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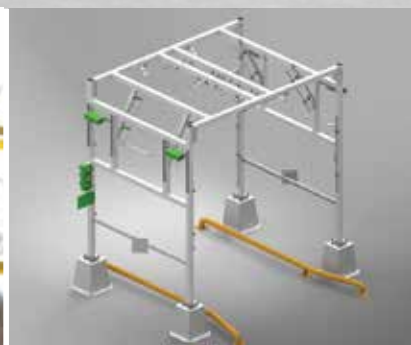
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Concrete InFocus

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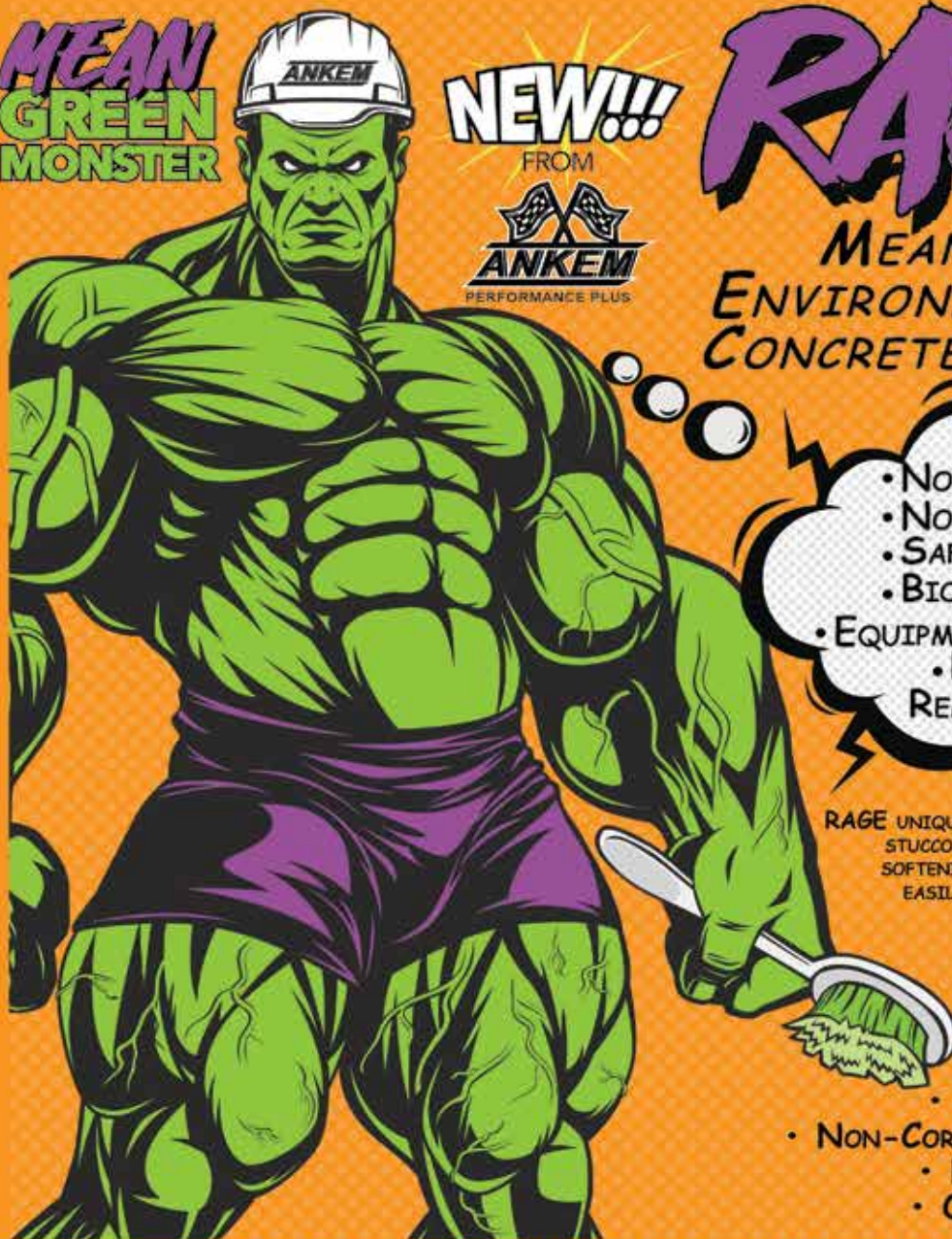


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Frank Cavaliere
Managing Editor,
Concrete InFocus

New Year, New Look

Way back in 2002 – and calling 2002 “way back” really does show how time does fly – former NRMCA President Bob Garbini and senior staff thought it was time for the Association to publish an in-house magazine. Names were discussed, formats, timeliness, etc. and *Concrete InFocus* was born. The inaugural issue appeared that spring; the cover story was titled *Solid Help: NRMCA Members Donate \$1.8 Million to the September 11 Relief Effort*. The lead-in column explaining the reason for the magazine’s debut was penned by then NRMCA Board Chairman Norm Nelson who asked, “Does the world need another industry magazine?”

Well, fast forward two decades and we still say the answer is yes. For while the publishing industry has steadily moved toward online distribution and content, NRMCA and the ready mixed concrete industry still values the print edition. Readers still read and advertisers still advertise, so to speak. But after two decades, even the most valued of print products needs a refresh and the Spring 2022 edition of *Concrete InFocus* is just that: a new look (we didn’t go crazy...) along with what we hope you’ll find are some insightful, new regular features.

Starting with the cover, you’ll notice we’ve added the NRMCA logo in the upper right hand corner; just a gentle reminder that this is an Association publication with our mixer drum graphic as the signature branding. And down in the lower right corner, you will find four distinct graphic elements representing four key topics that each issue of the magazine will feature: Build With Strength, Developing Industry Leaders, Pave Ahead and Think First. Each is a critical part of NRMCA’s mission to be the leading voice of the ready mixed concrete industry and the content behind the logos are well worth your time. There’s also some nifty new typefaces along with some additional headline coloring.

But we’re not all glitter and no content. After you read this, you’ll find our two new columnists, NRMCA’s Lionel Lemay gives an overview of the Build With Strength movement and Portland Cement Association President Mike Ireland’s Cement Side column delves into the issue of carbon neutrality and its critical importance to both the cement and ready mix industries. Mr. Lemay and Mr. Ireland have joined our two returning columnists, Doug Ruhlin with *Enviroscene* and Phil Kresge’s prose under the Pave Ahead banner.

