Summer 2020 edition of Concrete InFocus, the world is consumed by the COVID-19 pandemic. When the word got out that my wife is a pro with a sewing machine, the phone rang non-stop for friends wanting masks. A tire company is cutting production because no one is traveling and wearing out their tires. This rationing of essential goods has not seen an equal since WWII. A friend from New York has closed his entire company for concern of his employees, some of whom had contracted the virus. As the eternal optimist, where is the silver lining, I begin to wonder? I would argue that the answer lies in the forced slowdown that the current situation presents.

A notice came this afternoon that a webinar I signed up to attend was at capacity and I might not get in. This did not surprise me since NRMCA webinars of the past week also had record attendance. We are getting calls from designers who now have time to look at NRMCA collateral material for the first time, which is opening a dialogue that formally was not there. Both NRMCA PaveAhead and Build With Strength launched, on very short order, a complete webinar remote learning package.

By the time this article hits the newsstand so to speak, we should have returned to near normal conditions, albeit a new normal. With every crisis, a new normal occurs, just like post 9/11 saw security lines at airports or the 1968 federal mandate requiring seat belts creating a new normal in automobiles. So in 2020, the COVID-19 pandemic will create its own new normal. Buildings will look different, just as the airports look different today than they did prior to 9/11. And companies will change to match the new normal. I have a few predictions:

- Personal protection equipment (PPE) will not be something that just big companies in big cities will use; companies throughout the U.S. will make protecting their employees a primary concern. Some will adopt the practices willingly while other will be forced into it by contract or insurance carriers.
- Equipment will change. Much more emphasis will be put on operator safety. Quieter motors, air filtration in cab and other enhancements that the world of artificial intelligence affords everyone. Maybe measuring operator fatigue, reaction time, much will come from the equipment industry. I am reminded of the auction I had in 2004, selling much of the construction equipment I had accumulated over 30 years. The person that bought an air compressor asked me where the belt guard was, assuming there

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was one on the compressor that had been removed. When I told him that compressor never had a belt guard, that during the time it was purchased in the mid 1970's we just all knew not to stick your hand in that area or wear loose clothing around it when it was running. The normal of the 1970 machine was not the normal for 2004. A belt guard seems insignificant when today's technology can even know to stop a saw blade if a finger touches it.

 Buildings will become smarter than they are today. We all have heard of the smart building, the one that monitors itself in temperature, lighting, locking, etc., but what about a smart building that monitors the occupants? More than just the cameras that are everywhere now; how about a building that can tell if an employee is running a fever, coughing, sneezing or is contagious? Far-fetched, you say. I don't think so in light of 2020. Just like cars on the road today that can avoid a collision, or even self-drive, smarter buildings and public places could have the ability to detect virus intrusion.

I know some of this is a bit Orwellian, but we are on the verge of change. Construction will rebound, like it has so many times in the past and those that adapt to the new normal will thrive.

And speaking of new normal, it is my pleasure to direct you to a feature article in this issue written from inside an owner's perspective of how to make material choices and methods of commercial construction. Mike Hoeft is well equipped to pen this feature, having been in the concrete construction industry all his life along with a stint running a store construction division for a major Midwest retailer. He brings to the concrete industry not just the same "concrete is good, concrete is long lasting, concrete is sustainable" tag lines, but insight from being in a corporate boardroom with the bean counters in retail to the industrial executives who have differing opinions on return on infrastructure investment, be they buildings, parking lots or any other thing that goes into their company. Be sure to check out his article on page 32, Understanding LCCA from an Owner's Perspective.

I leave you for this issue with my favorite lines from one of my favorite movies, "Field of Dreams." James Earl Jones's character Terence Mann, a spinoff of the author J.D. Salinger, gives one of the most memorable dialogues in the entire film: "The one constant through all the years, Ray, has been baseball. America has been rolled by like an army of steamrollers. It has been erased like a blackboard, rebuilt and erased again. But baseball has marked the time."

I'd like to change the word *baseball* in these lines and insert the word *construction*. America has been rolled by (and on) like a steamroller. In 1918 when the flu pandemic took the life of my wife's grandfather at age 27, leaving her grandmother with her father who was just a year old and pregnant with her uncle who was born in 1919; to the 1930's depression, the 1941 bombing of Pearl Harbor, the 1980's farm crisis, the 9/11 attacks and now 2020 COVID-19. We build buildings, companies and businesses. They get erased like a blackboard, rebuilt and erased again. But *construction* has marked the progress of time. We are a country of builders, always have been and always will be. And even when detours we can't control cause us to change course, we work our way back and continue to build.

Jon Hansen can be reached at jhansen@nrmca.org.



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WHAT IF A CONCRETE PLANT CAN'T MEET ENVIRONMENTAL OBLIGATIONS?



Douglas Ruhlin

he COVID-19 health crisis has had significant social and economic impacts on everyone, certainly including the concrete industry. One area of operations which may not have received the same degree of focus in these troubling times is activities related to environmental regulatory compliance, such as those things a concrete producer must do to comply with the many environmental permits and approvals held at a typical concrete plant. What if a concrete plant or company failed to meet these regulator compliance obligations? Given the severity of the current crisis, environmental requirements may seem less than critical, but as long as a concrete plant continues to hold environmental permits and approvals, these obligations continue to need to be met.

Disclaimer: The Environmental Protection Agency (EPA) and many states have issued guidance on what to do should environmental obligations under specific environmental regulations not be capable of being met, whether as a result of COVID-19 or some other unplanned crisis or disaster. And many regulatory programs include specific requirements (such as required notifications) should failure to complete compliance-related activities happen. This article is not meant to take the place of any specific information provided by the EPA or any state agency – check with them first and always follow their guidelines – nor is this article intended or meant in any way to be legal advice. Instead, we're only attempting to give you some general guidelines!

So in general, without being too specific, what are some steps that a concrete producer can take should it fail to meet its permit or approval requirements, whether it might be failing to get a stormwater sample or visual inspection, failure to do regular reporting or even a spill, leak or other release of a chemical or petroleum to the environment?

