

# A&E PERSPECTIVES



# WITH SO MANY TECH ADVANCES, WHY HAS AEC PRODUCTIVITY GROWTH STALLED?

Engineers and architects find themselves at the mercy of incompatible software packages that make the design process less efficient and more time consuming.

Technology will provide the missing link for improving productivity in the design and construction industry.

Or will it?

As everyone knows, there have been incredible — almost unbelievable — advancements in technology in recent years. There was a time when all phones were attached to a cord that was attached to a wall. The rotary dial had to be spun. Visual voicemail had not even been thought of, since there was no screen to view the message.



BY SAM DOUGHERTY  
CARY KOPCZYNSKI  
& CO.

Fast-forward to today. Many people reading this article are doing so from a portable, high-resolution color screen attached to a device that can provide services to help them in all aspects of their daily lives.

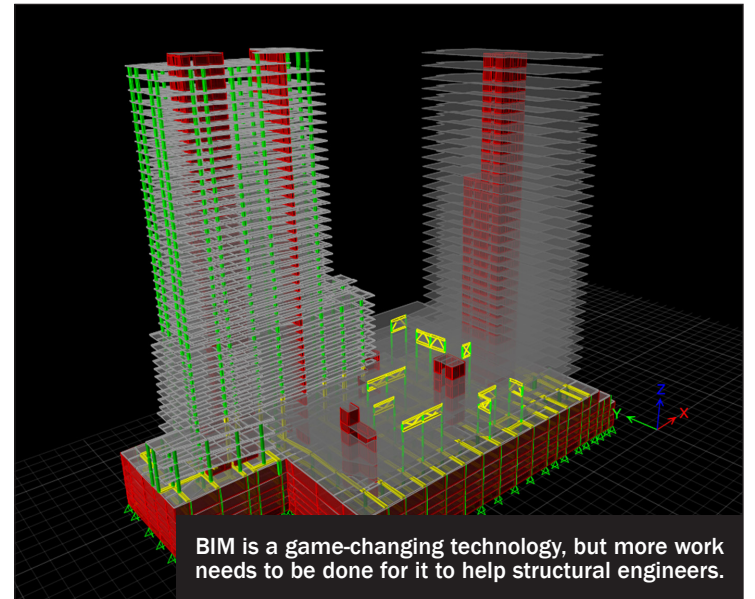
If technology has advanced so far, why is it that in the last 50 years — the same period that has seen the phone go from rotary dials to portable smartphones — productivity growth in the design and construction industry has flatlined? Surely with all this technology there must be a significant construction productivity benefit.

But statistics show that for the past five decades, productivity in the overall design and construction industry has actually declined slightly, according to Paul Teicholz, professor emeritus of civil engineering at Stanford

University.

The advent of the modern computer age has caused every industry to rethink and reinvent the way it does business. This includes the world of design and construction. Nevertheless, for every step forward in construction productivity, statistics show that there has been an equal step backward.

I don't have sufficient insight into the field productivity side of this problem to offer informed comment. As a practicing design engineer, however, the causes of productivity snags seem quite apparent. In a nutshell, there needs to be a rethinking of our design methodology and work product to allow the full potential of today's technology to be



BIM is a game-changing technology, but more work needs to be done for it to help structural engineers.

GROWTH STALLED — PAGE 10

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# MASS TIMBER IS BRINGING THE WARMTH OF WOOD TO THE WORKPLACE

Research shows there is an economic benefit to reconnecting people to nature in commercial spaces.

Many of Puget Sound's most beloved buildings were born from our rugged site and climatic conditions. Notable Northwest architects Paul Thiry, Wendell Lovett and Paul Hayden Kirk developed the architectural language of Northwest Regionalism, favoring locally harvested wood and stone that echoed the forested landscape and framed vistas of our mountains and waterways.



BY CODY LODI  
WEBER THOMPSON

The innovation of mass timber provides a new opportunity to build upon these tenets in contemporary commercial architecture.

Wood structures and finishes are commonplace in our homes, boats and retreats, connecting us to their craftsmanship and the forests from which they came. Put simply, wood tells a story.

From the mark of the craftsman, the texture of the grain or wood's color and finish, there is an inherent story of how this architecture came to be. This narrative should be told in the places we work as well.