After our columnists, we arrive at this issue’s lineup of regular features. Leading off is the NRMCA Year in Review where our department heads summarize notable achievements from the previous year. Just a heads up that this feature along with a few others are introduced in print and then continue online. We hope you don’t find that too inconvenient, but it is necessary to make sure all content is available. Next comes our Membership Department’s update by way of our A Team, Alex Land and Amanda Muller, followed by the regular Developing Industry Leaders submission and the Innovations in Pavement article. Lastly, please don’t forget to digest the content (and publicize, of course) of the two Think First submissions for this issue, Vehicle Repair Shop Safety! and Gloves...Get a Grip!

So there you have it. We think this issue gets our 2022 editorial calendar off to a great start. Please let our new columnists know you feel about their respective efforts and, as always, support our advertisers since without them *Concrete InFocus* would not exist. See you next time for our summer issue. ☺☺☺

Frank Cavaliere can be reached at fcavaliere@nrmca.org.

Driving Carbon Neutrality through **Transparency** and **Innovation**



Lionel Lemay

NRMCA members launched the Build With Strength initiative in 2016 with the primary goal of increasing market share in low- to mid-rise buildings from 22% (2014) to 30% by 2030. The mission of the initiative is to educate the building and design communities and policymakers on the benefits of ready mixed concrete and encourage its use as the building material of choice for low- to mid-rise structures. The good news is that NRMCA has exceeded its goal by achieving 36% market share in the 1-7 story segment in 2021 (see Figure 1). In fact, the story is even more impressive when you look at the entire building market (all story heights) where concrete has achieved 38% market share, the highest it has ever been going back to 2004. This is the first time we've achieved higher market share than steel or wood in the building market (see Figure 2).

However, BWS is not without challenges. We still struggle to gain share in the 4-7 story segment where we've shown only a 2% uptick since 2016. There are bright spots such as

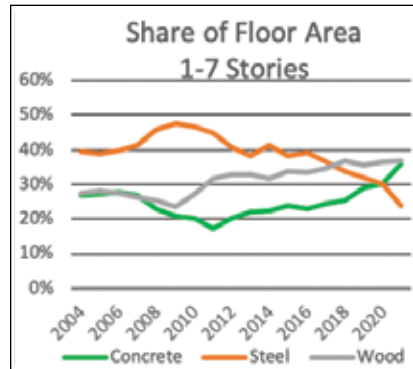


Figure 1: Historical market share of concrete vs steel and wood in 1-7 story buildings

4-7 story hotels which have gained over 5% in that period, but other project types have not. We also are seeing new challenges from Cross Laminated Timber (CLT) which will provide more competition in all segments, but especially in mid-rise (4-7 stories) and high-rise (8+ stories) segments.

Low-Carbon Concrete: The Key to Concrete's Future Growth

Although environmental stewardship and sustainability has been on NRMCA's radar for more than three decades, and we've promoted concrete as a sustainable material because of its unique qualities such as disaster resilience and energy efficiency, it's only over the last several years that the design build community and lawmakers are pushing the concrete industry to lower its embodied carbon footprint. Generally, embodied carbon footprint is the amount of CO₂ emitted during the manufacturing

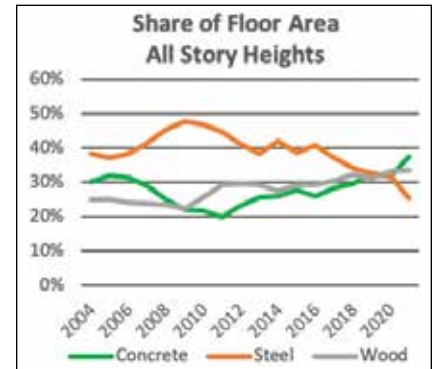


Figure 2: Historical market share of concrete versus steel and wood in all buildings

of a product. For concrete, that means the CO₂ emissions from raw material extraction, the manufacture of constituent materials such as cement, aggregate and admixtures, transportation of those raw materials to the concrete plant and the production of concrete. This is commonly called cradle-to-gate impacts.

Interactions with nearly 50,000 architects and engineers have demonstrated that although most understand the long-term benefits of concrete and often select concrete as the building material of choice, they want those long-term benefits at a lower embodied carbon footprint. We've become keenly aware that this aspect of building sector will be key to concrete's future growth. We will continue to promote the long-term benefits, but work with the design build community, material suppliers and NRMCA members to offer those benefits at a lower carbon footprint. To understand where we need to go from here, it's often beneficial

to review where we've been and build on successes.

NRMCA's March Toward Low-Carbon Concrete: 1990s

Although it was difficult to predict the drive toward sustainable manufacturing and construction 30 years ago, there were signs that the industry needed to improve its environmental performance. In the early 1990s, NRMCA adopted RMC 2000. The vision was simple but powerful. The ready mixed concrete industry will be viewed by our communities as an environmentally responsible industry that operates in a safe and healthy manner. Our goals for the RMC 2000 included the following:

1. Provide quality educational programs for industry employee development by promoting sound operating, administrative, marketing, environmental and public relations practices;
2. Create a work environment where employees are highly trained and empowered to anticipate and respond to customer needs;
3. Develop and promote successful, mutually beneficial relationships with customers, suppliers, communities and the construction industry; and
4. Provide tools and models designed to help members use benchmarking to improve their businesses.

At the same time, NRMCA helped establish the RMC Research & Education Foundation. Its mission is to help keep the concrete industry on the cutting-edge of technology and provide a platform for professional development across the industry. The foundation is:

1. Devoted to recruiting new talent, and strengthening the education and training of current and future professionals within the industry;
2. Concerned with protecting the safety of our workforce;
3. Working toward improving the quality of concrete and concrete construction; and

4. Dedicated to sustainability, resilience and strong environmental stewardship.
- RMC 2000 and the Foundation were the keys to programs developed over the next two decades to help the concrete industry address embodied carbon.

2000s

In the early 2000s, NRMCA helped establish the P2P initiative. P2P stands for Prescription to

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Carbon Neutrality Across the Value Chain



Mike Ireland
President, CEO
Portland Cement Association

Signed into law in November of last year, the Infrastructure Investment and Jobs Act has brought the issue of sustainability to the forefront of the national conversation about American progress. Industries and companies, across every sector, are finding ways to reduce their carbon footprints – not just out of concern for the environment, but also to retain market share in the years to come.