Some general guidelines:

 Be clear of this: Failing to meet a permit obligation is not the same thing as being out of compliance by not having a permit or approval. If you need an NPDES permit but don't have one, you're still in violation and no crisis will help with that. Talk to legal counsel or a qualified consultant, get an environmental audit and get in compliance.

- 2. Have legal counsel (an attorney, one with environmental regulatory experience) on hand to deal with situations like this. If not on retainer, at least know whom to call if you have a problem.
- 3. Know who your environmental government inspector is for the specific permits you're covered by. Likely, you have a "water inspector" who covers NPDES compliance, an "air inspector" who covers your air permits, etc. While it might be the same person, it's probably multiple people and you should know who they are. Keep a record of their names and contact information and get to know them when they show up at your site. When you have a problem (and after you've discussed the situation with your legal counsel), you might find them to be pretty helpful. And they might just be the people who you are supposed to report to first when you have a problem, such as missing a sample. They can be a great source of information and an ally when there's a problem.
- 4. Know what your permits and approvals say and require. They might describe what's

required in the event of a non-compliant situation, like who to report to and when. As I say all the time, "read your permit".

- 5. You couldn't do something? Document why not. Write it down, with as much detail as necessary. Did you take steps to try and mitigate the situation? Write them down also and what the outcome was. You're certainly going to be asked, so make a record.
- 6. If you truly have a problem that stops you from doing something, don't take advantage of the situation and don't slip up on a regular basis. If you miss a sample for some reason, don't take that as your opportunity to start missing all samples. If you can't get that report done, don't take it to mean that you can start missing all following regular reports. Address the situation as soon as you can and get on with it. Get back into compliance as quickly as you can. Prompt, corrective action will be taken into account.
- 7. Make contingency plans before a problem arises, review them and undertake corrective actions after the situation has passed. If only one person is trained to take samples and he or she isn't available for some reason, it pays to have a backup plan,

such as another trained person or external help to take the samples when needed. Not having a contingency plan won't be viewed favorably, having one might be a requirement!

8. And most importantly, know that there are things that cannot be overlooked, such as a chemical or petroleum spill, leak or release to the environment that might require immediate reporting or pose a threat to human health and safety or the environment. Fail to do this sort of thing and you're likely not going to get any leeway, no matter what the situation!

Again, none of this is intended to be legal advice and always follow applicable federal and state government guidance and requirements. But in a crisis situation do your best to meet your requirements and your best efforts will probably be taken into consideration. Remember, all crises eventually pass and you'll be back to normal sooner or later.

Doug Ruhlin is an environmental/sustainability consultant at Resource Management Associates. For more information, he can be reached at 1-888-762-0320 or doug@rmagreen.com. His company website is www.RMAgreen.com.



Ipave ahead

PROMOTION IN A SOCIALLY DISTANCED WORLD





Phil Kresge Senior Vice President, Local Paving

ere in the Northeast there is a family-owned department store called Boscov's. With 50 stores in eight states and a goal of one new store per year, Boscov's continued success makes it an outlier in a retail market where many competitors fail and close stores. For the late Albert Boscov, chairman, CEO and son of the store's founder, Boscov's was more than just a place to shop. To him, the store's popular slogan, "Did you Boscov today?" was more than just a marketing slogan. It was a way of life.

So now, by show of hands, I ask you, "Did you Pave Ahead[™] today?" (To raise your hand, simply e-mail me a quick "yes" message – **pkresge@nrmca.org**. I expect my e-mail box to be flooded.) In my last article, I encouraged you to check out the paveahead.com website and to make it your primary resource. I'll be very interested to see just how many hands are raised.

While thinking that Pave Ahead[™] becomes a way of life may seem a bit extreme, it should be forward enough in your mind that it becomes your first stop for all things concrete pavement related. And, more importantly, it should be so for your customers as well. There is a trove of information available. And it provides you a means to stay in front of your clients while staying socially distant.

Some eight years ago, as part of the NRMCA National Accounts Promotion Team, I hosted concrete pavement promotional webinars, sometimes four per month, on a variety of topics. At the outset, I would often have as many as 25-30 participants on such presentations as *Designing and Specifying Pervious Concrete, The Quantifiable Advantages of Concrete Parking Lots* and *Roller-Compacted Concrete – Your Third Choice for Pavement.*

Everything Old is New Again

Over a matter of time, interest in the webinars waned, participation dropped and we drifted away from distance learning. However, with recent events changing our way of doing business, everything old is new again.

In April, we kicked off our *Pave Ahead*™ Concrete Pavement Series - a weekly webinar program focusing on technical topics related to design, construction, maintenance and rehabilitation of concrete pavements. The series offers Continuing Education Learning Units for the American Institute of Architects (AIA) and Professional Development Hours (PDH) for engineers and other licensed professionals. Topics in the series include Designing Concrete Industrial Pavements, Soils 101: What to Know for a Successful Paving Project, Concrete Overlays of Existing Asphalt Surfaced Streets and Parking Lots, and Concrete Trail Design. Additional presentations will detail proper jointing practices, materials and construction specifications and concrete maintenance and repair. The inaugural presentation, Designing Concrete Parking Lots and Streets, had over 400 participants!

Part of the success of the program has been our members and state affiliates sharing



the registration links with their databases of customers in the designer/specifier community. You can take the opportunity to invite your contacts to join the webinars. The list of scheduled webinars is always available at **paveahead.com/education**. Then follow up with them, providing them a selected piece of collateral downloaded from paveahead.com and suddenly you are their go-to concrete expert.

Similarly, the *Pave Abead*[™] *Concrete Paving Promotion Series* is geared toward sales and promotion activities for the concrete professional with an emphasis on increasing market share and profits for concrete producers, contractors and related product manufacturers. Sessions within this series include *Understanding the Guide to Concrete Overlays of Asphalt Parking Lots, Overview of the Guide to Concrete Trails* and *Partnering with Contractor and Engineers for the Pursuit of Paving Projects.* The old favorites from our previous promotional webinars are here as well.