Fortunately, contemporary workplace designers are taking cues from residential architecture and bringing healthy, natural materials into commercial spaces. Thanks to renewed interest and innovation of mass timber technology, we're seeing the value of expressive wood structures that look less like a sterile cubicle farm and more like an alpine cabin.

There are good reasons for this shift. Research shows there is an economic benefit to reconnecting people to nature in the workplace. Well-designed spaces with a focus on biophilia (innate connection of human beings to nature) can encourage creativity and productivity while decreasing absenteeism, loss of focus, negative mood and poor health, according to Bruno Duarte Dias, a Portuguese architect.

Wood can contribute to this biophilic response with visual cues from the color and grain as well as non-visual cues from the touch, smell and even sound of timber. With the high costs to attract and retain quality talent, this is a win-win for employees and companies alike.



Cedar Speedster, a three-story office building under construction in Fremont, uses glulam columns and beams.

IMAGE PROVIDED BY WEBER THOMPSON

## Regional identity

From the cedar canoes of the Makah Tribe to the engineering and fabrication practices of the aeronautic and maritime industries, the Pacific Northwest has a strong and storied history tied to timber. While solid old-growth timber is no longer sustainable, embracing engineered timber as a commercial building material gives new life to these industries.

Our region is uniquely qualified to design, fabricate and construct mass timber buildings. Having a robust architecture and engineering sector, access to a highly skilled workforce and proximity to responsibly managed forests, few areas are better positioned to advance and adopt mass timber. This benefits the built environment and reinvests in the regional timber and construction industry's future by creating and maintaining jobs.

## Craft of prefabrication

With advances in design software and fabrication techniques, mass timber buildings can be prefabricated offsite, saving time and errors in the field. This requires early and in-depth

collaboration between architect, engineer, fabricator and contractor but the benefits are worth it.

If fully coordinated, structural timber frames and diaphragms can be constructed in a fraction of the time that a traditional concrete structure would take. Recent local projects have embraced mass timber and serve as a glimpse into what can be achieved.

Cedar Speedster, designed by Weber Thompson and nearing completion in Fremont, uses glulam columns and beams to support tongue and grooved Douglas fir floors with a concrete topping slab. Working with DCI Engineers, the team designed uninterrupted columns from the ground floor to the roof with prefabricated steel knife-plate connections. This minimized the amount of shrinkage in the wood and decreased construction times. Major glulam girder beams were dropped to allow MEP services to run tight to the ceiling, minimizing the impact on overhead height.

Looking forward, the five-story Living Stone office building on Stone Way, designed by

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## ON THE COVER

Gensler created a giant living room for employees and guests at the Gusto headquarters in San Francisco. The historic building was retrofitted by Wong Logan Architects.

PHOTO BY RAFAEL GAMO

## DJC TEAM

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# NEW OSU-CASCADES ACADEMIC BUILDING WILL AIM FOR NET ZERO

A photovoltaic array will provide on-site renewable energy, and tall windows with vertical shades will maximize daylighting and mitigate glare and summer heat gain.



The 50,000-square-foot building will provide learning spaces for science, technology, engineering, arts and math.

RENDERINGS PROVIDED BY SRG

The unique high desert campus of Oregon State University-Cascades is growing and has recently begun the design process for the transformational new Academic Building 2.



BY CARL HAMPSON  
SRG PARTNERSHIP

After hosting a highly competitive design competition as a part of its overall design team procurement, the university selected SRG Partnership as its architect. The new 50,000-square-foot building will provide learning spaces for science, technology, engineering, arts and math, and will create a new student hub with active interior and exterior event and social activity spaces.

The design will elevate OSU-Cascades' identity in Bend while exemplifying the university's commitment to sustainability with a net-zero energy target and a structure of regionally sourced mass timber.

Academic Building 2 will also be the first building to engage a dramatic reclaimed pumice mine acquired by the university for future campus expansion. The building will be sited on the rim of the vast man-made chasm, providing panoramic

views across the future west campus and to the mountains beyond. The building and its adjacent outdoor spaces will step with the topography to create a gateway and link between the existing upper campus and the future development that will occur below in the bowl of the transformed mine.

## Mass timber structure

Taking cues from the unique geology of the site, the building will feature a dynamic indoor-outdoor environment to support numerous activities and events, engaging people through classroom, laboratory and maker spaces; a formal amphitheater and an informal cascading plaza will promote gathering.