When we think of carbon emissions, images of gridlocked highways or factory smokestacks spring to mind. We think of the bumper-to-bumper traffic on the freeways of Los Angeles, endless jams on the roads of Beijing or the American manufacturing industry of the 1970s. Yet while the transportation and industrial sectors are still major contributors, the building sector – both in terms of building operation and building construction – actually accounts for almost 40% of emissions. The majority of this is in building operations, but 11% has been attributed to building materials and construction.

As things stand, this figure is likely to increase. As the electrification of vehicle fleets worldwide start to gather pace, the built environment will continue to grow. To accommodate the ongoing global urban expansion, an extra 2.4 trillion square feet of new

floor area is expected to be added by 2060 – doubling today's area and equivalent to adding an entire New York City, every month, for the next 40 years. The good news is that actions are being taken on the operations side – in New York City itself, where more than two thirds of the city's emissions come from buildings, the Empire State Building has reduced its emissions by 40%, shaving \$4.4 million off its annual electricity bill. The city council also made waves last month by voting to ban gas hookups in new buildings.

Even better, the cement industry has been working on this for years. Reducing emissions has been a commitment that the industry has been working to achieve since the mid-1990s, since then reducing carbon intensity by 11.9% along with general energy consumption while increasing production. According to Environmental Protection Agency data, cement plants have reduced energy-related carbon emissions by 1.5 million metric tons, annually, and the industry is responsible for just 1.25% of U.S. CO₂ emissions.

However, even though we have been ahead of the curve on climate, there is always more we can do and the wider energy transition, spurred by private and public sector actions taken to combat the climate crisis, has acted as a catalyst for industry action. The cost to the United States alone for extreme weather is now reaching hundreds of billions of dollars every year and that number is only expected to increase. That's why we need to produce sustainable, resilient building materials that can withstand severe weather.

Recognizing this, the Portland Cement Association (PCA) is working with its members to solve this problem. Senior and C-suite executives have volunteered their time to collaborate on this wider goal, reflecting their commitment to the cause. This work

began in 2020 with a statement of ambition from PCA's senior staff. "As PCA members continue to drive down the carbon intensity of their operations and products, PCA will develop a roadmap by the end of 2021 to facilitate its member companies achieving carbon neutrality across the concrete value chain by 2050."

In the 12 months since the statement was made, PCA has delivered on its initial goals, most notably with the October 2021 release of its flagship Roadmap to Carbon Neutrality, a step-by-step pathway for reaching the goal of carbon neutrality across the entire concrete value chain by 2050.

However, what makes this Roadmap especially compelling was the time, care and expertise that informed these comprehensive recommendations – and the process was painstaking. We began by setting up an executive council comprised of PCA and member companies, which in turn created a Climate Steering Committee. This committee went on to create task forces with member company expertise in five critical portions of the concrete value chain that we call the five Cs: clinker, cement, concrete, construction and carbonation.

It was in these five groups that the scope of the Roadmap was defined, achievable short- and long-term targets were developed, and the recommendations were formulated. For example, in the cement section of the five Cs, switching in the short term to portland-limestone cement (PLC) blends already in widespread use elsewhere can reduce the CO₂ footprint of today's cements by 10%. This was identified as a prime opportunity to quickly reduce carbon emissions in cement production. As a result, the task group went on to work on reasonable targets for PLC use for 2030 as well as 2050. Similarly, the carbonation task force first had to

America's cement manufacturers are committed to the goal of reaching carbon neutrality throughout the cement-concrete-construction value chain by 2050.

This will be achieved by focusing on:



ascertain the correct percentage of the amount of CO₂ concrete can absorb over its lifetime, with the task force leaders settling on 10%.

For these five Cs to work however, we need a sixth C: collaboration. While cement is the most energy-intensive step, it is still just one of several along the wider concrete value chain. At every stage, from concrete through to design and construction, we need commitments from other stakeholders to work in partnership with us on achieving carbon neutrality.

Concrete is an extremely important partner in this effort, as the product we jointly make is ultimately the built environment. From optimizing the performance of concrete materials to reducing energy consumption and increasing the use of supplementary cementitious materials, there are many options and opportunities for the concrete and cement industries to work together and with others further along the value chain to create a more sustainable sector. For example, together we can prioritize the use of low-carbon cement mixes, support

research on mix design, and transition to alternative fuels and low-emission vehicles. And just as carbon neutrality requires collaboration between the cement and concrete industries, it also needs cooperation between the concrete industry and its downstream partners on measures like performance-based standards, optimizing concrete mixes for specific products and taking a whole life-cycle approach to sustainable construction.

This Roadmap will secure the future of the cement and concrete industries by marrying concrete's proven ability to deliver a resilient material at scale with a sustainable value chain, but only if we work together, from cement to construction, to reach carbon neutrality by 2050.

Starting with this issue, the Portland Cement Association's column will be appearing regularly in *Concrete InFocus*. To comment, you can reach **Mike Ireland** at mireland@cement.org.



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Don't Forget EPCRA Reporting at Your Concrete Plant!



Douglas Ruhlin

One thing we all can count on when a new year rolls around is filing your tax return! Forget to do it, choose not to or just claim you've never heard of filing your tax returns before and you can bet that you'll be hearing from the IRS – and probably not positively. For all industrial facilities – including ready mixed concrete plants – there are a number of environmental reporting requirements that must be met on an annual basis. And just like filing tax returns, forgetting to do them, choosing not to or claiming you've never heard of them before usually falls on deaf ears with state environmental inspectors and Environmental Protection Agency.

Among these annual filing requirements are two that could be overlooked, but still warrant review and consideration by all concrete plants in the United States. These are two separate types of environmental filings as required by the Federal Emergency Planning and Community Right to Know Act or EPCRA. Specifically, these filings are commonly known as Community Right to Know/Tier II filings and TRI filings. For almost all concrete plants, annual Community Right to Know filings are required, while many concrete plants may not be required to prepare and submit annual TRI

filings. Both warrant careful review and consideration and, if required, filing in accordance with applicable deadlines.