Good Partners Make Good Business

Speaking of partnering with contractors, I can think of no better way to grow business. A focus of our Concrete Parking Lots Boot Camp is teaching producers and contractors to partner to be able to offer a team approach to pavement market development. Instrumental in this has been the growing partnership between NRMCA and the American Society of Concrete Contractors (ASCC). The NRMCA/ASCC Joint Paving Committee has developed a Paving Tool Kit which includes many of the documents available on our Pave Ahead[™] website.

Of special note, the committee has developed Podcasts on Paving, a series of recorded conversations with concrete contractors and other industry experts. Podcast One CO₂ - I Didn't Know You Could Do That CO₂ - is a discussion on concrete overlays of existing asphalt pavement. Its intent is to introduce contractors to the overlay process and help them educate their prospective customers. Podcast Two -Concrete Takes on Asphalt - discusses the advantages of concrete pavements (sustainability, structural superiority, reflectance, etc.) from an owner's perspective. The target audience is property owners. Design of the Times is the third podcast and it addresses proper concrete pavement design using ACI 330R – 08 and ACI 330.2R – 17 and is targeted toward the design community. The fourth podcast, *Stronger Together*, discusses education and collaboration between producers and contractors to grow the market.

The podcasts are hosted in the Paving Tool Kit on the ASCC's website, but they are also available for download at **paveahead.com/ resources**. They can be a valuable resource to you, if you take the opportunity to share them.

Social Media Overcomes Social Distancing

Social distancing is a term I had never heard before March 2020. Now it's part of everyone's vocabulary. Out of necessity, we have resorted to more conference calls, GoToMeetings and Zoom video conferencing. In the span of one week, I participated in eight separate remote conferences. And even as a self-proclaimed "technologically impaired dinosaur," I must admit the concept was easy to grasp and the meetings were very productive.

Besides the video conferences, there is much more focus on using social media sites such as Facebook for technology transfer – or at least as a vehicle to drive traffic to more specific detailed websites. In late February, we launched facebook.com/PaveAhead.org. The page is meant to be a clearinghouse of information related to the Pave Ahead[™] campaign and to steer traffic to paveahead.com. Additionally, by creating events on the page we've been able to inform our members, partners and potential customers of upcoming remote events. We've even provided registration links for the Concrete Pavement and Concrete Paving Promotion Series.

If you haven't already, I encourage you to "like" and "share" the Pave Ahead™ Facebook page. Use the page as an extension of your own social media presence. Invite your customers to subscribe to the page. That way, they will receive the same announcements and event invitations as you. And each notice gives you the chance to reach out to them to make sure they are taking full advantage of every opportunity.

In upcoming editions of *Concrete InFocus*, I plan to focus on each of the individual pages listed in the Paving Projects header on paveahead.com. My goal is to make you familiar enough with the website so that you're comfortable to ask, "Did You Pave Ahead Today?"

Phil Kresge can be reached at pkresge@nrmca.org.

developing industry leaders



MOVING THE NEEDLE ON DRIVER RETENTION



Steve Barton, Redi-Mix Concrete – A US Concrete Company Josh Cirulnick, Vulcan Materials Company Timmy Duhon, S&W Ready Mix Concrete Kevin Johnson, Superior Concrete Materials – A US Concrete Company Craig Zampiceni, Preferred Materials, Inc. – A CRH Company

t's not a new topic for discussion: improving driver attraction and retention in the ready mix industry. The issue is widely known throughout our industry from local to multinational producers and NRMCA covers the topic regularly through the efforts of the Workforce Development Committee and the NRMCA Delivery Professional Survey, among numerous other initiatives. In spite of the impact the coronavirus will have on the mixer driver pool in the short term, the topic deserves all and more of the attention it receives. Year after year, there's still more work to be done.

20

30

mph

km/h

Surveys each year yield similar results regardless of the methodology. Drivers



welcome better pay and benefits. They value a more predictable schedule that affords them the ability to plan their lives for more than 48 hours at a time. In terms of recruitment, drivers enjoy their jobs enough to refer their friends and relatives for similar positions. These referrals are consistently the leading recruitment method for our drivers.

The Workforce Development Group which serves within NRMCA's Developing Industry Leaders (DIL) program has brainstormed different ways to explore this topic; to view it through a new lens and see if we could find new insights. We created a short list of questions that was not that dissimilar to past surveys, focusing on what drivers want, how they feel about their jobs and if they had suggestions for improving their environments. However, we asked each other and our colleagues to spend as much time as they needed with the drivers to get responses. Sometimes this paid dividends in a small group discussion with multiple drivers fueling each other's responses. Other times, we were limited to passing the surveys out at plants hoping to get a decent response rate. Through our best efforts, the surveyed drivers in Florida, Texas and the Carolinas produced the same results as past surveys.

The data gathered was informative but not exactly actionable. We agree with previous recommendations of the Workforce Development Committee to find new ways to attract candidates, to pay at or above market rate and to better understand the needs of our respective workforces. We also think it's time to promote a new type of management that many ready mix producers may not be practicing with drivers today.

Effective supervisors must take an individual approach to know and motivate each of their drivers, but they aren't always incentivized to do so and are most frequently putting out the latest fire. Driver supervisors need to be encouraged by upper-level management to take an active management approach to bring lasting change to their driver cultures. By becoming more employee-centric, supervisors can identify the needs and motivations behind each driver and, as a result, provide a more fulfilling work environment.

Some drivers thoroughly enjoy delivering concrete and making customers happy; others might enjoy those aspects of the job but want to develop their careers in a different direction within our industry. Some drivers don't mind erratic hours, the seasonality of demand and never knowing what the next day will bring; other drivers might want shifts and structure. If we aren't taking the time to ask, we won't know how to retain our drivers and turn their careers into the opportunities they want.