Outdoor spaces will be a natural extension of the interior learning environments and will feature a diverse range of areas for casual gatherings, personal introspection, and open-air classes, lectures, and performances. The climate, native vegetation and ecosystems of Central Oregon will be reflected in the landscape approach and will be inspired by the natural and man-made forces which have shaped the surrounding terrain.

The selection of mass timber for the building's structural system reinforces OSU-Cascades' robust commitment to sustain-



The selection of mass timber for the building's structural system reinforces a commitment to sustainability.

ability with the use of a locally sourced renewable material and the low-carbon footprint associated with its production. The natural beauty of the timber structure will be expressed in the building's interior, creating a warm, inviting environment for students and faculty and visually connecting the building with the broader regional landscape.

The building's primary facade will feature tall windows and a filigree of vertical shading devices tuned to their solar orienta-

tion to maximize daylighting and mitigate glare and summer heat gain. A broad horizontal roof plane floating above the mass of the building form has been designed to accommodate an array of photovoltaics, which will provide on-site renewable energy for the project. The building's scale and use of natural materials will connect with the existing campus architecture while charting a path forward for future development.

## An adaptable concept

The design solution also reflects OSU-Cascades' goals of creating a scalable and adaptable concept that can serve as a model for future buildings. The team developed a simple building organization strategy with a flexible planning module and adaptable service core to support a variety of academic programs and functions. This

NET ZERO — PAGE 10

# WHAT OUR EVOLVING MOBILITY OPTIONS MEAN FOR DESIGNERS AND DEVELOPERS

Demand for parking is beginning to fall in urban areas as people seek alternatives to driving.

There are myriad transportation policies and emerging technologies associated with development, both traditional and progressive, that need to be dealt with during development, planning and design phases.



BY BRIAN CHANDLER  
DKS ASSOCIATES

Whether a developer is planning for city and neighborhood development or a single building, transportation needs will impact the decision-making process. Planners and developers must understand these key transportation issues and opportunities as they develop spaces to live, work and play.

## Transit-oriented development

As cities continue to grow in the Northwest, so does the need for greater access to transit.

Urban dwellers desire walkability, which will continue to lead developers to take pedestrian issues into account by building mixed-use communities. Transit-oriented development reduces space for parked cars while creating a “sense of space” for those who live and visit these developments.

There is a growing trend for developers to help fund public improvements directly related to their residential and commercial projects — especially here in the Northwest. Examples include sidewalks, bicycle lanes, bus stops and electric vehicle charging stations.

DKS consults with local munic-



A RapidRide bus stop by Sea-Tac Airport. Communities are relaxing parking minimums for developments near bus and rail facilities.

MOBILITY OPTIONS — PAGE 11

PHOTO COURTESY OF DKS ASSOCIATES

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# THE AEC INDUSTRY HAS A DATA PROBLEM

Reflecting on a year of machine learning explorations.

Machine learning has been enjoying a healthy amount of press of late, with most industries touting the promise of limitless intelligence as the antidote to every company's biggest challenges.

And many industries are indeed well-equipped to improve their processes with machine learning. Google, Tesla and others are fully utilizing artificial intelligence to improve their products, and they have been doing it for years.



BY DANE STOKES  
ZGF ARCHITECTS

So why is the AEC industry — and architecture in general — slow to follow suit?

Unfortunately, machine learning isn't a magical portal through which our most vexing challenges are automatically solved by pulling a single lever. The shininess and popularity of machine learning and AI in general make it an alluring talking point, but

