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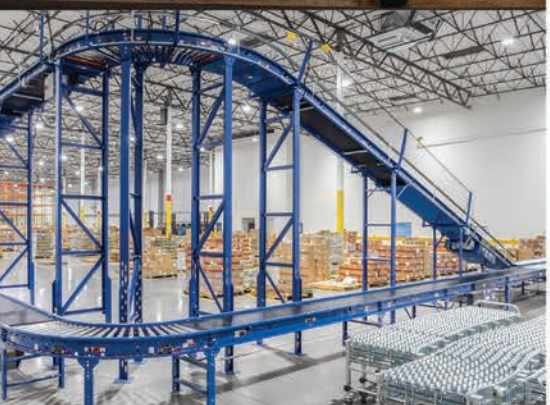
The VOICE

The official magazine of The Construction Users Roundtable
Issue 3, 2023

Leveraging ESG & Tech for a Profitable & Sustainable Tomorrow

CURT



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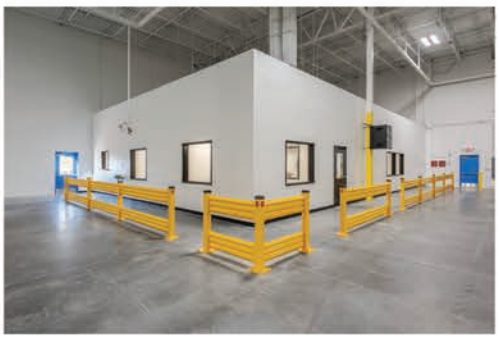

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WORDS OF WISDOM

THE COVER

This issue's cover story showcases companies and organizations that have created tools that tackle sustainability today, so that everyone can have a brighter future tomorrow.

8 COVER STORY

Leveraging ESG & Tech for a Profitable & Sustainable Tomorrow: Construction Companies, Owners, and Organizations are Leading the Charge Against Climate Change

FEATURES

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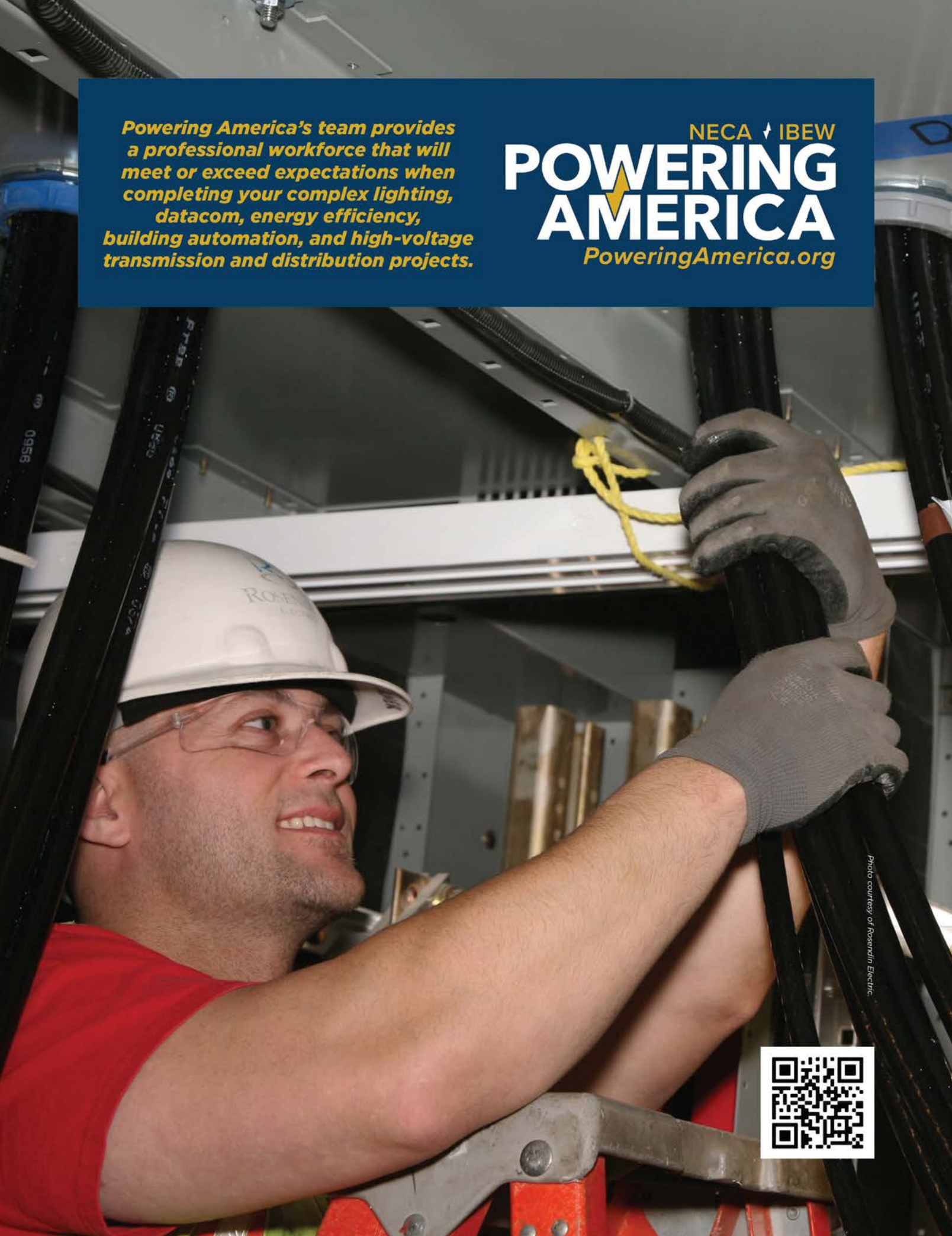
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WORDS OF WISDOM

A Message from Jim Ellis, CURT Chairman of the Board

Looking to 2024 and Beyond

Jim Ellis
CURT Chairman of the Board
Microsoft, Corporate VP Global Construction (Retired)

The construction industry is poised for significant growth and transformation in the next decade with estimates that show a $25T annual spend by 2035. As the world evolves and adapts to emerging technologies and sustainability demands, construction companies must embrace new strategies to thrive in this dynamic landscape. Successful engineering and construction firms must continuously innovate, optimize processes, and adopt cutting-edge technologies to deliver best-in-class capital projects.

In today's world, capital projects need to be delivered to an ever-increasing set of internal and external stakeholder expectations. Safety, efficiency, productivity, and profitability all remain key to success, while new expectations for delivering sustainable assets, executing with diverse and inclusive teams, and building collaborative and equitable partnerships across the supply chain are becoming essential to every company's ability to operate and grow.

With this capital growth challenge for our industry and the need for members to deliver on increasing stakeholder expectations, CURT recognized the need to revisit and enhance our vision, mission, key focus areas, and strategies to enable industry-wide transformation for the safe, sustainable, efficient, and profitable delivery of capital projects globally.

Twenty diverse, experienced, and recognized industry leaders and advisors are currently engaged to help understand the challenges that our industry faces and the opportunities to pursue that will create measurable value to members and their key stakeholders. We thank this team for their leadership and support as they helped validate our strategic direction and our 2024 and beyond roadmap. We are excited to be sharing this with you at our September meeting in Minneapolis and we look forward to our continued role as a recognized leader in providing key members and stakeholders with delivered sustainable value as the premier capital project delivery organization.

Our construction industry is at a pivotal moment, with opportunities for tremendous growth and transformation. To achieve success over the next 10 years and deliver best-in-class capital projects, construction firms must embrace sustainable practices, leverage technology, adopt off-site construction methods, prioritize resilience and safety, invest in talent development, build collaborative partnerships, and harness the power of AI and automation.

By adopting these strategies, our CURT affiliated companies can further position themselves as leaders in the industry, creating a safe, sustainable, innovative, and prosperous future for all stakeholders involved. CURT remains committed to making a difference and our focus is to continue enabling the idea of solving problems that matter, together! We can't do this without each of you engaged on this exciting journey with us. We look forward to your valuable feedback and alignment as we successfully position to deliver in 2024 and beyond!

As the world evolves and adapts to emerging technologies and sustainability demands, construction companies must embrace new strategies to thrive in this dynamic landscape.

Off and running: Leveraging ESG and Technology for a Profitable and Sustainable Tomorrow

The ESG and Sustainability in Construction Committee, launched at CURT's National Conference in February, aims to create awareness and understanding around ESG and sustainability. The Committee's focus is on how companies can get started with ESG and sustainability, as many are still struggling to include capital project delivery and construction into their goals, commitments, and actions.