Meeting regularly gives supervisors the chance to learn what functional amenities drivers want, how they prefer to receive feedback and praise, and how they want their careers to grow. Hold your driver supervisors accountable for finding the real answers to retaining each driver and for tracking progress toward creating a great driver environment. Once that driver environment is a reality, it will ideally attract a few more drivers to man your fleet and keep even more from leaving for other opportunities.

The real answers to increasing driver retention aren't going to fit in a quantitative survey or a categorized response to an open-ended question. The real answers to retaining your company's drivers are going to be personal to each driver; each one will require a different solution. Encourage your driver supervisors to meet regularly with your drivers and make sure you give them the time to do so. Creating stronger, more valuable working relationships with your drivers now will pay dividends in future workforce stability and growth.

For more information on the Workforce Development Committee and how you can get involved in addressing critical issues facing the ready mixed concrete industry, contact Eileen Dickson at edickson@nrmca.org.

PORTLAND-LIMESTONE CEMENT AN IMPORTANT STEP TOWARD ZERO CARBON CONCRETE

By Colin Lobo, PhD, PE and Lionel Lemay, PE, SE, LEED AP

oncrete producers are under pressure, just like other building product manufacturers, to reduce the carbon footprint of their products. Initiatives such as LEED, Architecture 2030 and more recently "Buy Clean" legislation are motivating building product manufacturers to reduce their carbon footprint through improved product formulation and manufacturing processes. Because concrete is the most widely used building product, it is often cited as the product that embodies the most carbon dioxide, primarily due to the cement manufacturing process. Carbon dioxide emissions from cement manufacture result from calcination of limestone, which represents about 60% of the CO₂, emissions, and burning of fossil fuels to achieve temperature around 2400 °F in the kiln. Most design professionals understand that concrete is an essential component to nearly every building, road or bridge we build. Concrete is literally the foundation (and superstructure) to modern

society. But concrete's benefits – strength, safety, durability, resilience – comes at an environmental cost.

Fortunately, the concrete industry is at an advantage over other industries since concrete producers can change product formulation quickly without retooling the manufacturing process. In fact, through more efficient use of portland cement, better quality control and more effective use of supplementary cementitious materials (SCMs), NRMCA members have lowered their carbon footprint by 13% over the last five years, according to the recently published Version 3 of NRMCA's Industry-Wide Environmental Product Declaration (IW-EPD) (ref 1) and Benchmark report (ref 2). This progress is impressive, especially considering that many projects don't currently have a sustainability goal.

The question now is, how does the industry take its carbon footprint closer to zero? This will obviously not be an easy task. There are some promising new technologies such as alternative cements, geopolymer cements, carbon capture and mineralization technologies, new sources of SCMs, among others. Some are commercialized, but others are years away from wider adoption. There is, however, one solution that could be implemented today with little impact on concrete manufacturing – using Portland-Limestone Cement.

Portland-Limestone Cement (PLC), designated as Type IL, was established around 2012 as a specific type of blended cement in ASTM C595/C595M, *Specification for Blended Hydraulic Cement*. Simultaneously, it was incorporated in the equivalent standard AASHTO M 240 that is referenced in many specifications of state highway agencies for transportation projects. The adoption of this cement type was a result of several years of effort by the cement industry to reduce the *carbon footprint* of cement. The carbon footprint of cement is primarily associated with clinker,



the product output from the cement kiln. In portland cement, which can contain up to 5% interground limestone, the clinker content is around 90% of the finished cement. Blended cements can include fly ash or natural pozzolans (Type IP), ground granulated blast furnace slag (Type IS), limestone between 5 and 15% (Type IL), and other additions.

Reducing the clinker content in the finished cement thereby reduces its carbon footprint. In a Type IL cement (PLC), the clinker content in the finished cement can be around 80%. With cement being the primary contributor to the carbon footprint of concrete, using a Type IL cement instead of a Type I or Type II portland cement for equivalent concrete performance will reduce its carbon footprint. Carbon footprint is characterized as a parameter referred to as *Global Warming Potential* (GWP) in a Life Cycle Assessment (LCA) report and/or Environmental Product Declaration (EPD) that includes other manufacturing and transportation factors. An LCA report conducted by Athena Sustainable Materials Institute (ref 3) compared the GWP of a typical 5000 psi (35 MPa) concrete made with ordinary portland cement (OPC) and PLC with compositions shown in Table 1. Both concretes had identical mixture proportions, including the cementitious component. According to the Athena report, the GWP or carbon footprint of the concrete made with OPC is 299 kg CO_2/m^3 compared to 272 kg CO_2/m^3 for concrete made with PLC, a 9% reduction. PLC with 15% limestone would reduce carbon footprint further.

The cement industry has made great strides with state highway agencies toward the acceptance of Type IL cement in state specifications. ASTM C595 and the use of Type IL is also accepted in the ACI 318, Building Code for Structural Concrete, ACI 301, Specification for Structural Concrete, ASTM C94, Specification for Ready Mixed Concrete and the AIA MasterSpec that is used by design firms to develop their specifications for private projects. A restriction to the use of Type IL cement for concrete exposed to sulfates in soil or water was eliminated in the 2019 version of ACI 318, provided the cement was tested for sulfate resistance and complies with a MS (moderate sulfate) or HS (high sulfate) special property designation. The only restriction to the use of Type IL cement may be in specifications of private design firms that have not updated their specifications to current industry standards.

Limestone is softer than clinker and grinds preferentially. To effectively achieve equivalent performance, PLC is typically ground to a higher fineness than portland cement. While there is some evidence that limestone reacts chemically, the contribution to strength from chemical reactions is marginal. It is postulated that finer limestone particles improve particle packing in concrete (similar to fine SCMs) and provide reaction sites for more efficient hydration of cement. There is considerable research that compare and document the equivalent performance of concrete made with PLC to those made with portland cements (ref 4 and 5). These include the effects on fresh concrete, hardened concrete properties like strength and shrinkage and, for impacts on durability such as freeze-thaw resistance, alkali-aggregate reactions and other properties.