And right up front to know this: these are different filings for different reasons, with different applicability thresholds, and with different deadlines and reporting requirements. They are not the same! Doing one does not mean you're covered for the other. Let's take a closer look at each of these filings:

Community Right to Know Reporting

Community Right to Know (sometimes referred to as "CRTK" or "Tier II" filings) are meant to provide the public – the community – of the hazardous substances used, produced or stored at facilities, including ready mixed concrete plants. While many concrete producers may think they lack any hazardous substances at their concrete plants, realize that this requirement pertains to any hazardous substances required to have a Safety Data Sheet (SDS, of which most concrete plants have many) as required by the OSHA Hazard Communication regulations.

And it's not all materials with an SDS at your concrete plant, it's only those present at any one time above certain reporting thresholds, which for most common materials is 10,000 pounds (liquids are included and must be converted from gallons to pounds). For most concrete plants that narrows the list to a manageable number of hazardous substances. These reports are made annually to the applicable state and local emergency planning commissions, and provide basic information on the hazardous nature of the substance, how much is stored, etc. For most

concrete plants in the U.S., the list of reportable hazardous substances usually includes materials such as portland cement and other SCMs, concrete chemical admixtures, liquid and solid colors, fuels, oils and even aggregates and concrete materials (provided they have SDS and exceed the reporting threshold). The deadline for this filing is March 1 of each year, it's due annually – doing it just once doesn't cover you for the following years!

Toxic Release Inventory Reporting

Toxic Release Inventory (or "TRI") reporting is entirely different. This reporting is for the processing, manufacturing or otherwise use of certain toxic chemicals specifically identified on a list by the USEPA and which exceed applicable annual throughput thresholds over the course of the year. So unlike CRTK reporting, this isn't a "one time snapshot" of material present, it's based on annual throughput. Toxic chemicals at a concrete plant usually fall into the "processed" category and, for most, the annual throughput threshold is 25,000 pounds over the course of the calendar year (again, liquids need to be converted from gallons to pounds). However, keep in mind that the annual throughput threshold for reporting can vary significantly, depending on the toxic chemical and in some cases can be as low as only a few pounds (or less) per year depending on the toxic chemicals which may be present at your plant!

One significant difference between CRTK and TRI reporting is that CRTK refers to substances, not the specific ingredients in that substance, while TRI reporting refers to the



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specific ingredients (provided they're listed as being a reportable toxic chemical by the USEPA). So, while concrete plants normally might not think of having toxic chemicals present, there are in fact some listed toxic chemicals present in many of the common materials processed at concrete plants, including nitrates in certain types of admixtures, lead and mercury (with very low reporting thresholds) in cement materials, and possibly more. Whether or not these materials are present in quantities that exceed the applicable reporting threshold requires careful review and evaluation. Not all toxic chemicals which may be present might require reporting, only those specifically listed ones which exceed the applicable reporting thresholds.

The need to conduct TRI reporting is also based on the number of employees at a facility's location and requires at least 10 full-time employees or over 20,000 man-hour equivalents; this also would include concrete mixer truck drivers (whose

time can be allocated proportionally among multiple plants if they batch concrete from more than one location). For the concrete industry, this might exempt a lot of smaller, lower production plants.

There's another major difference between CRTK and TRI. Toxic Release Inventory reporting requires an evaluation of the release to the environment (hence the "Release" in the name) of the reported toxic chemicals – where did they go and in what quantities. For example, concrete producers might have to evaluate how much was released to the atmosphere or via water discharges or land disposal, or any number of other release pathways. This can get very complicated and may require the services of someone experienced in this field, preferably one with experience with the concrete industry.

This reporting also has a different filing deadline (July 1), is required annually, and goes to the EPA and state environmental agencies via online reporting.

Summary

So, while it's almost a given that a concrete plant in the U.S. is likely to conduct annual CRTK reporting, annual TRI reporting may or may not be required at any individual concrete plant. Remember, these two separate EPCRA reporting requirements are for different materials, different reporting agencies, different thresholds, different deadlines and different requirements. Doing one is not sufficient for the other. And, just like filing your tax returns, if you fail to do this filing, someone will probably eventually knock on your door and ask to see your filings (or proof that you don't need to do TRI reporting). If you've forgotten or just didn't bother, you're probably going to have a problem on your hands. ☹☹☹

Douglas Ruhlin begins another year as a regular columnist for Concrete InFocus. His company, Resource Management Associates, is an Associate member of NRMCA. He can be reached at 1-888-762-0320 or doug@rmagreen.com.

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*Senior Vice President,
Local Paving*

They say, “Strike while the iron is hot.” The idea is the blacksmith must act quickly to shape the iron while it is hot and pliable, straight from the forge. If delayed, the metal soon cools and hardens, at which point the opportunity is lost. All the signs are there. The industrial real estate market is still booming. The iron is hot.

And 2022 looks to be as intense as 2021. The main driver is supply and demand. The rise of e-commerce over the last decade is at least partly responsible. E-commerce sales increased by 220% from 2014 to 2020. And while e-commerce continues to drive growth there is an additional increase in demand for manufacturing facilities, adding to a continued shortage of industrial sites across all major markets.

With supply chain bottlenecks and rising transportation costs, many companies are switching from a just-in-time inventory to a just-in-case supply chain strategy, pushing up the need for space. According to a report from industrial real estate giant Prologis, the shift to just-in-case could require as much as 800 million square feet of new logistics space in the near term. Similarly, real estate services firm Cushman & Wakefield forecasts continued “intense pressure” for warehouse and fulfillment center



space through the end of 2023. Specifically, “new deliveries are projected to reach 932 million square feet from 2022 to 2023,” according to a company report. Most of those new additions will be seen in primary industrial markets, port-proximate markets (both intermodal and maritime), and in markets with dense or fast-growing populations where demand has been strongest, the firm said.

NRMCA's Tactical Paving Promotion Plan was developed to capitalize on this market growth. You've heard me talk of this plan before. I wrote about it previously in my article *Warehouses are Where It's At!* in the Summer 2021 edition of *Concrete InFocus*. At the risk of sounding like a broken record, I think it bears repeating. The plan provides the steps to increase ready mix product share in the warehousing, logistics and distribution center pavement market. There is growing and significant

opportunity in this market over the next five years in both new construction and rehabilitation of existing assets.