Our September Summit will combine the work of the ESG and Sustainability Committee with the Technology Committee, focusing on Leveraging ESG & Technology for a Profitable & Sustainable Tomorrow. The summit aims to engage participants in defining key problem/opportunity areas and potential solutions to support a profitable and more sustainable future for the industry and companies involved.

We look forward to seeing you all at that summit and we are excited about the opportunity to further engage on these topics with each of you! Thanks for all that you do for CURT, and for advancing and enhancing our industry. Each of you makes a difference and together, we will compound the impact!

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NOVEMBER MEMBER MEETING + SUMMIT

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Tucson, AZ

FEB. 12 - 14

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THIS ISSUE'S EXPERTS

Thank you to this issue's experts for sharing their knowledge.

Jim Ellis, Chairman of CURT's Board, is a Senior Executive with 40+ years of global leadership experience in business, operations, manufacturing, technology, engineering, project management, and supply chain, Jim has a demonstrated track record of delivering sustainable shareholder value while building strong sustainable internal and external stakeholder relations across the globe.

Jeremy Chasen, Senior Manager, Business Development at Procore, is responsible for partnerships and alliances that support Procore's owner and public sector business. His career at Procore has also included roles in product strategy and product marketing. Prior to Procore, Jeremy's career includes over 15 years of finance, operations, and consulting roles related to capital project and infrastructure delivery.

Daniel Groves, CEO of Construction Industry Resources (CIR) and workforce consultant for the Construction Users Roundtable (CURT), brings over 25 years of experience in strategic planning, entrepreneurship, finance, and construction labor risk analysis, including a decade of experience in sophisticated technology development and implementation. For the past decade, CIR has been providing market intelligence and project risk mitigation solutions for owners and labor providers; including the Construction Labor Market Analyzer (CLMA), the Contractor's Workforce Development Assessment (CWDA), the Labor Risk Index (LRI) and the Labor Risk Management program (LRM).

Michele M. Jones, Executive Vice President & CEO, National Insulation Association (NIA), has been with NIA for 30+ years. Michele has served in the role of Vice President of Member Services, and Director of Meetings and Program Development, where she was responsible for the Annual Convention, association meetings, website, membership, products and services, and the formation of the Foundation for Education, Training, and Industry Advancement. In November 2002, Michele was promoted to the role of Executive Vice President and subsequently Executive Vice President/CEO, overseeing all aspects of NIA.

Jardena London is a consultant, author, speaker, and is CEO of Rosetta Agile. She has spent the last 30 years finding ways to transform organizations so that our souls can flourish, while our financials thrive. Her book, "Cultivating Transformations: A Leader's Guide to Connecting the Soulful and Practical," supports this mission by drawing a straight line between the processes we use, the way we feel, and the results we get that nourish our souls while producing thriving financial outcomes.

Jane Marsh, Editor-in-Chief of Environment.co., works as an environmental writer, specializing in net zero topics as it relates to the energy industry, technology, and the built world.

Paul Massih, founder of Massih Advisors, LLC, has more than 36 years of experience in oil, gas, chemicals, pipelines, and construction industries. He advises organizations on business strategy, major capital projects, field developments, local content, and the supply chain. Paul held executive positions most recently as Vice President of Global Wells Supply Chain for British Petroleum (BP). He was also with Royal Dutch Shell in the Netherlands as Vice President of Upstream International and with Chevron Corporation, where he held several executive roles, including leading a large team for the merger of Chevron and Texaco.

Chris Semlies, AVP Construction Project & Business Resilience at ZRS, leads delivery of Zurich's sustainability consulting and risk advisory services in the construction industry to improve business and project performance, focusing on key challenges such as decarbonization, climate change, cyber security, workforce, and supply chain issues. Chris has over 25 years of experience managing diverse teams in all facets of planning, development, design, procurement, construction, commissioning, and maintenance of public, institutional, and commercial buildings.

Stacy Smedley, Executive Director of Building Transparency, helped create this nonprofit organization that provides open-access data and tools to foster a better building future and aid in reversing climate change.

Ian Welch, Engineering Director of Autonomous Solutions at Trimble, is responsible for systems engineering and cloud computing. He has held roles in hardware and software development, as well as management, over the past 13 years. Ian holds a master's and bachelor's degree from the University of Denver in electrical and computer engineering respectively.

Construction companies, owners, and organizations are leading the charge against climate change.

Leveraging ESG for a Profitable & S Tomorrow

By Paul Adair, Staff Writer

The construction industry is looking to the future in terms of sustainability, and its leaders are using new and exciting innovations and technologies to ensure the building assets they are planning and creating leave the world better off than ever before. Here are three examples of companies, owners, and organizations doing good in the face of climate change.

Assessing climate risk made easier

Drawing on Zurich's 75 years of risk engineering experience, Zurich Resilience Solutions (ZRS) helps companies navigate a dynamic risk environment and build greater resilience in the face of emerging risks related to factors such as natural hazards, workforce and business continuity, supply chain disruption, and cybersecurity. These are all challenges that fall within the broad framework of ESG (environmental, social, and governance) and have become increasingly important considerations for the design and construction industry, especially when it comes to climate change.

"Climate change poses significant risk to the built environment and many construction owners and design teams don't have the expertise or resources in-house to analyze those risks," says Chris Semlies, AVP Construction Project & Business Resilience at ZRS. "Zurich has done natural hazard assessments for construction projects and existing properties for years. But more recently we've been taking that expertise a step further and incorporating climate change modeling data to help customers better understand and prepare for how these natural hazards may evolve over time."

Whether it is related to climate change scenarios, or a variety of perils related to high winds, unprecedented precipitation, or extreme temperatures (among other factors), ZRS helps clients to hone in on the most critical climate risks for their project or properties, and then provides recommendations for how to build resilience to any potential climate risks. The climate risk assessment and recommendations can then be incorporated into the site selection and design process for a renovation or new construction project.

The newly launched ZRS Climate Solutions digital portal enables customers to access and filter relevant climate data for their single site projects, as well as for their entire property portfolios across the United States and around the world. The client can apply the different climate-related perils and time-horizon scenarios and see where they might have the greatest concentration of exposure to any potential risks.

"The dashboard essentially is just a tool for putting this information at our customers' fingertips making the analysis and presentation of that data simpler and more user friendly," says Semlies. "It's not just saying, 'Hey, you have a flood risk.' We work with our clients to build specific views that integrate various data sources and characteristics, including the ability to see the data in financial terms, to provide a holistic view of risk across multiple time horizons and scenarios. Paired with our reporting, the dashboard is a great tool to support businesses in making strategic decisions based on growing climate risks."

The company will continue to update and refine the dashboard as additional climate change models become available.

"We want to make the climate assessment process as efficient and cost effective as we can for the owners, and continuously work at improving our products over time," says Semlies. "To do this, we are always listening to the feedback from our customers. After all, this is

& Tech ustainable

where the idea for the dashboard came from in the first place."

Building Transparency and EC3

Building Transparency is a 501(c)3 nonprofit organization that provides open-access data and tools that support broad and swift action across the building industry in addressing embodied carbon's role in climate change. The nonprofit hosts, manages, and maintains the Embodied Carbon in Construction Calculator (EC3) tool, which was co-conceived by Skanska USA and C Change Labs, with initial funding and piloting coming from Microsoft, MKA Foundation, Charles Pankow Foundation, Interface, and Skanska USA.

The Carbon Leadership Forum incubated EC3 up to its public beta launch in November 2019 with more than 50 industry partners.

It's estimated that global new construction generates more than 3.7 billion metric tons of embodied carbon emissions annually. Embodied carbon – or the carbon emissions associated with the manufacture, transport, and installation of construction materials – marks a significant opportunity for mitigating carbon emissions and achieving zero-carbon, resilient, and healthy built spaces.

Helping companies come to terms with their carbon footprint, EC3 is the industry-leading tool that encourages low-carbon procurement choices, allowing the AEC sector to drive reductions in embodied carbon emissions. EC3 is the only free and global, open database of digitized Environmental Product (EPDs), which are essentially technical documents about the environmental impacts of creating a specific product, including its carbon footprint.

"EC3 integrates with both the design and procurement phases of a construction project to look at a project's overall embodied carbon emissions, enabling the specification and procurement of low-carbon options," says Stacy Smedley, Executive Director at Building Transparency.

To better understand the potential impact and benefits of using EC3, Microsoft (a lead sponsor of EC3 and the tool's first large corporate user) recently released a case study surrounding the company's Puget Sound campus modernization project, which is located in Redmond, Washington. The project included the construction of 17 new buildings and 2.5 million square feet of workspace.