There is also published work that shows improved effectiveness of fly ash and slag cement when used with Type IL cements (ref 6) to further improve performance and reduce carbon footprint. The successful use of Type IL cements has been documented in field trials and actual projects (ref 7 and 8). The cement industry takes various steps to

Table 1. Composition of	portland and Portland-Limestone Cement (re	ef 3)
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Composition	Type I or II portland cement (ASTM C150)	Type IL cement (PLC) (ASTM C595)
Clinker	92%	82%
Limestone	3%	13%
Gypsum	5%	5%

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optimize Type IL cements for performance to to be comparable to that of portland cement and to comply with the requirements of ASTM C595. This typically includes additional grinding and optimizing the chemistry of the cement.

During manufacture of PLC, optimization of cement properties is based on cement tests for compliance with the cement specifications. A concrete producer should independently evaluate the impact of using Type IL cement on the performance of concrete mixtures with their local materials. This is a prudent step when using any new material. This may include evaluating water demand for equivalent slump, slump retention for typical delivery time, setting characteristics, strength to w/cm curves, admixture dosage, amount of supplementary cementitious materials that can be used for required performance and the impact on a wide range of durability concerns. If the goal of an owner of a new structure is to include sustainable construction, Type IL cement (PLC) is an important option available to the concrete producer.

NRMCA, through its P2P initiative, codes and standards activities, sustainability initiatives, EPD program and Concrete Design Center, has worked with its industry allies and design professionals to promote performance-based specifications. All these recommendations include the option of using blended cements, including PLC. We've made progress, but we still have work to do. While all industry standards permit the use of PLC, many project specifications still specify the use of ASTM C150 portland cement. NRMCA advocates for no restriction on the types of materials that can be used to produce ready mixed concrete, provided they comply with a material specification. If the use of PLC fits within the objectives of a ready mixed concrete producer for performance and sustainability, there should be no restriction to its use. Ready mixed concrete producers should work with cement suppliers to determine availability and, if available, consider proposing PLC as an alternate on project specifications where there is an obvious sustainability goal, especially those with a carbon footprint or GWP target.

Colin Lobo is executive vice president of NRMCA's Engineering Division and can be reached at clobo@nrmca.org. Lionel Lemay is executive vice president of NRMCA's Structures and Sustainability Division and can be reached at llemay@nrmca.org.

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URGENCY OF EMBODIED CARBON

By Tien Peng, NRMCA Senior Vice President of Codes and Standards

he top 50 architecture, engineering, construction (AEC) firms and other key professionals responsible for over one trillion dollars of global annual construction have rallied around establishing building sector emissions targets to meet the Paris Climate Accord. That is, to strengthen the global response to the threat of climate change by keeping a global temperature rise below 2 degrees Celsius above pre-industrial levels. This is achieved by limiting carbon dioxide (CO₂ or "carbon") emissions from building operations and construction.

The built environment accounts for 39% of total carbon emissions; 28% is building operations and 11% is building materials and construction. Reduction of carbon from operational use phase has been the focus of construction industry professionals for many years. Now, with significant gains in building energy efficiency, leading energy codes and an increase in the country's renewable energy portfolio, the attention has shifted toward the building's embodied carbon.

Embodied Carbon

Embodied carbon is the carbon dioxide emitted during the production, transportation and construction of building materials (also called "cradle-to-gate" emissions). It does not include the operational use, maintenance and repair of materials, nor end-of-life emissions ("cradle-to-grave").

While there is consensus that the embodied carbon impacts are currently a fraction (15-30%) of a building's service life, there

is a looming deadline due to a remarkable forecast of building construction. According to Architecture 2030, if we continue business as usual, 66 billion square feet of buildings will be built per year, emitting approximately 4,110 million tons CO₂ annually. By 2050, the embodied carbon emissions will be responsible for almost half the building sector's emissions. We're adding the equivalent of an entire New York City to the planet every 34 days according to UN Environment, Global Status Report 2017. Enhancing energy efficiency alone will not be sufficient to meet the international carbon reduction targets.

Concrete is an incredibly valuable product. It has built modern society and will continue to do so. But like all building products, concrete has an embodied carbon footprint,





mainly due to the cement manufacturing process. Although most design professionals and government officials understand the value of concrete and will likely continue to specify and use concrete on their projects, they are motivated to reduce concrete's carbon footprint.

Buy Clean Legislation and Other Drivers

With federal inaction to curb carbon emissions in the U.S., state and local governments are developing ambitious new policies. In October 2017, California Governor Jerry Brown signed into law AB 262, the Buy Clean California Act, the world's first legislative effort to address embodied carbon emissions. The legislation requires state agencies to consider the embodied carbon emissions of industrial products – structural steel, carbon steel rebar, flat glass and mineral wool board insulation – when contracting for state-funded infrastructure projects.

Concrete and cement were left out to be added at a later date. The law was intended to level the playing field for clean CA manufacturers by addressing imported carbon emissions. Taking a cue from California, other states such as Washington, Minnesota, New York and Colorado have also attempted Buy Clean legislation in the following years that includes concrete to meet their climate action goals, but have failed passage into law.

The premise is simple: curb carbon emissions of public projects by utilizing the purchasing power of the state. The Buy Clean bills emphasize reducing a material's carbon impact, a proxy for global warming potential (GWP) impact, by identifying embodied carbon emissions in "eligible materials" through the use of environmental reporting tools. The burden is placed on the bidding contractor to deliver environmental disclosure reports, known as Environmental Product Declarations (EPD), and select material providers with lower GWP impacts. An EPD is third-party verified report marketed by a product manufacturer that provides information regarding environmental performance of their products. Further, the agency is to develop "maximum acceptable" GWP of materials in the near future to which materials must comply to be considered for contract bidding.