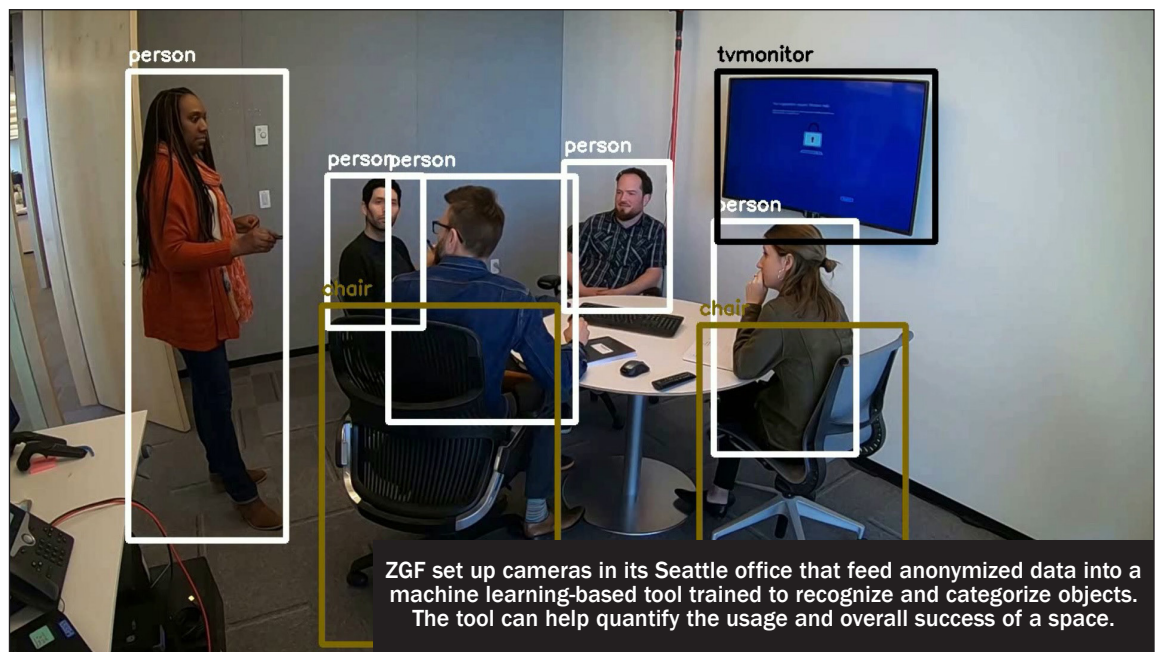
the key is data. Data itself is also often oversimplified into a talking point, and the AEC industry continues to lag behind in the quantity and quality of data that is routinely gathered.

Rather than generally appreciating data, successfully leveraging machine learning requires us to scientifically identify the problems we are trying to solve, and then strategically gather the data to quantify and then solve that particular problem with clear intent and rigor.

## Laying the foundation

In the past year at ZGF Architects, we very quickly learned that attempting to use machine learning to solve a problem without first investing heavily in rigorous and intentional data collection was the very definition of putting the cart before the horse. Further still, intentionally collecting data that was relevant to solving a problem wasn't really the beginning of the process.

Machine learning at its core isn't really any different from human learning. We use every-



ZGF set up cameras in its Seattle office that feed anonymized data into a machine learning-based tool trained to recognize and categorize objects. The tool can help quantify the usage and overall success of a space.

IMAGES PROVIDED BY ZGF ARCHITECTS

thing we've experienced throughout our lives to inform the solutions and opinions we form every day.

When training a machine learning algorithm, these same concepts apply. It is up to us,

the handlers of an algorithm, to give it the historical context it needs to solve a problem. We dictate the concept of right and wrong by showing the algorithm examples of good and bad solutions, with the hope that it will eventually identify good solutions on its own.

But what is the difference between right and wrong in the context of architecture? The parameters for success are more muddled in our industry than, say, the realm of self-driving cars or email spam-blocking. So we went in search of meaningful data from within our existing process.

## Training grounds for AI

To better understand a client's current state and their future design needs, and to evaluate our own work once a building is complete, we routinely complete occupancy evaluations. The process has traditionally entailed collecting feedback through surveys distributed to the occupants.

The occupancy evaluations were a good start for our data-gathering efforts, but the purely qualitative nature of occupancy evaluations is now only part of the picture. To gain even a rudimentary understanding of the effects of a designed space on a survey participant, we quickly realized that our survey responses, especially for workplace typologies, had to be geotagged.

By analyzing responses within the context of a floor plan, and by pairing them with objective environmental data from workplace sensors (air quality, temperature, circulation, and more), we realized we could use machine learning to find pos-

sible correlations between specific qualities of a building and the satisfaction of the occupants within it — connections that we would might not have thought to explore otherwise.

We are currently in the process of deploying our first geotagged survey on a client project and will be repeating the survey quarterly for the next year. Moving forward, the potential insight could help us make more informed design decisions than ever, rather than relying on rules of thumb or intuition alone.

Hypothetically, if a person complains about the quality of amenities in an existing office building, we could explore whether the person's desk location is the culprit (maybe they sit too far from amenities to use them), or whether low rates of amenity use overall (as measured by foot traffic) signals that the amenities are indeed subpar.