Concrete pavement is commonly specified in heavy duty areas like dock loading areas, trailer stand strips (dolly pads) and industrial facility storage areas where forklifts are commonly used. However, there are other large areas where concrete is underused, including entry/exit drives, trailer storage areas and car parking lots. Efforts resulting from this plan are focused on expanding cement-based paving use in heavy duty areas and capturing market share in light duty areas.

While there is no standard ratio of floor space to pavement for warehouses and distribution centers, it is not uncommon to see as much potential exterior pavement as there is interior floor space. If a 500,000 square foot warehouse also had 500,000 square feet of exterior paving, the combination of standard

and heavy-duty paved areas would require approximately 10,000 to 11,000 cubic yards of concrete. A warehouse with one million square feet of pavement (comprised of loading docks, entry/exit drives, storage areas and vehicle parking) can require 20,000 cubic yards or more of ready mixed product just for the surface layer (not including cement bases or stabilized soils). That can be a significant increase in production with minimal effort. All you need to do is ask for the business. (If this also sounds familiar, it means you read my article in the Spring 2021 *Concrete InFocus*, Get Out of Your Comfort Zone.)

To paraphrase the marketing Rule of Seven, most people will need to hear your message at least seven times before they are moved to take action. Some marketing professionals claim as little as three times. Others push that number as high as 14 times. (I promise I won't put you through that!) Besides the two previous articles cited here, you've heard it at NRMCA

conventions, ConcreteWorks and in at least three LinkedIn/Facebook posts. So, can we all agree the time for action is now?

The opportunity presented to us is monumental. And the iron is hot. Is there any other opportunity to nearly double your production on a project? And without any substantial increase in your financial outlay? I have given examples of individuals who have been successful in this endeavor. I'll spare you hearing their names again. They confronted the opportunity head-on, with a focused plan and a solid partnership between producer and contractor.

The Pave Ahead team is here to support your efforts. On a national level, we continue to build relationships through the International Council of Shopping Centers (ICSC) and the National Association of Industrial and Office Properties (NAIOP) – the two leading associations for commercial real estate development. Regionally, we continue to work with our state affiliate

partners as they develop promotion plans focused on the industrial pavement market.

During 2021, the largest percentage of reported success in the warehouse paving market segment came from NRMCA Parking Lot Boot Camps and ASCC contractors. "These individuals understand the approach to successfully and profitably build these multi-million square foot paving projects," says my colleague and Boot Camp co-instructor Jon Hansen. Producer and contractor participation in Boot Camp is the most successful combination for winning projects.

Of course, we are always at the disposal of our NRMCA members and ASCC partners to provide whatever help we can. You don't have to go it alone. The Pave Ahead Local Paving Team is here to help. As Jon says, "We go where we're asked." Now is the time to strike, while the iron is, indeed, still hot! ☺☺☺

*Phil Kresge can be reached at
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NRMCA 2021 Year in Review

*Editor's Note: Each NRMCA department was asked to summarize its major accomplishments in 2021. What follows here are the highlights along with the respective staff member's contact information at the end of each section. *Please note that the Structures and Sustainability/Buildings submission is featured separately in this issue under the inaugural Build With Strength column found on page 10.*

Safety, Environmental and Operations

2021 National Mixer Driver Championship – We're Back! – After cancelling NRMCA's Mixer Driver Championship for a year due to the COVID-19 pandemic, 2021 marked its return. The program saw participation from companies and drivers from across the U.S. competing for the title of "Best of the Best." The program also ushered in some new changes to enhance the competition for both drivers and spectators. Capping off the program was the drivers' awards dinner, which pulled in over 700 participants to congratulate the winners. Last year also witnessed the largest sponsorship program haul in the program's 15-year history. NRMCA foresees the program to continue to grow in 2022 with more drivers, spectators and sponsors.

NRMCA Response to OSHA COVID-19 Mandates – In November, OSHA released its anticipated Emergency Temporary Standard mandating COVID-19 workplace vaccinations for employers with 100 or more employees. NRMCA advocated against such a mandate through communication with DOL and OSHA as well as with the White House OMB, which NRMCA staff met with in October. NRMCA

alerted the membership and crafted industry-specific compliance materials. NRMCA successfully opposed a similar COVID-19 ETS back in May. Following NRMCA SEO staff (amongst other groups) meeting OIRA, OSHA, SBA and DOL staff members in May, OSHA announced it would only enact an ETS for the healthcare industry. A huge win for the industry!

EPA Corrosivity Rule Withdrawn – Last year, EPA formally withdrew what was known as the EPA Corrosivity Rule. The rule would have increased concrete plant burdens and costs by lowering the allowable pH thresholds in process water and wet concrete before triggering hazardous waste regulations. NRMCA had been advocating against this rule since its inception in 2016. Another huge win for the industry!

Think First Monthly Safety Initiatives – In 2021 NRMCA continued with its very successful *Think First* monthly safety initiatives. The library of initiatives covers 24 various safety topics related to people, plants, trucks, jobsites, seasons and other safety concerns. The initiatives are meant to be shared, used as a training tool, printed, posted and distributed; all of which are encouraged. All initiatives can be found by visiting NRMCA's website.

Second Annual Mixer Driver Appreciation Week – Last year's Mixer Driver Appreciation Week, held the week of Aug. 2-6, marked the program's second successful year. The week of appreciation is for the ready mixed concrete industry's frontline workers – our ready mixed concrete truck drivers. Without the hard work, dedication and professionalism from the industry's mixer drivers, providing ready mixed concrete to the point of placement wouldn't be possible. To recognize these drivers, tributes and honors were observed across the industry from producers, vendors, state associations and industry partners. The program also included industry letters, driver swag opportunities and recognition of our various driver award winners from past years. The program will continue again the week of Aug. 1-5.

Kevin Walgenbach, kwalgenbach@nrmca.org

Online Exclusive

Read the full version of this article in the digital edition of *InFocus* at www.naylornetwork.com/nrc-nxt/

Membership

A Strong 2021 Sets Stage for Increased Membership This Year

By Alex Land and Amanda Muller, Directors of Membership Engagement

Alex and I approach 2022 with a continued focus on YOU, our membership. While we work to grow the member footprint, we will also double down on our education campaign designed to ensure all our members are aware of the full range of NRMCA services. Over the last year Alex and I have spent hundreds of hours connecting with NRMCA members to review membership benefits while offering opportunities and recommendations on how to be more engaged. We've connected with new and rejoining members to communicate the value their membership offers their companies and how NRMCA can best serve them.