Some local jurisdictions are not waiting for the state agencies to figure things out and have decided to address embodied carbon emissions in building materials through ordinance. Last year, Marin County, California, approved code amendments to limit the GWP of concrete material for public and private projects. Earlier in the year, Portland, Oregon, adopted a regulation that requires all concrete used for city projects to disclose carbon emissions through product-specific EPDs.

The trend to curb embodied carbon is not limited to governments. Design and construction professionals have seen the integration of carbon criteria in building rating systems such as LEED, GreenGlobes, ASHRAE 189.1 and in the International Green Construction Code. However, major organizations such as Apple, Google, Amazon, Honda, Bank of America, PG&E, CalPERS and others are addressing their supply chain emissions as part of company policy. Microsoft and Skanska USA even developed a free online tool, the Embodied Carbon in Construction Calculator (EC3), that allows benchmarking, assessment and reductions in embodied carbon of various products.

Concrete Solutions

Fortunately, the concrete industry is uniquely positioned to meet the challenge of reducing its carbon footprint. To help concrete producers reduce their carbon footprint, NRMCA signed on to the 2030 Challenge for Products in 2012. The 2030 Challenge for Products is a global challenge to specify and manufacture products that meet a carbon footprint below the industry average and subsequently improve on this reduction to 50% by 2030.

In support of the challenge, NRMCA became an EPD Program Operator to facilitate the development and verification of EPDs and establish industry baselines for concrete. NRMCA has also helped develop a Product Category Rule (PCR) that provides instructions on how to conduct and report EPDs. The concrete industry recognizes the need to reduce embodied emissions and producers can offer our specifiers several strategies to improve processes and product formulations to ultimately reduce embodied carbon emissions, including:

 Measure – The first step to achieve carbon reductions is to measure and evaluate the carbon footprint of the concrete mixes of a project. EPDs are a tool to measure and communicate environmental impacts of a product. Then reformulate, modify processes and implement technologies that result in lower emissions. EPDs provide the tool for measuring environmental impacts of a product. Then compare the GWP of products to that of industry benchmarks. NRMCA has published industry benchmarks for concrete in different regions of the country to help project teams achieve this.

2. Performance Specifications – Traditional prescriptive specifications for concrete are no longer effective and the concrete construction industry is moving

toward performance-based specifications. Minimum cement content or maximum water-to-cement ratio (w/cm) are among many common specification requirements that can increase the carbon footprint of concrete. The challenge is to identify the best way to specify concrete to help meet an objective of lower GWP by providing the necessary flexibility to the producer and contractor without compromising the various performance objectives: shrinkage, strength, curing time, workability and other performance characteristics.



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- 3. Optimize Cement Content New concrete manufacturing methods can enhance concrete's performance to tackle modern challenges, including reduced carbon emissions. These include optimizing mix designs to minimize portland cement with supplementary cementitious materials such as fly ash, blast furnace slag or geopolymers. More recently, there has been an increased use of blended cements or portland-limestone cement (PLC) that can immediately reduce the carbon footprint by 10% by inter-grinding regular clinker with limestone.
- 4. Other Innovations There are now commercially viable technologies that incorporate carbon mineralization to accelerate carbonation, a naturally occurring process where the concrete reabsorbs CO₂. This is accomplished either by injecting CO₂ into concrete, curing concrete in CO₂, or creating artificial limestone aggregates using CO₂.

All these initiatives and technologies are promising solutions for reducing the carbon footprint of concrete without jeopardizing performance and, in most cases, improving performance. The possibility of vastly reducing carbon emissions associated with the production of concrete or even going beyond by sequestering more carbon ("carbon positive") than is produced during the cement manufacturing process will only happen if there is market demand. In fact, legislators from New York and Hawaii have proposed legislation to mandate or incentivize some technologies for concrete on all public projects.

NRMCA is engaging with members and state affiliates to address these embodied carbon legislative activities to ensure they are written in our members' best interests. A holistic approach is important; the focus on reduced embodied carbon should be appropriately balanced with maintaining performance. There should be incentives from government to implement new technologies to offset capital costs of implementing these new technologies. At this moment, with the dizzying, sometimes overwhelming rise of new digital innovations from the iPhone to Uber to Instagram, the 200-year old concrete industry should be looking forward to the future headline "Concrete: Sequesters More Emissions Than It Produces."

For more information, contact Tien Peng at tpeng@nrmca.org.

NRMCA Safety Initiative

SILICA COMPLIANCE

Respirable Crystalline Silica

On June 23, 2018, the new respirable crystalline silica rule promulgated by the Occupational Safety and Health Administration (OSHA), became effective. The rule, which covers ready mixed concrete plants, is intended to eliminate exposure to workers of respirable crystalline silica. According to OSHA, exposure to silica over a certain threshold and prolonged exposure can lead to respiratory health problems, including silicosis. The new standard requires employers to prevent worker exposure to silica.

Preventing Silica Exposure

In order to determine how to prevent and/or limit worker silica exposure, a concrete plant first needs to know what, if any, the exposure level might be. Determining an exposure level through an exposure assessment, can be completed by an industrial-hygienist, third-party testing group, mail-order testing kit, or a producer's insurance provider. Once an assessment has been performed, only then will a producer know what the exposure may be. If the exposure level is below a certain threshold, a producer may have little or no action to take. Exposures recorded over a certain threshold may require specific actions that could include regular testing and monitoring, creating a written exposure control plan, extra housekeeping, recordkeeping, signage, training, employee notification, new controls, a respiratory protection program and even medical surveillance.