Before commencing the project, the company committed itself to reducing the amount of carbon associated with the construction materials used in the new buildings. This is where EC3 came in, which allowed Microsoft to easily compare, contrast, and select the most beneficial materials, right from design through to construction.

"Using this tool enabled the campus modernization project team to be on track to reach the company's commitment to reducing embodied carbon by at least 30 percent compared to its baseline, while also supporting Microsoft's pursuit of International Living Future Institute's (ILFI) Zero Carbon Certification," says Smedley.

Building Transparency continues to experience exponential adoption of the EC3 tool, and interest is only growing. The

tool currently has over 35,000 users from more than 80 countries across the building industry, who are leveraging its data and functionality to decarbonize their construction projects. EC3 currently contains more than 130,000 global product EPDs across material categories and supports 3,600 building projects.

Moving forward, Building Transparency will seek to continue announcing new integrations for the tool, as well as seek out new pilot partners who are committed to reducing embodied carbon emissions and prioritizing open-access data and tools.

How insulation helps the world

What helps keep people warm when it's cold outside, and cool when it's hot?

Insulation. But insulation has been such a simple solution for so many building problems – and for so long – that people tend to forget about the importance of what's hidden behind the walls and on the pipes.

"Insulation has always been one of the best solutions and should be one of the first priorities for any owner, plant, or facility. An investment in insulation often pays for itself in as little as six months, and owners achieve a double benefit of dual gains for energy and environmental goals. Many expensive technology options right now don't offer nearly as much," says National Insulation Association (NIA) Executive Vice President & CEO, Michele M. Jones. Since 1953, NIA has been the voice of the mechanical insulation industry, dedicated to keeping the commercial and industrial insulation industry up to date on the latest industry trends and technologies.

By reducing heat loss or gain, insulation reduces the overall energy demand of a facility, plant, or building. This leads to reduced dependency on foreign oil, decreased operating expenses, lower greenhouse gas emissions, and a reduced carbon footprint, supporting environmental goals, and addressing the challenges posed by climate change.

Mechanical insulation also significantly impacts the built environment by enhancing thermal comfort, controlling condensation, protecting personnel, extending equipment life, and reducing noise levels both within a facility and the surrounding area. Mechanical insulation is an effective and efficient solution that provides both financial and environmental benefits, making it a valuable investment for owners, plants, and facilities.

"What will really surprise you is that installing mechanical insulation is even greener than planting trees," says Jones. "We concluded that you would need to plant 46 trees to achieve the same CO_2 reductions realized by insulating a single foot of 350°F pipe. Here's another example: Using Environmental Protection Agency calculations, NIA has found that installing eight feet of mechanical insulation on a 350°F pipe will offset the carbon emissions of driving a pickup truck for 20,000 miles, which is equivalent to planting 360 trees or replacing 310 forty-three-watt bulbs with LED bulbs."

Insulation products have low embodied carbon, which means they save more energy during their use than the energy needed to manufacture them, and some common insulation materials, like fiber glass, are made from recycled content. NIA member manufacturing company Knauf

Insulation® reports the company uses half a billion pounds of recycled glass in its manufacturing process each year – the equivalent of 10 full railcars worth every day – diverting 50 tons of recyclable glass from landfills every hour.

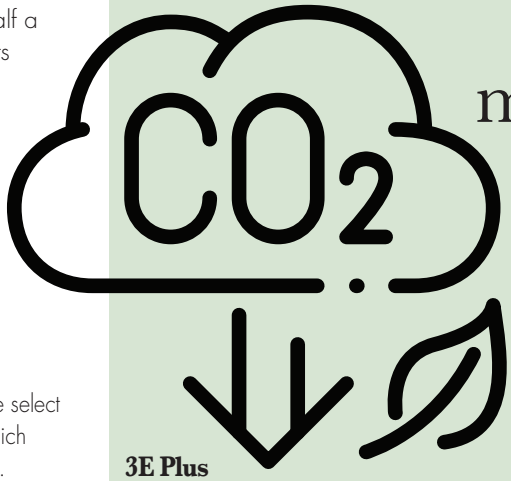
Another NIA member, manufacturing company Owens Corning®, uses Renewable Energy Credits from its power purchase agreements to certify with SCS Global Services that the electricity used to make select products is 100 percent renewable, which reduces the product's embodied carbon. According to the company's 2021 Product Environmental Footprint Summary of Owens Corning® PINK Next Gen™ Fiberglas™ Insulation, "insulation installed in Chicago pays back in heating and cooling savings in less than 40 days, equivalent to taking 12 cars off the road EVERY year."[1]

Mechanical insulation is a proven technology with much still left to offer. To help showcase the benefits of mechanical insulation and its benefits for the environment, NIA is currently working on a 10-year (2018-2028) carbon emission and energy efficiency study, with early results being released later this year.

"The preliminary results are staggering and will provide more statistics on the value and impact of mechanical insulation, once again proving that the best way to reduce carbon emissions is to prevent it from being released in the first place," says Jones. "Insulation is one of the best ways to save on energy. This readily available technology works the second it is installed and does not require any type of power source to work, and it will continue to work as long as it is properly maintained, thereby saving energy and preventing carbon emissions year after year after year." ○

REFERENCE:

1. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://dcpd6wotaa0mb.cloudfront.net/mdms/dms/Shared/10019223/PRODUCT-ENVIRONMENTAL-FOOTPRINT-SUMMARY_10019223_fiberglass_foil_faced.pdf?v=1624470140000



Tools to use to measure and reduce your emissions

3E Plus

A free online software that helps engineers and designers calculate insulation thickness, energy saving, and emission reductions when designing insulation systems.

www.3eplus.org

AggRegain Carbon Dioxide (CO2) Emissions Estimator Tool – For Aggregates

The Carbon Dioxide (CO2) Emissions Estimator Tool is a free, Excel-based calculation tool that estimates the carbon dioxide saved in selecting different construction techniques and supply alternatives.

www.wrap.org.uk

BRE IMPACT Compliant Tools

The Building Research Establishment (BRE) maintains an embodied carbon database called IMPACT, which is compliant with four separate embodied carbon footprint calculators: ADW Developments, CarboniCa, eTool, and One Click LCA.

www.bregroup.com

Build Carbon Neutral

The build carbon neutral tool is a website tool that helps developers, builders, architects, and land planners get a handle on their project's embodied carbon emissions related to structures and sites.

www.buildcarbonneutral.org

Building Transparency

The Embodied Carbon in Construction Calculator (EC3) tool is a free and easy-to-use tool that allows benchmarking, assessment, and reductions in embodied carbon, focused on the upfront supply chain emissions of construction materials.

www.carbonleadershipforum.org/ec3-tool

www.buildingtransparency.org

cove.tool

Atlanta, Georgia's cove.tool offers a simple and automated embodied carbon calculator for building design projects, providing a complete carbon profile for a projects from start to finish.

www.cove.tools

eTool

The subscription-based online software, eTool, is a life cycle assessment (LCA) tool for buildings, and it is one of the few BRE IMPACT compliant tools available.

www.etool.app

Greenly Carbon Calculator

More than 1,000 companies already trust Greenly to reduce their carbon footprint with its unique and intuitive carbon accounting platform that measures CO2 emissions in real time.

www.greenly.earth

Mechanical Insulation Design Guide

A free design planning tool for engineers and facility managers for the design, specification, installation, and maintenance of mechanical insulation systems for the commercial and industrial sectors.

www.insulation.org/designguide

One Click LCA

Like eTool, One Click is one of the few BRE IMPACT compliant tools currently available and is an online LCA tool for buildings.

www.oneclicklca.com

Terrapass

The Terrapass carbon footprint calculator helps individuals, businesses, or organizations estimate their carbon footprint or the amount of greenhouse gas emissions they produce.

www.terrapass.com/carbon-footprint-calculator

Watershed

The enterprise climate platform, Watershed, offers solutions dedicated to helping businesses reduce carbon emissions at scale across their supply chain.

www.watershed.com

The reality of the autonomous jobsite.

Beyond the

By Ian Welch, Engineering Director, Autonomous Solutions, Trimble

From unmanned machines working at renewable energy sites to robots that tie rebar for new bridge decks, autonomous solutions are evolving with impressive speed on construction projects. It seems every day a new automated application is put to work on a jobsite – and the continuing investment in autonomous technology is significant.

According to the 2023 Autonomous Construction Equipment Global Market Report,[1] the global autonomous construction equipment market will grow from $11.86 billion in 2022 to $14.05 billion in 2023; that's a compound annual growth rate (CAGR) of 18.5 percent. The autonomous construction equipment market is expected to grow to $20.33 billion in 2027 at a CAGR of 9.7 percent.

But what does this really mean for the future of autonomy in the construction space?