If a particular group of employees who work in an open office environment report having trouble concentrating at their desk, we could compare that team's feedback to the experiences of a group reporting higher satisfaction in a similar setting. In this case, we would have identified a mismatch between workplace environments and certain job profiles, in which case the open office concept isn't implicated, and the problem can be addressed by more strategically locating certain teams in the new space.

## Rethinking our approach

We have also had to retool the way we collect our data. Previously, occupant evaluation



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DATA PROBLEM — PAGE 10

# CLT: CONSTRUCTION'S LEAN, GREEN BEAUTY QUEEN

Mass timber products are making a comeback thanks to their warmth, performance and sustainability.

Widely considered to be the first modern steel and reinforced concrete building, the 10-story Home Insurance Building constructed in Chicago in 1885 was the forerunner of today's skyscrapers.

Previously, timber and masonry were the primary structural materials for most buildings. By the end of the 19th century, however, those materials technologies had reached their limits.

Since then, steel and concrete have essentially become the default for most large-scale commercial construction. Stronger and more space-conscious than traditional timber and masonry, these newly popular materials reduced the size of necessary structural elements, allowing for more usable floor area and enabling the construction of much taller buildings.



BY MICHAEL FRANK  
MCKINSTRY

to consider the carbon used in the production of building materials (often called embodied carbon), which can represent a significant amount of a building's lifetime carbon footprint.

By contrast, both concrete and steel require significant amounts of CO<sub>2</sub> in their production. Every ton of steel produced results in 1.9 tons of CO<sub>2</sub> emissions, while in 2016 the production of cement (the key ingredient in concrete) generated 2.2 billion tons of CO<sub>2</sub>, or 8% of the global total.

CLT also provides a significant amount of carbon sequestration. As an example, our Catalyst project in Spokane (which, at 159,000 square feet, will be one of the largest net-zero buildings in the world), will use 4,000 cubic meters of CLT and other mass timber products, which we estimate will store the equivalent of 3,713 metric tons of carbon.

Thermally, CLT can increase the insulation value of a building when used in its envelope system. In our Catalyst project, the use of CLT has allowed us to reduce the number of thermal bridges that would otherwise diminish the overall envelope R-value. CLT also creates a more seamless structure that helps to limit air leakage. In fact, with CLT it's possible for large buildings to approach or meet Passive House Institute U.S. standards.

Beyond its sustainability benefits, building with CLT also helps to reduce construction time and increase efficiency.

CLT is a manufactured product, with pre-engineered connections. The pieces arrive ready to install and fit together more easily and precisely. It's not a stretch to think of them as sophisticated Lego pieces. And because the pieces are pre-manufactured in a factory off-site, there is much less job site waste.

While commercial construction hasn't yet reached the point where large facilities are constructed with flat-pack kits that arrive ready-to-build on flatbeds, CLT and other mass timber products are bringing us closer to a future where there is very little need for jobsite fabrication.

## Considerations for CLT

Architects are also excited by the possibilities that CLT offers, adding to its growing popularity. Exposing CLT structural members (that look like beautiful wooden beams) provides more warmth and texture within a building. Wood also creates a more natural environment that is welcom-

The Catalyst building in Spokane will use 4,000 cubic meters of cross-laminated timber and other mass timber products.



PHOTO PROVIDED BY MCKINSTRY

WSDOT, SR 520 Bridge Replacement - "Rest of the West"



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# HOW SUCCESSFUL WORKPLACES OFFER MORE THAN JUST A PLACE TO WORK

The relationship between people and place is an important one, and for business it is critical.

Growing up in northern California, my family would go camping every summer on the Mendocino Coast. It was a beautiful place. Those summers were formative, and to this day I love being near salt water; the green and gray of the coast is a palette that resonates deeply. This is perhaps why I live in the Northwest.



BY JIM FARISS  
GENSLER

Places have an amazing capacity for shaping us, don't they? Not just the formative places

of our youth that we reflect on with romantic nostalgia, but the everyday places of our lives — our favorite coffee shop, the park where our kid took their first steps and even our workplaces.

As the novelist Elizabeth Bowen said, "Nothing can happen nowhere. The locale of the happening always colors the happening, and often, to a degree, shapes it."