Actions

Conditions that can prevent silica exposure and help maintain compliance with the new rule:

- Think first
- Proper ventilation
- Wet methods for grinding, chipping, cutting, sweeping
- Isolation of dust creating activities
- Worker rotation
- Use of water trucks and/or sprinklers in plant yard
- Regular, proper housekeeping
- Minimize drum chipping
- PPE where appropriate (OSHA views PPE as the last line of defense)

Resources

For more information on silica exposure compliance please follow the links below:

- NRMCA Silica Guide
- Respiratory Protection Program
- OSHA Silica Standard
- OSHA National Emphasis Program: Silica
- NRMCA: Safety Series

Contacts

Gary Mullings: gmullings@nrmca.org | Kevin Walgenbach: kwalgenbach@nrmca.org



state association corner

CAROLINAS READY MIXED

STRONGER TOGETHER: TRAINING IN ACTION

By Jessica Palmer, Director of Business Development and Education Carolinas Ready Mixed Concrete Association

he year 2020 ushered in a new focus for the Carolinas Ready Mixed Concrete Association. Traditionally known for being Carolinas Strong, the association committed to fully engaging members in 2020 through a new Stronger Together initiative. Stronger Together in the Carolinas took an already vibrant membership base and paired it with the drive and commitment to see the concrete market share grow in the Carolinas through education and training, promotion and advocacy. By continuing to partner with NRMCA and the Build With Strength coalition, we have benefited from the vast array of resources that continue to be available. Those resources, combined with our desire to promote concrete in a multifaceted approach, has created excitement and engagement across our states.

Our CRMCA Promotion & Membership Committee truly took the Stronger Together initiative to heart through its Insulated Concrete Forms (ICF) Contractor Training Course. Using the Insulated Concrete Forms training course as a vehicle, we collaborated with universities, trade and technical colleges as well as other associations and industry professionals to conduct education and promotion on a large scale. The course provides in-depth ICF training with a hands-on demo for students, construction trades,



specifiers and municipal leadership while offering AIA-approved continuing education.

One of our most successful ICF events was held earlier this year in Wilmington, NC, in collaboration with Cape Fear Community College. CRMCA member Gordon Singletary of S & W Ready Mixed Concrete worked with us to help organize and recruit over 65 attendees for the one-day event. Buddy Hughes of Logix was the ICF presenter and Frank Gordon of NRMCA gave a presentation highlighting concrete, poured wall foundation applications and ways to utilize the concrete design center tool through NRMCA. Each presenter received excellent marks and we have had requests to come back for another session.

As the training concept continued to grow, another exciting opportunity came through a member connection with Clemson University. Now scheduled for the fall, CRMCA has been working closely with the university to conduct a one-day concrete symposium on the resiliency of concrete. The event will incorporate ICF training and a hands-on demo, with a new addition of utilizing Clemson's stud cannon. We are excited for yet another successful event with an opportunity to reach a bilingual community of contractors, as well as engage city officials, university staff, engineering and design students and faculty along with the specifying communities.

Together, we have learned that now, more than ever, is when thinking outside of the box is critical to the success of the ready mixed concrete industry. Our partnerships alongside our members, local community colleges, universities, allied associations and industry professionals have created open dialogue, increased product knowledge and industry exposure on a greater scale. Together, we can continue to drive home the value of concrete in our communities and show just how we are in fact Stronger Together!

Jessica Palmer can be reached at the CRMCA offices in Charlotte, NC, at 704-717-9199.



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member spotlight



Bob Haldrup, Irving Materials Inc.

arlier this year, our local business journal ran an editorial supporting a city council member's proposal to enact and track environmentally responsive policies at the municipal level under the headline "Climate change is a problem city government should tackle." With climate change being such a high-profile topic in the national press, you can imagine there were thoughtful responses on all sides of the issue. And as a result, I felt like this conversation was a perfect opportunity to discuss and explain some of the recent climate friendly advances that our industry has made.

The construction and materials industries are consistently interested in tackling tough challenges, embracing new solutions and moving forward. This sector is evolving and always ready to embrace change relative to safety enhancements, process efficiencies, new product development, improvements in equipment and technological innovation. Truthfully, any industry that isn't trying to innovate, change and grow is probably dying – and we don't fit into that category.

If local business and communities need to play a bigger role in sustainability and progress – trying to do things that are more beneficial for the planet and making decisions that are going to stand the test of time to benefit both current and future generations – we say, "Great!" But you have to do those things without forcing expensive and drastic change on existing businesses, destroying markets and



livelihoods or draining public coffers. That's where we come in. Concrete has never been a zero-sum game and it has always been our job to find solutions that serve everyone's best interests. In the ready mix and aggregate businesses, we've always been keenly interested in delivering better product and more transparency to our communities, to the marketplace and to our customers.

Improvement in Process

For example, anyone who has ever ordered concrete is probably familiar with the question, "Where's my truck?" Some years ago, our company started to grasp that there should be nothing so secret about this business that you couldn't share it with your customer. In fact, in concrete, the only way to really improve your business exponentially is to also help improve the customer's business. Process improvement was required. Process improvement was delivered – to mutual benefit.

Over the past eight years, our company and the industry at large have worked to deliver more insight and greater transparency to the customer through technology. We use telematics and service dashboards, platforms and mobile phone apps for sharing process flow with customers, from the first call to order specs, loading details, weather impact, truck departures/arrivals, traffic updates, even billing. The customer can see every step of the transaction exactly as you see it. You and your customer can collaborate realistically on what works well and what doesn't for continuous fine-tuning. This builds trusted partnerships that enable exponential, as opposed to marginal, business improvements for all. Win-win.

Improvement in Product, Technology and Equipment

Process isn't the only thing that can always be made better. Our sector pre-emptively invests in new science and technologies that move our businesses – and the industry – forward. At imi, we've spearheaded everything from front-discharge mixer trucks to speed up pours on the job site and increase safety, to incorporating supplemental cementitious materials for specialized applications. Most recently, we incorporated carbon utilization technology that reduces the carbon footprint in the construction materials industry without compromising the concrete's quality.

Each market segment we serve is touched with this technology. It is fast becoming standard in our mix on a regular basis, without making customers do anything differently than what they've always done. We did not do this because there's huge cost savings. We did not do this because there's huge gains in revenue. We did it because we think it is not only the right thing to do for our communities, our customers and our employees, but sustainability and resiliency are real differentiators in the marketplace.