The answer requires a bigger picture perspective. Today, we often talk about autonomy in relation to a specific machine, such as an autonomous bulldozer, an excavator, or even terrain robots like Boston Dynamics' Spot®. But autonomy in construction is all about the site – not one individual machine – and the inherent workflow that goes into the construction of any asset.

In the near future, it won't be good enough to have a fantastic robot on a job if you can't remotely create the work order and then ensure the machine is executing the task in an optimal manner, and then provide relevant data back to the project management solutions. We must be able to turn real-time data into real-time actions and recommendations to optimize and coordinate workgroups of machines across a site – and that goes well beyond point solutions. Autonomous machines in construction must adapt to a site as it changes. That requires the machine to know where it is and the current state of its operating environment as it is evolving on a day-by-day or minute-by-minute basis.

It's a significant hurdle, but one the industry is already finding ways to resolve. Imagine the workforce and sustainability benefits of having a continually updated 3D map of your site you can use to navigate a fleet of machines across the site as it changes?

Now the autonomous construction concept starts to get really interesting. That said, there are steps the construction industry must take to prepare and make the most of the transition.

Transformative dimensions

The industry has a long road ahead to get to a point where 'machines' are running a site –autonomous construction is a journey. It's simply too complex of an environment to happen quickly or with the necessary level of safety. Every year, machines will become more efficient and more automated (much like the passenger car). Today, we are already seeing semi-autonomous machine control becoming more common in the industry, which is the first step on the autonomous journey.

The convergence of key technologies is enabling the industry to accelerate towards having both autonomous machines and optimized site management/machine workgroups. The back office software acts as the "queen bee" of the site operations, directing and coordinating all the machines. While it's not required to operate every machine, the queen bee site manager owns the master plan and adjusts the machine's "worker bees" as required by using inputs the machine doesn't have access to.

e Machine

It's a maturation in multiple areas that includes communications, advanced perception solutions, edge computing, path planning, machine control solutions, site management software, and more.

These solutions rely on cloud services or technology able to coordinate and direct machines wirelessly. Just as importantly, advanced path planning technology provides users the ability to optimize and automate the trajectory, speed, and overall path design of industrial equipment to increase efficiency of work.

Multi-machine operations with path planning capabilities are also already at work. At its 2022 user conference, Trimble demonstrated an autonomous Link-Belt 220 excavator, a remote-controlled Komatsu D51PX bulldozer, and an autonomous Dynapac CA2500 compactor – all working in unison to execute a single task. The excavator traveled to a designated spot and dug a trench. Nearby, an operator remotely operated a semi-autonomous bulldozer to automate the blade, keep it at the desired elevation and steer the machine. Finally, a fully autonomous compactor was sent a "mission plan" with boundary lines and the optimum compaction level, which, using its path planning software, created an optimal methodology to complete the task as efficiently as possible. Also, the compactor was equipped with safety sensors to stop if an obstacle entered its work path.

The sustainable advantage

In the coming years, I believe we will see the first autonomous piece of construction equipment in a true production environment with humans interacting alongside equipment on a site. It's already happening on more contained sites, such as mines and renewable developments. These task oriented solutions – such as digging a trench – will begin to emerge in less restricted environments as we address issues around site safety and efficiency.

In the near term, I can see autonomous rollers working on a piece of a project, while skilled workers complete more complex tasks. It's a transition that will go a long way to overcoming the workforce challenges and attracting new talent to our industry. The technical components of autonomous construction are tailor made for next generation talent. It's also a highly effective way to drive sustainability in the construction space.

Automatic capabilities are already helping to make less skilled labor more skilled, and the highly experienced operator, more efficient. In a recent productivity and sustainability study,[2] Trimble sought to scientifically document the carbon reduction benefits that can be realized using automated solutions, such as horizontal steering control. The two-month study focused on a relatively simple soil compaction operation. It found that using automatic steering led to considerable time and fuel reduction, as well as significant carbon savings compared to manual steering. These results and anecdotal demonstrations should help drive the continued investment in and advancements of automated and eventually autonomous solutions.

An ecosystem of opportunity

For those firms looking to take advantage of the industry transformation, here are some tips compiled from lessons learned about successful deployment.

Before investing, it's important to understand what workflows or efficiencies you are trying to improve. Is it accuracy, or predictability? Is it productivity? What's the state of your labor force? The answers to these questions will help guide your decisions. In many cases, you may not need a fully autonomous solution, but more automated enhancements.

Also, recognize the importance of a field-to-office-to-field connection. You can buy a robot to perform a task, but do you have the ecosystem to use it effectively? Autonomous machines require detailed information so they can make the right decisions at the right time to perform a task and fit into

continued on page 16

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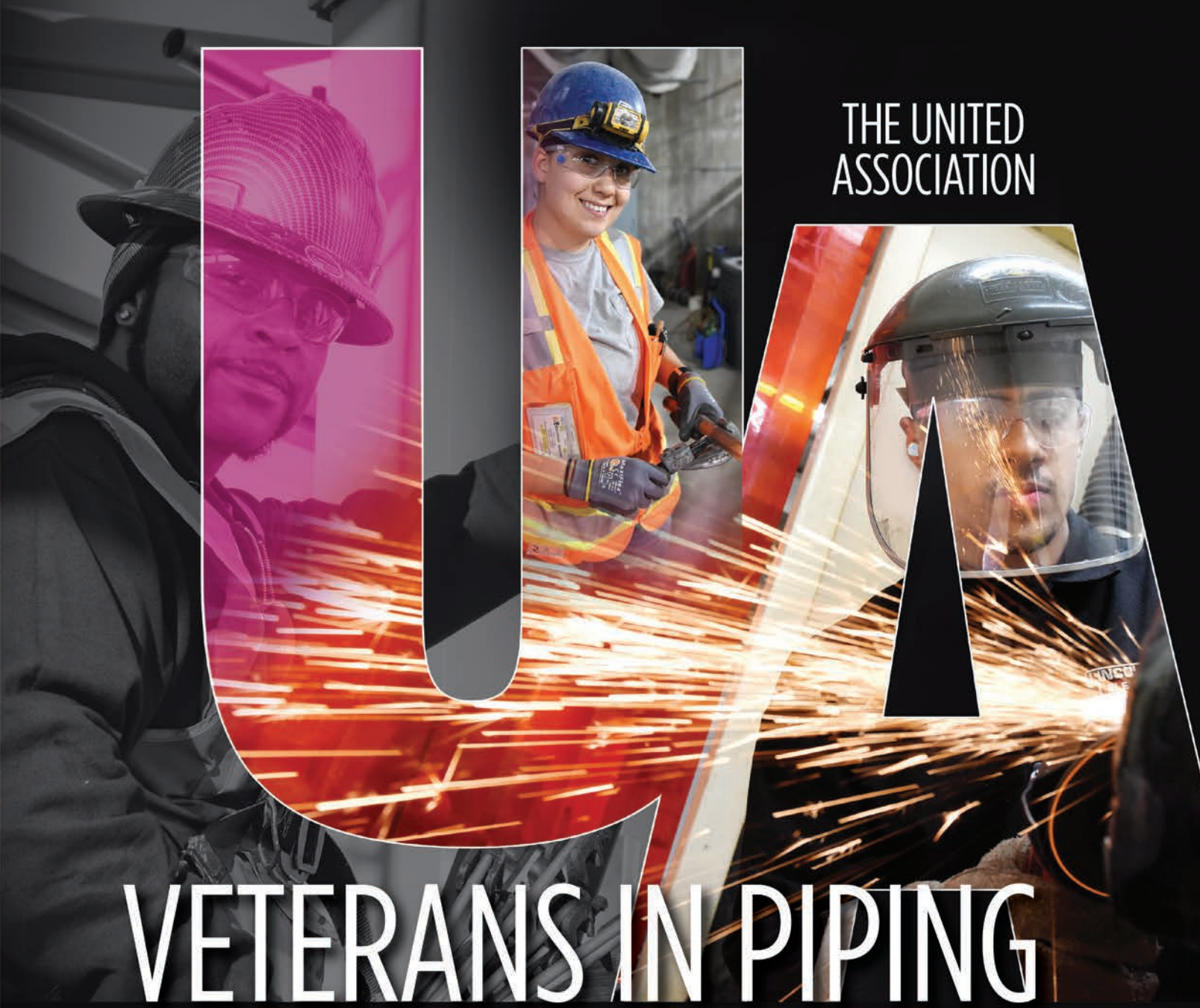

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To those who have served, the UA salutes you.

the workflow. Evaluate your workflow ecosystem to make sure it facilitates an automated operation.