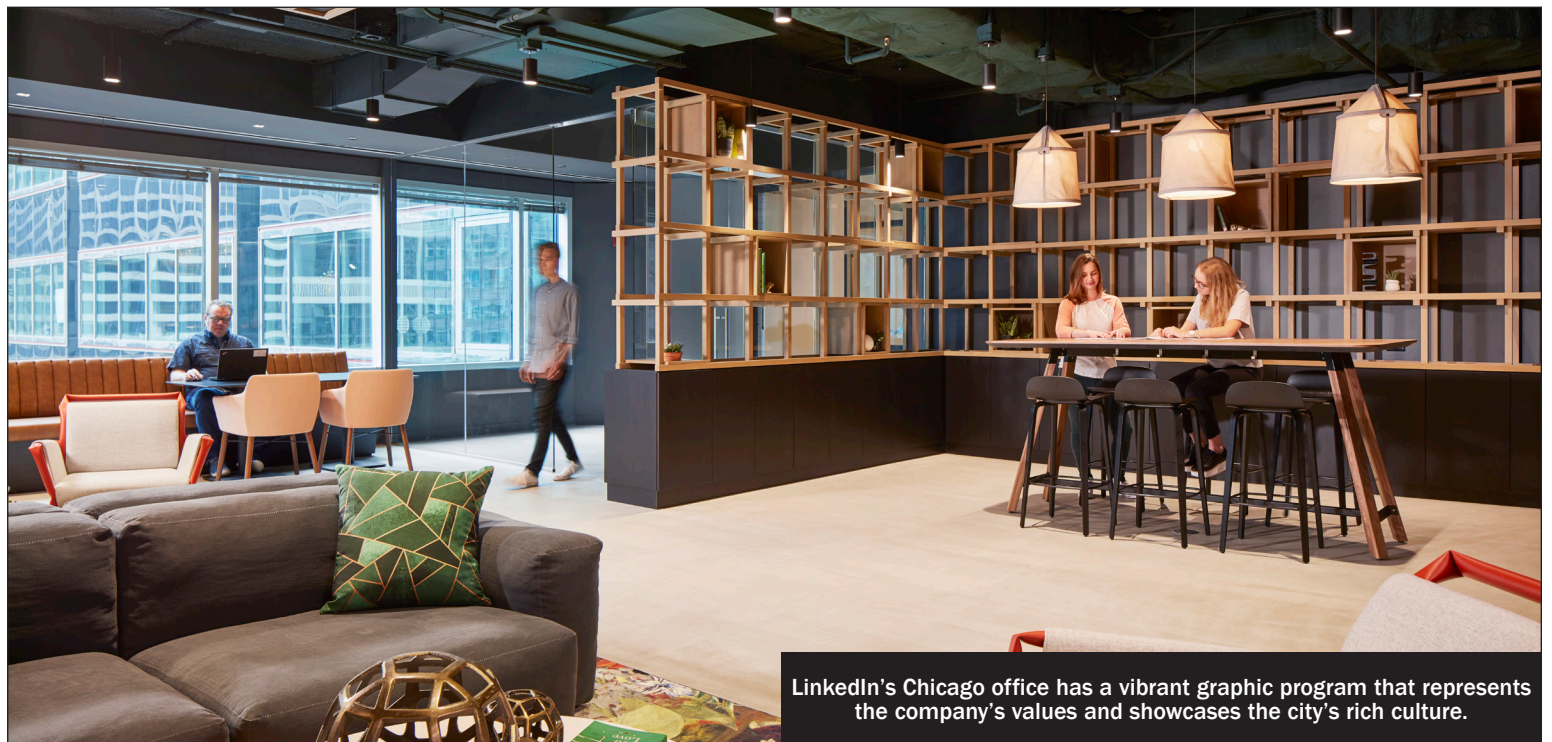
## Place is important

But it's also just that — a stage. And stages requires actors, because we're ultimately talking about the experiences that we, as people, have. It's the stories that play out in place that shape us. Apart from my experience of the Mendocino Coast, I wouldn't know its beauty and power. Place is the platform on which people operate. It's the hardware to our software. The relationship between people and place is an important one, and for business it is critical.

Being in the business of places, I think about this a lot. Many of our clients are as well, and I've seen some themes emerge among those who are creating the most value for their employees, shareholders, industries, and in some cases, society. They've defined the relationship between place and people in terms of possibility.

These companies understand that value creation is an ecological equation. They've moved beyond two-dimensional value chains and are proactively designing three-dimensional value networks.

Envision a tricycle — possibility is the front wheel, bringing momentum and direction to the enterprise. But the center of



LinkedIn's Chicago office has a vibrant graphic program that represents the company's values and showcases the city's rich culture.