Materials suppliers aren't usually the ones writing or responding to policies or editorials. We're the ones who find the solutions to the problems faced by contractors, designers, builders, infrastructure developers, homeowners, governments and everyone in between. That's our job and we excel at it. We find, develop and embrace the technologies that improve our businesses and improve the businesses of our customers so we can all make a positive impact.

You can call it change. You can call it innovation. We call it good business.

Bob Haldrup is senior vice president of Irving Materials, Inc. (imi), an NRMCA Producer member company that operate throughout the Midwest and the Southern U.S. imi produces and delivers ready mixed concrete in Indiana, Kentucky, Tennessee, Southwestern Ohio, Southeastern Illinois and Northern Alabama.

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Industry spotlight

UNDERSTANDING LIFE CYCLE COST ANALYSIS FROM AN OWNER'S PERSPECTIVE



Michael Hoeft

ife Cycle Cost Analysis is a difficult subject to define based on the audience and its collective expectations. Given that concrete pavements are generally accepted as a superior product within our industry and publicly, it is essential to keep in mind the potential variables that deserve to be considered. Many institutional owners are equity investors, meaning their facilities are owned and generally have more predictable business models. They are able to forecast and schedule facility maintenance expense and capital investment with a high degree of accuracy and expect long-term service from their facilities and infrastructure investments. On the other end of the spectrum many corporate clients, and for this comparison I speak specifically to my retail fleet experience, are dominated by leased building assets and a very dynamic business model in which to forecast facility capital expenses.

All owners want the greatest possible value from their investment dollars and it is our responsibility to research and understand how to best market and fulfill those expectations. As an example, I have an institutional client that is well educated, highly effective in his discipline and possesses an above average level of construction knowledge. He has been involved in multiple capital building projects, manages the maintenance of multiple facilities and is a steadfast advocate for concrete parking lot pavement. Following are the top five things I have learned from this business relationship:

- 1. Leadership position for several years and takes the consequences of his decisions very seriously
- 2. Leadership has a clear understanding regarding the market value rate of his investment dollars
- 3. Leadership operates a business that has a low level of economic volatility



- 4. Leadership plans and executes a business plan that is founded on a stable revenue stream
- 5. Leadership has a long-term expense and a capital investment plan The opposing example comes from my 32 years of personal expe-

rience managing expense and capital investment dollars in a 400 building fleet of retail locations in 26 states. Corporate leadership changed frequently and had minimal experience in the construction industry. It did not possess hands on experience in managing facility maintenance nor the consequences of investment deferral and may have had an overall interest in minimizing investment in physical assets to enhance short-term gains. Here are the top five lessons taken away from this experience:

- 1. Leadership and business philosophies change often
- 2. Leadership has an internal financial hurdle rate for its investment dollars based on investor expectations
- 3. Leadership operates a business that is highly susceptible to market and investor forces that may require radical departure from planned forecasts
- 4. Leadership executes a business plan based on weekly, monthly and quarterly revenue and gross margin
- 5. Leadership investment in facility maintenance is significantly influenced by direct revenue, margin and market capitalization Understanding these two examples, here is a recapitulation of these diverging business positions as they relate to our marketing:
- 1. Stability in leadership has a significant impact on the decision-making process; institutional tenures may average 15-20 years while
- corporate tenures typically average 3-5 years.
 Value of investment dollars is generally tied to long-term institutional rates indexed from prime or long-term bond rates stabilized by solid revenue streams. While internal corporate hurdle rates of return of 15%-20% are influenced by inventory levels, first in/last out inventory, last in/first out inventory, market opportunities, politics, world events and/or EBITDA (earnings before interest, tax, depreciation and amortization).
- 3. Institutional business economics are generally based on stable revenues and cost of money, while retail is dominated by fluctuating costs of goods, revenue and margin based on credit worthiness, shifting market trends, inventory availability subject to global events, acquisition costs and customer fulfillment.
- 4. Institutional business planning being more predictable allows for long-term forecasting, scheduled preventative maintenance and opportunity to take advantage of economic downturns to capitalize on vendor market pressure that lower costs. Corporate planning is typically very fluid based on real time leading to deferred maintenance, partially appropriated capital requests and emergency or unplanned repairs.
- 5. Institutional goal orientation is directly relative to the decision-making process, long-term leadership, reliable funding, low volatility, stable revenue and predictable forecasting, providing for personal accountability. Fiscal responsibility and solid initial and long-term preservation of building, infrastructure and furniture, fixture and equipment (FF&E) assets that provide legacy returns to the owner. Many corporate executives today are hired on three-year employment contracts, which pins their career, compensation and future marketability to a very short time period with minimal consideration for legacy accomplishments.

My marketing experience suggests you know your customer and anticipate what circumstances govern his or her business decisions before you get too far in the weeds discussing LCCA and never engage in a conversation around return on investment (ROI). This discussion is so complex and subjective that most people may not understand how it relative to their own business and, additionally, there are an infinite number of ROI equations, expectations and opinions to manipulate the result. I suggest staying with a simple comparison that is generally supported within the industry. There are several software packages available that have basic inputs that allow you to produce an illustration that may be beneficial when speaking with a client. And remember this: In the concrete industry we can design for 20, 30, 40 or more years which may outlive the useful life of many buildings and most certainly many decision makers' careers.

In summary, we need to focus on how to best design and deliver a superior product at a competitive initial investment that provides a comfort level to our clients. As we move forward, we can look to the success of the auto industry for guidance, where scheduled maintenance and extended warranties provide a platform for positive marketing and provide additional revenue streams.

Michael Hoeft is director of sales and marketing at K&M Concrete Construction (www.KMconcreteinc.com) in Edgerton, MN. He is a member of the American Society of Concrete Contractors and the NRMCA/ ASCC Joint Paving Committee. He can be reached at 507-442-4855 or michael@kmconcreteinc.com.



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