Next, anticipate interoperability. There are many OEMs and startups focused on autonomy for single machines or tasks, such as pipe fitting, trenching, or excavation. They are typically not focused on the software required to power the workflow or seamlessly interact with other software in the ecosystem, such as the design, scheduling, and reporting solutions. If there isn't a seamless connection to facilitate path planning, you will end up with a standalone workflow that has to be managed from system A to system B, which directly affects the productivity benefits you will realize from automated or autonomous machines.

Further, the sensors will need to be more robust, more flexible, and smarter to handle different situations. We need the data to "teach" these machines to avoid obstacles and people, which we, as humans, automatically do. That's where artificial intelligence (AI) comes into play, and should be part of any discussion with a potential technology partner. AI is a foundational technology, the tip of the spear, which allows the machine to perceive the environment in which it is operating. It's going to play a huge role in optimization of the site, and making recommendations about task sequencing, material logistics, equipment selection, etc.

Autonomy is a multi-step process that includes understanding how we do our jobs through machine instrumentation, drawing data from sophisticated sensors on those machines, and applying AI to make those operations more efficient. We have to teach the systems to recognize and differentiate objects, such as one material pile over another, or cones, or humans. These machines must learn to recognize what's going on around the machine for productivity and safety.

Finally, look for a technology partner who understands the construction domain and the inherent complexities that come with nearly every job, whether it's building a highway or a vertical structure. You shouldn't have to change your entire workflow to make these more automated and autonomous solutions work.

These foundational AI-enabled capabilities are essential to realizing the future value of autonomy in construction – as well as the tangible and intangible benefits of the individual advancements being made today. As we become more comfortable with autonomous machines, we will start to see a paradigm shift in the way our industry builds both horizontal and vertical structures. We'll start to trust the capabilities of autonomous and AI-enabled solutions and we'll have the tools to consider building using totally different methodologies, allowing us to look at the construction workflow in ways we've never imagined. ○

Ian Welch is the Engineering Director of Autonomous Solutions at Trimble. He is responsible for systems engineering and cloud computing, having held roles in hardware and software development as well as management over the past 13 years. He holds a master's and bachelor's degree from the University of Denver in electrical and computer engineering respectively.

REFERENCES:

1. www.researchandmarkets.com/reports/5735079/autonomous-construction-equipment-global-market
2. heavyindustry.trimble.com/resources/white-paper/white-paper-quantifying-productivity-and-sustainability

FEATURE

CIR announces new partnership with Procore.

Delivering Labor Risk Solutions

Construction Industry Resources (CIR), a leading provider of skilled labor market intelligence for project planning and execution, recently announced a product integration in partnership with Procore Technologies, Inc., a leading global provider of construction management software. This integration will provide early project planning labor risk solutions to Procore customers by enabling them to access the Construction Labor Market Analyzer (CLMA) tools within their Procore account for analyzing labor shortage challenges and determining how their project(s) will compete for skilled labor.

One of Procore's priorities is helping customers more effectively execute early labor risk planning for projects. This early planning is critical to help avoid labor shortage surprises and knowable construction performance issues. Integration of the CLMA into the Procore platform will enable customers to set up a project, use the CLMA Project Labor Forecaster® to create the craft profile and labor schedule, and then use the data and analytics to visualize how and when the project is competing for labor. Access to the CLMA will also enable the customer to see how market dynamics and regional project activity will impact the cost of labor over time.

This integrated solution helps solve a key industry challenge by streamlining the project(s) data exchange, providing instantaneous future labor market intelligence, and enabling early risk detection during the capital planning process to help avoid labor risk during project delivery. The integration enables greater insights to improve decision making and maintain control of the project.

"We are excited about this partnership with Procore, which enables their customers to identify project

labor risk early and implement solutions to avoid that risk," stated Daniel Groves, CIR[1] founder and CEO. "The earlier a problem is identified, the greater the range of available risk mitigation options."

Most capital projects are executed to meet a business need, which are translated into specific project objectives for cost, quality, schedule, and safety. These become the primary measures of success or failure for the project team. Missing these targets has a significant impact on the associated stakeholders and can be considered a failure within an organization. This integration will help project stakeholders identify how skilled labor shortages will increase risks for a project, how they can use tools readily available to identify risks earlier, and how to employ labor risk mitigation recommendations to maintain control of their projects and consistently meet project objectives.

"Right now, and for the foreseeable future, construction labor issues are a huge pain point for everyone involved in the project," said Groves. The CIR solutions relieve the pressure by enabling project planners to know early in pre-construction, and with a high degree of certainty, what labor issues to expect, so solutions to avoid those problems can be deployed before they arise."

Procore customers can expect a quick setup with an immediate time-to-value. Easy to use, simple data entry and real-time reporting will become pre-construction planning hallmarks. To get started, visit us on the Procore App Marketplace.[2]

"We are thrilled to have CIR as a Procore partner. Their preconstruction solutions and specialized knowledge will help our customers identify labor risk early enough in project planning to develop and implement appropriate mitigation strategies," said Jeremy Chasen, Senior Manager, Business Development at Procore. "Integrating the CLMA solution with the Procore platform provides customers with an opportunity to drive meaningful improvement in capital project planning and connect strategy with project delivery to decrease the impact of labor risk." ○

Construction Industry Resources, LLC (CIR) is an investor-owned, Kentucky-based company providing technology solutions to help the construction industry more effectively recognize, plan for, and avoid project labor risk. CIR's platform for accomplishing this mission and delivering powerful, predictive risk analytics is the Construction Labor Market Analyzer (CLMA). The CLMA database provides labor market intelligence based on a robust database of over $6 trillion in non-residential project spending, and since its launch in 2009, the CLMA has become the industry's leading labor market intelligence platform and analytics provider. Learn more at www.ciranalytics.com.

Procore is a leading global provider of construction management software. Over one million projects and more than $1 trillion USD in construction volume have run on Procore's platform. It connects every project stakeholder to solutions built specifically for the construction industry – for the owner, the general contractor, and the specialty contractor. Procore's App Marketplace has a multitude of partner solutions that integrate seamlessly with their platform, giving construction professionals the freedom to connect with what works best for them. Headquartered in Carpinteria, California, Procore has offices around the globe. Learn more at www.procore.com.

REFERENCES:

1. www.ciranalytics.com
2. https://marketplace.procore.com

FEATURE

Buffering from disruption means building a secure and competitive supply chain.

Take Control of Your Supply Chain

By Paul Massih, Founder of Massih Advisors, LLC, and Retired Executive (BP, Shell, Chevron, and Fluor)

Today's news is dominated by supply chain disruptions and delays across many critical parts, including commodities, raw materials, finished goods, and baby formula. Everybody[1] is now talking about how Lean methods caused the shortages and we should go back to the old batch[2] and queue[3] methods. Even worse, decisions are being made around in-shoring and buffering[4] without fully understanding how a specific supply chain will behave in normal and unusual cycles.

Choosing the right way to buffer for disruptions depends on the probability and extremity of the disruption and on the users' capabilities to design their own supply chains. Before making any decisions to buffer for disruptions, organizations must take command of their business supply chain by fully understanding how they should behave in normal and abnormal (a radical change in flow of third party provided material, services, etc.,) periods.

For more than seven decades, academia took on the mantle of advancing supply chain science. Both business and academia focused on several processes – sourcing, outsourcing, category management, spend management, inventory and warehouse management, logistics, and supplier management – to secure materials and services while reducing cost.

Little attention was given to understating how to shape effective supply chains, how supply chains should be configured to meet business needs, and how supply chains should behave in normal periods and in periods of disruption.

Global upheavals over the last few years have demonstrated that supply chains, regardless of how simple or complex, will be disrupted time and time again. The response has been to use some form of capacity, inventory, and/or time to buffer against disruptions. These approaches have been proven to be more expensive than the disruption itself.

Considerable attention has been paid to the efficiency of supply chains in addition to their effectiveness and resiliency. The outcomes of more than seven decades of research and application have resulted in massive disruptions, lower end user satisfaction, higher prices, and the inability to manage shock waves.

Supply chain research has confirmed that supply chains are networks of production systems[5] that connect dual or multiple nodes to satisfy a specific demand. I agree, and in this article, I will show that because supply chains are production systems, they can be mapped, modeled, simulated, analyzed, configured, controlled, and improved.

Existing science (e.g., operations science, industrial engineering) provides the foundation to design supply chains with significant visibility into their behaviors while existing technology provides the means to build digital supply chain models to satisfy specific demand.

Can supply chain networks be controlled?

If buyers do the necessary pre-award work to map, model, simulate, analyze, and configure supply chain models to create secure and smart networks, they can determine how best to control the flows of the networks to meet specific demand and therefore can be in control of their networks to shape and adjust as necessary.