In 2021, NRMCA increased its membership across all categories:

- 40 producer members
- 31 manufacturers, products and services associate members
- Seven materials associate members
- Two contractor associate members

Participation on NRMCA committees grew by over 150 member individuals, with over 300 member companies represented. **If you are not currently participating in an NRMCA committee please contact us!**

Our Member to Member (M2M) program expanded to 17 participants. This program offers discounts and value-adds exclusive to NRMCA members; see more at www.nrmca.org/m2m.

As we write this in mid-January, new and rejoining membership numbers are growing weekly:

- Five producer members added
- 18 associate members added

We're working on a revised NRMCA value proposition statement that will help us further grow our membership. A strong, supportive membership helps NRMCA continue to lead the industry from a position of strength. And we do anticipate these membership stats to continue to climb as we work with our state affiliates to reach prospective members that would benefit from joining the NRMCA family. And Alex and I also remain diligent with existing membership

to ensure our retention rate holds year-over-year.

With a new year comes potential and promise. We look forward to continuing conversations that we held in 2021 held along with new ones yet to be started. On behalf of the membership team, thank you for your continued support of everything we do here at the NRMCA, our success is your success. Here's to the best year yet! 🍀🍀🍀

Want to become more involved in NRMCA? Know of a company that would benefit from membership? Please contact either Amanda Muller at amuller@nrmca.org or Alex Land at aland@nrmca.org.

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Reducing Environmental Impact Through **Benchmarking and Alternatives**

By Mason Booth, Sales Development Specialist, Master Builders Solutions; Jason Jimenez, Sales Representative, Euclid Chemical and Andrew Mercker, Sales Manager, Irving Materials Inc.

When discussing the future of concrete, it is next to impossible to not mention the growing list of green initiatives: LEED, Architecture 2030, Structural Engineers Institute 2050 and Buy Clean are some at the heart of discussions. These initiatives have one main objective, to reduce the environmental impact of new structures that are built. While this impacts all materials and products, the implication for concrete is for the reduction of the embodied carbon of mixtures used. This is associated with the carbon dioxide (CO₂) emissions associated with the materials, manufacture and delivery. While this sounds simple enough, achieving this goal can result in a complex solution involving many different technologies. On a per unit basis, concrete is a very green product with a low carbon footprint compared to other materials used in buildings. Its contribution is large because of the relatively large volume used – being the largest volume construction material used.

This 2022 Developing Industry Leaders group took a look at alternatives that ready mixed concrete producers can utilize to develop mixtures with a lower carbon footprint for projects with a sustainability goal. The technologies we primarily researched included the use of blended cements, supplementary cementitious materials (SCM), admixtures and carbon dioxide mineralization in concrete

mixtures. These technologies should be addressed in the specifications portion of the project and are driving factors toward performance-based specifications that allow producers and contractors to innovate toward the best way to produce sustainable concrete mixtures.

It is claimed that cement production accounts for 8% of the world's CO₂ emissions (Ref 1). Approximately 60% of these emissions come from the calcination of limestone and 40% comes from the fuel burned to achieve kiln temperature for cement manufacture. It is estimated that while cement is about 10% of the volume of concrete, it accounts for about 80% of the carbon footprint of concrete. Cement producers have made great strides toward energy efficiency and the use of alternative fuels to aid in reducing CO₂ emissions. They have developed Portland Limestone Cement (PLC) that conforms to ASTM C595, Type IL, which contains between 5 and 15% interground limestone (Ref 2). A rough estimate is that using a PLC instead of portland cement can reduce concrete's carbon footprint by about 10%. PLC can be replaced by portland cement at the same quantity and without reducing the quantity of SCM for equivalent performance (Ref 3).

PLC is permitted by industry standards and specifications and about 34 state highway departments accept its use. Supply is limited and related to pending demand. Concrete producers will have to test and evaluate PLC to develop information for project

submittals that require some lead time and there will be challenges related to storage and production. There is adequate research and successful projects where PLC has been used. However, there are still many commercial specifications that do not list ASTM C595 and thereby implicitly do not permit the use of blended cements like PLC. PLC is a great step in the right direction and will undoubtedly play a major impact in the future of the concrete industry.

Supplementary Cementitious Materials (SCM) are waste byproducts of other industries that are important components of concrete mixtures for enhanced workability, strength and durability. SCMs are perfect materials to optimize concrete mixtures to reduce embodied carbon. One of the challenges with using SCMs is that many specifications place maximum limits or sometimes prohibit their use.

Strength enhancing admixtures are chemical additions a producer can utilize to optimize mix designs and increase strength without increasing cement content. Other admixtures, such as water reducing and workability retaining, can be used to reduce w/cm, improve finishability, reduce permeability and improve workability. These can be used to reduce the embodied carbon of concrete mixtures with equivalent performance.

The technology of injecting CO₂ into concrete when batching is a technology that permanently sequesters CO₂ in concrete forming minerals that increase concrete strength or permits reducing cement

content for equivalent strength. This CO₂ is harvested from industrial sources so using it in concrete has the benefit of capturing carbon that would be emitted as well as utilizing the benefits of the carbon mineralization to lower the mixture's CO₂ footprint.

The focus of our research project was to learn how technologies that exist today can be applied to everyday concrete mixtures and to quantify reduction in carbon footprint. Figure 1 at right shows the Athena Impact Estimator tool that was utilized for comparing the technologies we researched. The tool allowed for side-by-side input of the different technologies and was the input section of our research. Our group utilized a standard specification with w/cm limits and minimum cement content defined as well as a limit on SCMs. Our group defined six different concrete mixtures that documented the GWP reduction potential of each technology and included a seventh mixture to combine different technologies to generate the lowest possible GWP for each of the three classes of mix designs we compared.

Mixture 1 (Specified Benchmark), Mixture 2 (50% Slag), Mixture 3 (20% Fly Ash), Mixture 4 (Carbon Mineralization), Mixture 5 (PL Cement), Mixture 6 (Strength Enhancing Admixture), Mixture 7 (Optimized Mixture using CO₂ & Slag)

Figure 2 shown at right is the comparison of the six different environmental impacts for different mixtures we designed. The light blue bar shows the GWP (or carbon footprint) of each mixture and how it compares to the benchmark for the mix class (red dotted line). Utilizing different combinations of technologies, we were able to lower the GWP compared to the benchmark by up to 39%.