Questions must be raised around how many alternate sources of supply should be in place and how process will be affected by having too many or too few alternate sources of supply. Decisions around these questions will depend on each entity. The number of alternate sources of supply should be weighed against the cost of flexibility, buffering, and forgone profits.

If anything, the pandemic, ever-changing climate conditions, and geo-political turmoil have confirmed that the supply chain will continue to be

disrupted. Products, services, and capital projects' costs will continue to rise. Unless buyers and sellers begin to do the necessary pre-work, companies and consumers will suffer the consequences.

Creating efficient and effective supply chains

Supply chains are best understood as the final configuration of various explicit and implicit interdependent decisions made related to what to buy from external suppliers and service providers, what to make internally, how to make it, who should make it, and where should they be made.

Some even include what should be made (supply chain considerations during design or product development).

For the purposes of this article, a digital twin, as defined by the Defense Acquisition University, is: *"an integrated multiphysics, multiscale, probabilistic simulation of an as-built system, enabled by Digital Thread, that uses the best available models, sensor information, and input data to mirror and predict activities/performance over the life of its corresponding physical twin."*

NAFEMS[6] council member Rod Dreisbach recently defined it as: *"a physics-based dynamic computer representation of a physical object that exploits distributed information management and virtual-to-augmented reality technologies to monitor the object, and to share and update discrete data dynamically between the virtual and real products."*

According to Zabelle (2022)[7], attributes of an effective supply chain must be reliable partnerships, transparent supply process, redundancy, agility/flexibility, cost efficiency, and inventory.

What should companies do?

Management must mandate the creation of digital models of company's supply chains to determine the most secure, resilient, efficient, and effective supply chains for the business. The modeling work must be segmented into pre-award and post-award activities.

Utilize available science and technology to build digital twins of each critical supply chain, and use the same process to build alternative supply chain twins. Use the output to approach the market and select the supply network that satisfies preset conditions (e.g., security of supply, cost, price, quality, inventory holding cost, local requirements, etc.).

Pre-award actions:

- Define the type of supply chain needed to satisfy specific demand;
- Map, model, simulate, analyze, simulate, configure, and optimize supply chain models by building digital twin(s) for desired network(s);
- Use spend intelligence, cost intelligence, supply market intelligence, and inventory requirements to inform the modeling process;
- Understand the tradeoffs between holding inventory, building back-up networks, and cost of disruption;
- Continually maintain and upgrade the models driven by changes in requirements and or market conditions;
- Develop and maintain cost models, use cost data to inform the digital twins;
- Create a supplier segmentation matrix to classify suppliers;
- Select suppliers and contractors that believe in modeling their supply chains; and
- Develop a structured relationship management process to utilize before and after award the contract.

Post award actions:

- Spend quality time and build deep relationships with critical to business or capital project suppliers;
- Reward suppliers for efficiency and effectiveness of relevant supply chains;
- Reward contractors for finished work and not work in process (WIP) on capital projects; and
- Continually stay abreast of internal and external supply and demand conditions, potential disruptions and pricing for critical commodities, material, or finished goods to keep digital models current.

Conclusion

Supply chain disruptions will continue to occur and potentially at a higher frequency than expected. Here are my suggestions:

- Manage supply chains in operations or on capital projects in the same manner and by the same means engineering is managed;
- Take command of critical supply chains by using available science and technology;
- Do the prerequisite work during pre-award and post-award contract management;
- Build digital twins as the first step to determine the impact of internal design and sales decisions on available networks;
- Choose those networks that provide security, flexibility, effectiveness, and efficiency; and
- Build alternate networks and determine the cost of tradeoffs and the impact on the bottom line.

My last note is that owners must always ask the following questions[8]: "If you own the whole supply network, how would you want it to behave?" and "Since you don't own the whole supply network, what can you do to make it behave the way you want it to?" ○

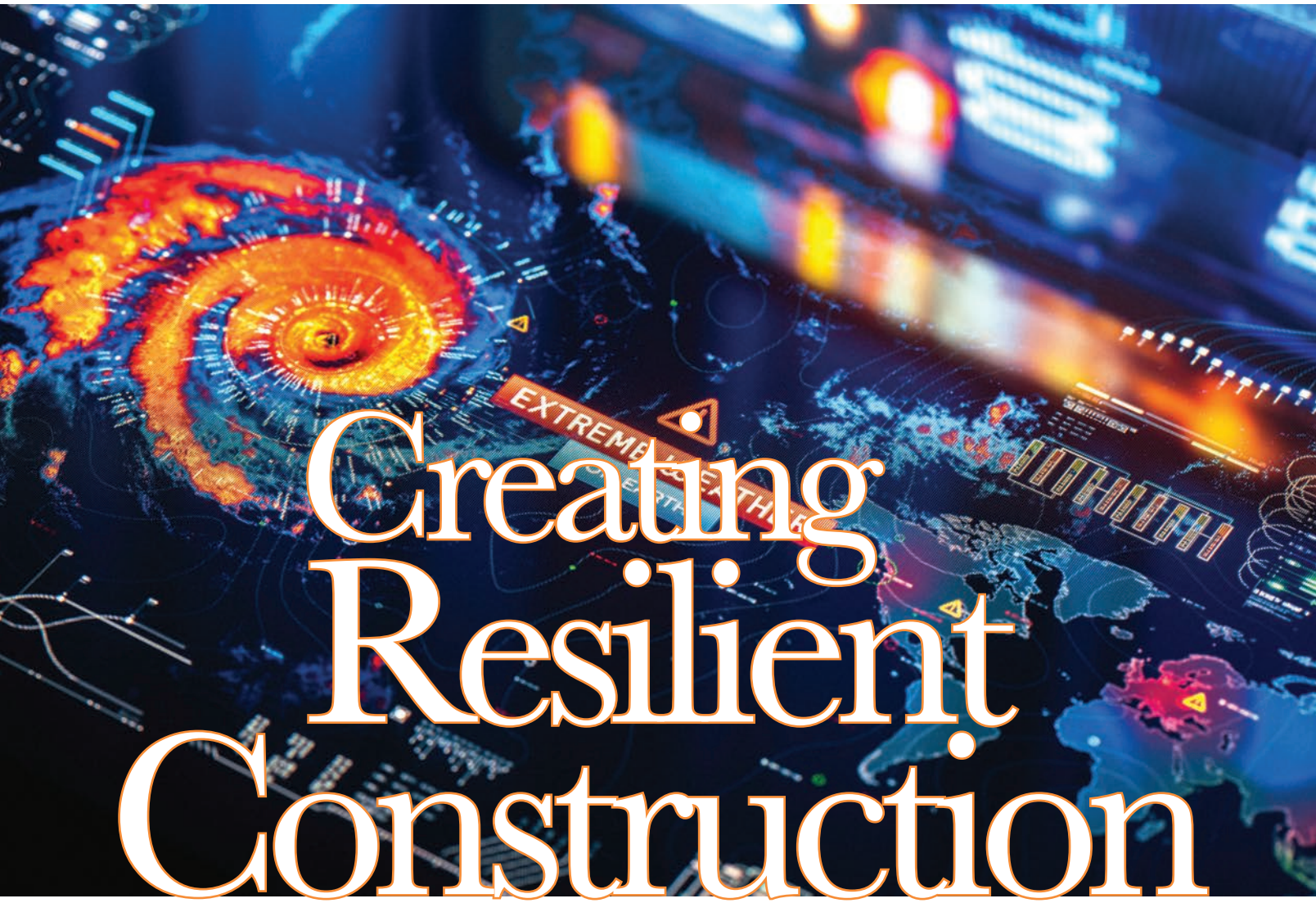
Paul Massih, founder of Massih Advisors, LLC, has 36+ years of experience in oil, gas, chemicals, pipelines, and construction industries. He advises organizations on business strategy, major capital projects, field developments, local content, and the supply chain. Paul held executive positions most recently as Vice President of Global Wells Supply Chain for British Petroleum (BP). He was also with Royal Dutch Shell in the Netherlands as Vice President of Upstream International and with Chevron Corporation, where he held several executive roles, including leading a large team for the merger of Chevron and Texaco.

REFERENCES:

1. How the World Ran Out of Everything, New York Times. Published June 1, 2021. Updated October 22, 2021.
2. https://projectproduction.org/glossary/batch
3. https://projectproduction.org/glossary/queue
4. https://projectproduction.org/glossary/buffer
5. https://projectproduction.org
6. NAFEMS is the International Association of the Engineering Modelling, Analysis and Simulation Community.
7. www.offshore-mag.com/business-briefs/article/14287051/opinion-how-to-create-efficient-and-effective-supply-chains
8. Phil Kaminskey, Project Production Institute, 2016.

FEATURE

Considerations now that fires, floods, and extreme weather are the norm.



Creating Resilient Construction

By Jane Marsh, Editor-in-Chief for Environment.co

With the looming threat of climate change and migration due to flooding and natural disasters, the construction industry must look to build greater resilience into projects. This will require determining what reliant buildings are and how to best meet these needs amid current inflation and supply chain struggles.

The cost of climate change

In 2020, total losses from natural disasters amounted to $210 billion, a 26.5 percent increase compared to 2019.[1] Worsening weather events are inevitable as long as climate change continues, but creating more resilient buildings will save countless lives and billions of dollars in damage. It will also lower energy bills as the cost of heating and cooling increases.

Measuring resilience

Credits for the LEED Design for Enhanced Resilience pilot now include three new certifications that buildings can earn related to resilience. Construction crews and architects can use these metrics to guide future projects:

1. **Assessment and Planning for Resilience (IPpc98):** This certification encourages builders to look for climate-related vulnerabilities on the project site, including extreme heat, rising sea levels, and intensifying storms.
2. **Designing for Enhanced Resilience (IPpc99):** Builders must take measures to prevent the hazards they identified in the IPpc98 process. LEED will acknowledge their efforts and award them for mitigating multiple risk types.
3. **Passive Survivability and Backup Power During Disruptions (IPpc100):** This credit specifies that buildings should be able to shelter occupants during a power outage. Additionally,

they should have a backup power system in place.

The International Finance Corp. (IFC) also developed a Building Resilience Index (BRI) to evaluate buildings' resiliency. It awards letter grades to new construction projects and retrofits, helping guide managers in creating resilient structures.

There are several other ways to measure resilience, but in general, the most weather-resistant buildings score well in four key areas:

1. **Robustness:** Robust structures allow occupants to continue operations during an emergency. For example, hospitals cannot shut down during a crisis – in fact, they may need to work even harder. Robust building designs allow heating, cooling, lights, and plumbing to operate as usual, even if running on a backup generator.
2. **Resourcefulness:** Resourcefulness is the ability to prepare for, respond to, and handle an emergency as it unfolds. Resourceful designs aid flexibility during crises and reduce dependence on external sources. For example, buildings should have strategic and well-marked fire exits so people can evacuate quickly and without confusion during a fire.
3. **Recovery:** Recovery means bouncing back as quickly as possible after a disruption. For example, at most observatories, lightning strikes are so common that builders must design telescope domes to withstand daily electric shocks. The metal domes usually feature rotating, fully controllable roofs that operators can close during a storm, and in some cases, operators can shut off the buildings' power remotely. Domes also have lightning rods to absorb and redirect lightning. After a storm, telescope operators can press a few buttons to restore power and return the roofs to their previous positions.
4. **Redundancy:** Just as rockets contain spare parts if one fails, resilient buildings often feature copies of their most important structures. For example, they may have backup generators, looped utility mains, or alternate water sources in an emergency.

> Worsening weather events are inevitable as long as climate change continues, but creating more resilient buildings will save countless lives and billions of dollars in damage.

Environmental threats to buildings

Climate-resistant buildings can withstand the most extreme weather conditions, including:

Landslides: Contractors building on a landslide plane must use foundation elements that extend into the soil[2] to hold it in place. For example, horizontal steel cable tiebacks, soil nails, and steel-encased concrete piers can prevent the earth from slipping during an earthquake and causing a landslide under a home. Building on pillars further protects structures against seismic activity.

Drought: Extreme dryness often causes soil to crack and shift, damaging foundations. Builders can use thicker slabs for slab-on-grade foundations and more piers for beam-and-pier homes. Irrigation systems around buildings can also keep the soil moist to prevent shrinkage and cracking.

Wind: The structure and orientation of a roof strongly impacts the effects of wind. Hip roofs are aerodynamic and allow gales to pass over a building rather than push against it. Reduced overhangs also make it harder for the wind to lift the roof off. Additionally, a building's interior can influence its wind resistance. Skyscrapers contain exceptionally strong steel or concrete cores to help them brace against wind. Some towers also include wind-compensating dampers to shift the entire structure's weight from side to side during inclement weather.

Heat: Reflective roofs or those with gardens can cool a building's interior considerably. Trombe walls absorb solar heat and reduce temperature swings. Placing windows in strategic spots can maximize airflow and allow for passive lighting, while trees shade buildings to lower the temperature without additional energy input.

Cold: Window orientation affects the amount of sunlight coming indoors, so sun-facing windows can help heat a building. Dark exterior paint also maximizes sunlight absorption. Additionally, steeper roofs prevent snow from piling up. Concrete, stone, and brick walls retain heat and resist snow. This design, coupled with fiberglass or mineral wool insulation, makes for a more cold-resistant building.

Fire: Stone, stucco, and cement siding are fire-resistant materials perfect for building structures in wildfire-prone areas. Builders can encircle structures with decks and patios treated to resist flames. Unvented roofs prevent embers from being drawn inside during a fire. Additionally, surrounding irrigation systems can put out fires. Certain types of insulation can also make a building more resistant to flames, with treated cellulose – which is made of 80% recycled newspaper – being a great choice.[3]

Flooding: One of the most classic designs to mitigate flooding is to build on top of pillars, allowing the water to pass underneath. Contractors can even connect buildings with elevated walkways to let people travel between them during floods. Restoring surrounding floodplain ecosystems helps absorb water by soaking it up like a sponge. Berms can also act as a buffer against floodwaters and direct them away from buildings.

Weathering any storm

The changing climate is generating more severe, frequent natural disasters. Amid these volatile conditions, owners and construction companies must design buildings with resilience in mind. Architects and building managers must research the weather conditions at proposed build sites to decide which types of structures can survive there.

Jane Marsh works as an environmental writer, specializing in net zero topics as it relates to the energy industry, technology, and the built world. She also serves as the Editor-in-Chief of Environment.co.

FEATURE

Leading today looks very different than it did ten, five, or even two years ago.

Transformational Leadership

By Jardena London, CEO, Rosetta Agile, and Consultant, Author, and Speaker

Transformational leadership has become a popular term recently, and a popular job title. Before we look at what a transformational leader is, first we'll have to define "transformation."

What is transformation?

The definition of *transformation* is "change in form." It is a buzzword right now because it has become apparent that the way companies operate fundamentally needs to change for them to survive. Transformation is not about implementing a new process; this is about foundational change.

Implicit in organizational transformation is the idea of a *paradigm shift*; a change in approach or underlying assumptions. We're not just changing form, we're changing assumptions.

What is transformational leadership?

Now that we have established what a transformation is, what is transformational leadership? I'm using "leader" in this context to refer to anyone who takes responsibility for changing their world. Transformational leadership is more of a calling than a choice.

A transformational leader is part spiritual leader, part work manager, part inspirer, and part community builder. Transformational leaders breathe life into organizations.

Many of the same skills that worked for leaders in the past, in mechanistic organizations, stifle living, adaptive organizations. The things we rewarded leaders for in the past will no longer serve us in the future. Management activities like directing work, driving deadlines, and evaluating people have now been replaced by creating conditions, identity, and clarity.

The three lenses of transformational leadership

Transformational leaders operate through three lenses:

The "me": The process of mastering ourselves and all the things we do that get in the way of being an effective leader.

The "we": The "we" is about how we interact with others and enable people to interact with each other.

The "system": The overall organizational system; find where it's hampering the organization's success.

Connecting the soulful and the practical

Transformational leaders help connect the soulful and practical. When I see a group have a pizza party and then say, "the fun is over, get back to work," I know that this company isn't connecting the soulful and practical. The connection means that all our work feels good and feeling good helps the work. Note: The term "soulful" acknowledges that

life is not always happy or easy. Soulful means that we can experience difficulty openly and in a non-toxic way.

Transformational leaders are connecting the soulful and practical, as they move through all three lenses: the "me," the "we," and the "system."

WHERE TO GET STARTED

The ME

Self-awareness is key for all leaders. If you are unaware how you affect the people around you, you will keep getting in your own way. There are a lot of self-development tools that can help you know yourself inside, but you also need to know how you show up on the outside. Ask the people around you for feedback on how you show up.

Have you ever had the experience where someone walks into a room and the energy shift is palpable, even if they didn't say a word? Your energy has an impact. It has been said that "we create our world." Everything we do and say – our whole vibe – attracts or repels, encourages or inhibits other people's actions. It's a soulful matter to "know thyself" but it's a practical matter to show up on the outside the way you intend to. Self-awareness is the process of getting congruent on the inside and out.