Our study focused primarily on the use of fly ash and slag. When comparing a 4,000-psi mixture with straight cement we were able to reduce the overall Global Warming Potential (GWP) by 24% when utilizing a mixture with fly ash



Enter Data for Custom Mixes on a per yd3 basis

Concrete Mix (per yd3)	Mix ID	Class 3000 - Benchmark	Class 3000 - 50% Class 3000 - 20% Class 3000 - CO ₂ Class 3000 - PLC Class 3000 - Ash Class 3000 - Combo
Strength for Benchmarking (psi)	3000	3000	3000
Portland Cement (lb)	450	225	335
Slag Cement (lb)		225	
Fly Ash (lb)			85
Crushed Coarse Aggregate (lb)	1850	1850	1850
Natural Coarse Aggregate (lb)			1850
Crushed Fine Aggregate (lb)			1850
Natural Fine Aggregate (lb)	1540	1480	1540
Manufactured Lightweight Aggregate (lb)			1540
Accelerating Admixture Chlorides (oz)			
Air Entraining Admixture (oz)			
Water Reducing Admixture - plasticizer (oz)	15	15	15
High Range Water Reducing Admixture - superplasticizer (oz)			
Water (gal)	\$1.00	\$1.00	\$1.00

Figure 1. Athena Impact Estimator Tool

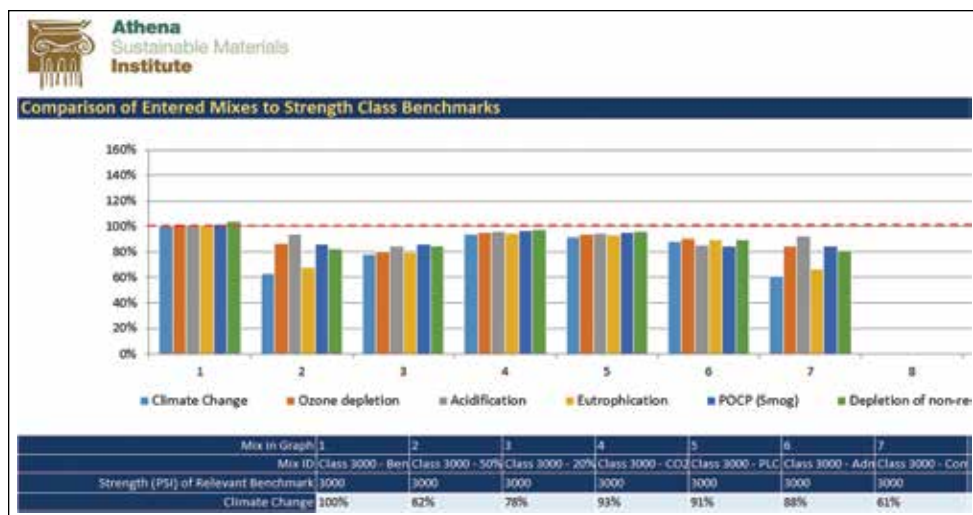


Figure 2. Athena Impact Estimator Comparison to Benchmark

at 20% by weight of cementitious materials. When utilizing 50% slag cement we were able to reduce the GWP by a whopping 43%. Our case study with a 4,000-psi concrete mixture showed a reduction in GWP by 16% when comparing it to a regular cement mixture. Depending on dosage rates you could expect to see a strength gain of up to 30% at 28 days. Our research shows that a 4,000-psi mixture was able to achieve a decrease in GWP of 14% by injecting CO₂ for mineralization and reducing cement content for equivalent strength.

The technologies that we researched and reported on are proven, readily available technologies that can be applied to concrete mixtures today and will have an immediate impact on the sustainability effort in concrete. Performance-based specifications will allow for the greater implementation of these technologies that will result in a

greener, more sustainable footprint for the concrete industry. ☺☺☺

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This article continues the long-running series under the Developing Industry Leaders program. For more information on how you can get involved in addressing issues facing the ready mixed concrete industry, contact Eileen Dickson at edickson@nrma.org.

Pavement Sustainability and Resilience

By Brian Killingsworth

NRMCA Executive Vice President, Local Paving

Infrastucture Investment and Jobs Act, Build Back Better, Climate Change, Wildfires, Tornadoes, Flooding, Winter Storms, Sustainability, Resilience. How many times have we heard these terms over the recent past? They fill the radio airwaves, TV screens, news websites, blogs and our daily conversations. In nearly every activity we conduct throughout a day, we are mindful of the impact we may be having on the environment. Conversely, adverse environmental conditions, spurred by a changing climate, are also having detrimental effects on our lives.

Being a resident of Texas, I was affected by the unprecedented 2021 winter storm. Hundreds of thousands of residents were without power or water for days. Snarled supply chains affected grocery stores and gas stations. The National Weather Service said it was one of the most impactful winter events in recent history that brought multiday road closures, power outages, loss of heat, broken pipes and other societal impacts for the region.¹ Because of these and many other events, it is incumbent upon the design and construction industry to lead efforts that build sustainable and resilient infrastructure which includes our pavements.

However, we must first understand what it means for a pavement to be sustainable and resilient. The Federal Highway Administration (FHWA) says that pavement sustainability refers to system characteristics that encompasses a pavement's ability to:

1. Achieve the engineering goals for which it was constructed;
2. Preserve and (ideally) restore surrounding ecosystems;

3. Use financial, human and environmental resources economically; and
4. Meet basic human needs such as health, safety, equity, employment, comfort and happiness.²

For resilience or resiliency, the FHWA states in Order 5520 that it is the ability to anticipate, prepare for and adapt to changing conditions and withstand, respond to and recover rapidly from disruptions.³ In its simplest form, being sustainable should improve an ecosystem while being resilient means we can respond and recover from the disruptions that the ecosystem may impact on us. Thus, sustainability and resilience are compatible, but they are not the same. Pavements can be both sustainable and resilient, but the two may also exist without the other.

A blog post in 2014⁴ addresses this circumstance by highlighting that the sustainability and resilience start and different points. It states:

"Sustainability starts with a functioning system, and then looks at how long that system can operate without wearing down. It also takes into consideration how a system's component functions can be improved so that the system can run continuously on its own.