Try this: The Johari window is a free tool that gives insight into the qualities that others see that you don't see yourself. Find it here: https://kevan.org/johari

The WE

First, heal the pain. No transformation can happen when there is pain in the organization. Piling new processes and techniques on top of a festering wound just makes the wound worse. The pain might be acute, or it might be pain from the past that has never been reckoned with. What I know for sure is that ignoring the pain never works.

Second, expand participation. Molly Breazeale[1] says, "people support what they help create." I find that some leaders are afraid to include people because they don't want too many different opinions and objections. Participation means a voice, not a vote. It's perfectly acceptable to say that you want to hear what people think, but you will make the final decision. There are wonderful facilitation techniques to gather and cull ideas from large groups and easily make room for "too many opinions." Try Liberating Structures.[2]

Both healing the pain and expanding participation are soulful in that they create ease and inclusion. The practical side is that both also yield better results. Participation upfront ensures adoption and eases the need for heavy change management later on.

Try this: Identify the biggest source of unattended pain in your organization. What is one thing you can do to attend to that pain today?

The SYSTEM

Transformational leaders focus on creating thriving, living systems and less on directing work. A healthy system is the best predictor of business success, whereas individual performance is not predictive. Focus less on managing an individual's tasks and more on cultivating the system.

Planting: Build structures, connections, and competencies for your system to flourish. What's missing that you need to get to that future state? Sometimes it is as simple as two teams needing a communication channel, which could be addressed simply by including each other in a monthly meeting. It might be a competency that's lacking, that could be gained through hiring or training. What seeds can you start planting?

Pulling weeds! Look for places where the system (internal or external) is inhibiting value from getting to the customer. Listen to the people doing the work. How are corporate processes slowing them down? Are there contradictory goals in place? Contradictions that look small from the top, can be magnified on the ground. Remove these obstacles so people can work with ease.

Try this: Create an "obstacle backlog" of items you hear about. Work through removing them and reporting back to the people on the ground.

You're ready to begin!

Transformational leadership calls for attention through all three lenses, the "ME," the "WE," and the "SYSTEM." As you look through the lenses, also think about where you need to make connections between the soulful and the practical. ○

Jardena London is a consultant (the good kind), author, speaker, and CEO of Rosetta Agile. She has spent the last 30 years finding ways to transform organizations so that our souls can flourish, while our financials thrive. Her book "Cultivating Transformations: A Leader's Guide to Connecting the Soulful and Practical," supports this mission by drawing a straight line between the processes we use, the way we feel, and the results we get that nourish our souls while producing thriving financial outcomes. Her new community and movement on leadership can be found at www.cultivatingtransformations.com.

Subcontractors paid $97 billion more for materials and labor than expected in 2022.

Navigating Rising Costs

This article was originally published as a blog on CURT's website. For more valuable insights on topics of importance to the construction sector, visit www.curt.org/blog.

As the commercial construction industry continues to face challenges related to rising material costs and labor shortages, subcontractors find themselves bearing the brunt of these expenses. In its third annual construction industry market report, Billd reveals alarming statistics regarding the financial burden placed on subcontractors. The 2023 National Subcontractor Market Report1 sheds light on the significant additional costs incurred by subcontractors in 2022, amounting to a staggering $97 billion.

In this article, we will delve into the key findings of the report, explore the impact of rising costs on subcontractors, and discuss potential solutions for commercial developers navigating these challenges in the coming year.

Rising input costs

The first major challenge highlighted in the report is the substantial increase in material cost, which surged by 26 percent in 2022. Subcontractors, who largely front the costs of these materials, faced significant financial strain as a result. Moreover, the report reveals that 81 percent of surveyed subcontractors reported a negative effect on their businesses due to rising material costs. This upward trend is expected to persist, with 80 percent of respondents anticipating further increases in the coming year.

Furthermore, the construction industry continues to grapple with an unwavering labor shortage. Subcontractors saw an average increase of 15 percent in labor cost, intensifying the financial burden of their project staples. The shortage of skilled laborers, combined with increased competition for available workers, contributes to the rising labor costs.

The total unexpected additional cost to subcontractors for materials and labor in 2022: $97 billion dollars.

Cash flow in jeopardy

Because of the nature of the repayment cycle in construction, subcontractors covered the entirety of these costs (not just the overage) out of pocket before receiving payment. The average time from work commencement to payment is 74 days, with some waiting much longer than that. The resulting strain on their cash flow limits their ability to take on the projects they need for growth while impacting their ability to deliver committed projects on time and within budget.

Decline in profitability

Despite efforts to mitigate the impact of rising costs, subcontractors faced difficulties in maintaining profitability. The report indicates that 57 percent of businesses reported a decrease in profitability, even though 61 percent experienced revenue growth. This discrepancy highlights the significant strain imposed on subcontractors' margins. One contributing factor is the low-bid environment that subcontractors operate in; one-third of survey respondents were unable to raise their bids commensurate with their rising expenses. As a result, subcontractors were forced to absorb a substantial portion of the additional costs, further squeezing their profit margins.

How commercial developers can mitigate risk

The findings of the 2023 National Subcontractor Market Report highlight not only the financial challenges faced by subcontractors but also the potential risks that commercial developers may encounter as a result. The increasing financial strain on subcontractors can have far-reaching consequences for the successful completion of construction projects. It is essential for commercial developers to be aware of these risks and take proactive steps to mitigate them.

One of the primary risks faced by commercial developers is subcontractor default. When subcontractors face significant financial

strain, they may struggle to fulfill their contractual obligations, leading to delays in project schedules and increases in damages. To mitigate this risk, developers should work with general contractors to adopt strategies that promote subcontractor financial stability and resilience.

One effective approach is to incorporate material price escalation clauses in contracts that pass through to subcontractors. These clauses ensure that subcontractors are not solely responsible for bearing the full weight of material price increases. By making sure that these clauses apply to subcontractors, commercial developers can distribute the impact of rising material costs across all project stakeholders, reducing the financial burden on subcontractors and minimizing the risk of default.

"Another crucial aspect is establishing transparent payment timelines and fast payment processing systems. Subcontractors heavily rely on timely payments to manage their cash flow effectively. For subcontractors, pay-when-paid terms are common. This ambiguity makes it difficult for them to anticipate cash flow gaps and adjust their financial strategies accordingly. By ensuring that general contractors pass net-30 or net-45 terms to subcontractors, commercial developers gain confidence that subcontractors can focus on delivering high-quality work without compromising their financial wellbeing."

Furthermore, commercial developers should consider working alongside general contractors to evaluate the financial health and stability of subcontractors during the selection process. By assessing subcontractors' financial standing and their access to financial resources, developers can make informed decisions that minimize the risk of subcontractor default. This evaluation can include analyzing subcontractors' lines of credit, their past financial performance, and their ability to leverage third-party financial services if needed.

Taking a proactive approach for sustainable success

As the 2023 National Subcontractor Market Report reveals, the financial challenges faced by subcontractors in the commercial construction industry have significant implications for commercial developers. It is in the best interest of developers to acknowledge these risks and adopt a collaborative approach to ensure the long-term success and profitability of their projects.

By focusing on subcontractor performance and health, developers can address potential financial risks at an early stage, reducing the likelihood of delays, disputes, and compromised project quality.

Moreover, developers should consider working with general contractors to establish fair and transparent payment terms in the sub-contract that align with the needs of subcontractors. Timely and equitable payment practices contribute to subcontractors' financial stability, enabling them to meet their obligations and deliver high-quality work.

In conclusion, the financial strain experienced by subcontractors poses inherent risks for commercial developers in the construction industry. By understanding these challenges and taking proactive steps to mitigate them, developers can establish a collaborative and mutually beneficial ecosystem that ensures successful project completion, high-quality craftsmanship, and sustainable growth for all parties involved. Working hand in hand with project stakeholders, commercial developers can navigate the complexities of rising costs and financial pressures, ultimately achieving their project goals and contributing to a thriving construction industry.

For more on the challenges subcontractors face and how developers can help, check out Billd's video roundtable series, which is a conversation between a developer, general contractor, and subcontractor on topics including payment, quality, and scheduling: https://billd.com/roundtable. ○

Billd founders Christopher Doyle and Jesse Weissburg are industry veterans in both construction and finance. Their time in the trades inspired them to launch Billd in 2018, bringing the financial power of Wall Street to the construction job site. Billd's financial and payment products empower subcontractors to bypass project hurdles by providing access to upfront funds to cover their most pressing costs, including materials and labor.

REFERENCE:

1. https://billd.com/2023-national-construction-financing-market-report-for-subcontractors

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