Resilience starts with a disaster and then looks at how to clean up afterward. It then considers how to prevent or minimize a future disaster or at least minimize the negative effects of the disaster. The end result may or may not be sustainable, although a sustainable outcome is ideal."

Sustainability

When a pavement is constructed and used by vehicles there can be impacts on the surrounding environment.

Generally, that impact is measured by the greenhouse gases (GHG) that are emitted during construction and while the pavement is being used. The primary GHG impact that is considered is CO₂ emissions. Along with GHG emissions, there are also other effects like energy consumption, impacts on habitat, water quality, changes in the hydrologic cycle, air quality, depletion of non-renewable resources, among others (FHWA-HIF-15-002) that can be considered when fully evaluating the sustainability of a pavement.

Disclosing or being transparent about the environmental impacts is an important part of, and the first step toward, being sustainable. Through these disclosures, a decision maker can make better decisions about the materials he or she uses to construct a pavement. One way to disclose the environmental impact is through an Environmental Product Declaration (EPD). An EPD is a third-party verified document that is officially registered to show the environmental impact of a product or service. The general goal of EPDs is to use verifiable and accurate information to encourage the demand for and supply of products that have a lower negative impact on the environment. EPDs assess impacts that occur from cradle-to-gate or in other terms just the production stage of the

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NRMCA Monthly Safety Initiative

Volume 3, Issue 1



Vehicle Repair Shop Safety!

Ready Mixed Concrete and Vehicle Repair Shop Safety

According to the National Ready Mixed Concrete Association nearly 75% of all ready mixed concrete production facilities include at least a small repair shop. Large trucks, dangerous chemicals, heavy objects, flammable materials, and powered equipment are all part of implementing a Safety Management System in a shop. Keeping shop employees and shop visitors safe starts with making sure shop housekeeping is a priority. Shops can get rather cluttered in a short period of time. Strict procedures should be in place to maintain an orderly shop. Whether its securely storing tools and equipment, testing fire alarms regularly, replacing burned out lights, or making sure emergency exits are clear, organization is the key.



Safety for Repair Shop Mechanics in the Ready Mixed Concrete Industry

Safety for shop mechanics starts with understanding that the job's not done until all the tools are put away. Make sure the proper gloves are used to avoid abrasions, burns and cuts. Always use proper lifting techniques for heavy objects. Safety goggles/face shields are a must when welding and grinding. Steel toed boots with non-slip soles reduce the risk of slipping and falling. Use ear protection when around loud equipment. Always use lockout, tagout procedures when working on or in a mixer truck. Make sure spilled oil, transmission fluid, or other liquids are cleaned up immediately to reduce the risk of slips and falls. Sweep and clean floors daily. Never eat or drink in the shop to avoid contamination with chemicals. Make sure the shop is vented properly to avoid harmful fumes. Never smoke in the shop. Never work under a vehicle unless all jacks are set and stable. Keep your hazard communication program up-to-date and available to all employees. Make sure cell phones are kept secure in the shop office to limit unsafe distractions. Finally, make sure the shop has an emergency action plan and mechanics know what to do in case of an emergency.

Shop Staff and Visitors... Dos and Don'ts

- Think first before entering a shop
- Verbally announce yourself when entering a shop
- Park your vehicle in designated spot, never behind rolling doors
- Be especially mindful of wet or slippery floors
- Only walk within designated walkways
- Wear appropriate PPE (hardhat, gloves, goggles, hearing protection)
- Never stand in front of or behind a moving vehicle
- No smoking in the shop
- Follow all posted safety signage



Resources

OSHA: [Autobody Repair and Refinishing](#)

NRMCA Safety Series: [Repair Shop Safety for the Ready Mixed Concrete Industry](#)

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NRMCA Monthly Safety Initiative

Volume 2, Issue 11



Gloves... Get A Grip!

Ready Mixed Concrete Production and Hand Protection

Whether it's at the plant or at the jobsite, working in the ready mixed concrete industry holds the potential for hand injuries. Due to the potential for hand injuries, OSHA requires industries, such as ready mixed concrete, to require personal protective equipment (PPE) to protect against these injuries. To combat hand injuries, the industry relies heavily on engineering and work practice controls, but also PPE, specifically gloves. It's important to know that gloves should be the last line of defense for eliminating hand injuries, and also that not all gloves are the same. If engineering and work practice controls cannot be relied on to remove hand injuries, then the correct type of glove shall be required to address the specific hazard, operation, and task. Ready mixed concrete producers should survey their plants and work sites and analyze different tasks to determine what types of gloves are needed. Not all gloves are designed to protect against multiple functions and hazards. In an effort to limit and eliminate industry hand injuries, numerous ready mixed concrete companies have moved to a 100% glove policy. This means that regardless of position in the company, regardless of task or job function, anyone physically at one of their ready mixed concrete plants is required to wear gloves. These same companies have seen dramatic declines in hand injuries due to this policy.



What to Know About Hand Protection and the Ready Mixed Concrete Industry

While working at or visiting a concrete plant, or when delivering fresh concrete to a construction site, types of hand injuries can include bruises, cuts, abrasions, fractures, burns, skin absorption, frostbite and even amputation. To prevent these types of injuries, glove selection is crucial and should rely on factors such as chemical handling, nature of contact (splashing, immersion, etc.), duration of contact, grip requirements (dry, wet, oily, dusty, etc.), thermal protection, size, comfort, and abrasion resistance. There are generally four types of glove groups, depending on the hazard, to choose from: leather, canvas, or metal mesh; fabric and coated fabric; chemical- and liquid-resistant; and insulating rubber gloves. Within each of these categories there may also be specific types of gloves to meet the specific hazard. As with any PPE, before utilizing the PPE, employees need to be trained on when to use the specific type of glove, how to don and remove the gloves, store, and clean the gloves.



Hand Protection... Dos and Don'ts

- Think first
- Before using gloves, try to eliminate the hazard
- Determine hand injury hazards before using gloves
- Use the right type of glove for the specific hazard
- Know how to handle gloves before and after their use

Resources

OSHA: [Personal Protective Equipment Guide](#)

OSHA: [Personal Protective Equipment Factsheet](#)

NRMCA Safety Series: [Personal Protective Equipment Program](#)

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Concrete Industry Specialist
Ph: (605) 763-4032
Email: cwheeler@sioux.com

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Toll Free Ph: (888) 763-8833
Email: cwheeler@sioux.com
Web: www.siuux.com

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