IMAGE PROVIDED BY GENSLER

gravity exists in the back. It's the wheels of people and place that bring structure, balance and sustainable momentum, even in the face of adversity.

I'll call these companies "tricycle companies." Silly metaphor, I know, but it works for our purposes here. Let's break this down a bit.

The first question for a tricycle company is, "What is possible?" This is a question of vision and purpose. The question of possibility is one that is discontented with the status quo. This question cuts through the tyranny of the urgent and creates space to imagine what could be.

Great leaders create this space for themselves, and for others. And in doing so, they cultivate a common vision for the future which intrinsically motivates cohesive action.

This is what I mean by the momentum and direction of the front wheel. Tricycle companies have a very clear vision of the future they are working toward.

The second question of a successful company is, "What are the human conditions necessary to achieve our vision?"

This is a question of culture and emotional experience. Many of our clients come to us for workplace design services because they are navigating a significant transformation of one kind or another. Whether seek-

# nice job team!

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WORKPLACES — PAGE 11

## GROWTH STALLED

CONTINUED FROM PAGE 2

realized.

### Inefficient processes

With the advent of the computer and instant communication, many people changed their primary communication style from talking in person to emailing and texting. Businesses also changed. They eliminated the jobs of stenographers and others, and threw out carbon paper. File cabinets gave way to hard drives and local networks.

In short, as technology advanced, businesses and consumers advanced with it, changing their production procedures and work product to suit the new ways of producing and delivering goods and services. However, at least in the world of design, our industry has not updated fundamental ways of doing business to allow the full realization of the technological power available to us.

Some parts of our industry have done better than others. BIM modeling, for example, is perhaps one of our most “game changing” recent advancements. Nevertheless, overall productivity growth in our industry — including design — continues to flatline. Perhaps one of the areas most ripe for change is the design process itself.

Architects spend hundreds of hours producing digital models of their buildings in advanced 3D BIM software, only to print the plans in 2D and send them to the structural engineer for review. The engineer then designs the structural portions of the building, typically utilizing 3D analytical software to more accurately determine the effects of forces on the structure. He or she then gives the design to drafters to make a 3D BIM model, to then print out 2D plans and send back to the architect.

Certainly, architects will sometimes send their 3D BIM models to the engineers, and vice versa. The actual design work is often

done using 2D plans, however. Not the 3D model.

The fundamental idea of the 3D model is for complete integration and coordination of all portions of the building — the goal is to build the complete building digitally before constructing it in the field. And yet, since both engineer and architect often make separate models and coordinate largely through 2D plans, the potential benefits of collaboration, coordination and clash detection are almost completely lost. This causes a significant loss in efficiency, which is compounded by the fact that 3D models are often more time consuming to prepare than 2D plans.

### Compatibility issues

Structural design efficiency can also suffer in other ways. The 3D BIM model rarely helps the structural engineer with his calculation package since it is seldom transferred to the structural analytical software. When it is, there is often significant time spent “fixing” it to create compatibility between the BIM model and the analysis package so that the analysis software, which is separate from the modeling software, can work properly. For this reason, it is usually more cost effective to draft a 3D model of the building after the basic components have been designed.

One of the biggest issues with these software packages is that most of them specialize in different parts of the structure. The engineer is left to design the gravity system with one software package, the lateral system with another, and the foundation with a third — each time transferring the loads from one software to the next “by hand” through spreadsheets.

The specific components are then broken out further into different software packages, to then be designed separately. In a perfect world this happens only once.

Most building designs change multiple times before they are constructed, however. When these changes occur, this process of designing individually through a chain of software packages must be repeated.

### Encouraging developments

The good news is that positive changes are occurring and, going forward, encouraging strategies are being pursued.

One is to form a standard format of input and output that works for all software, by which the engineer can update the entire design by altering the changed components in one location. Preferably, this will occur in the 3D modeling software, which will then automatically trigger coordination by the analytical software.

Another is to create single and more comprehensive analytical software packages that handle the entire design. These two changes and others will help structural designers in important and significant ways.

The realization of these objectives is still a ways out, however, leaving the structural designer of today’s buildings to sometimes question whether it is faster and more efficient to design everything “by hand” with specialized spreadsheets.

Perhaps if the design and construction industry chose to fully embrace today’s available technology, further technological advancements would occur to support those choices. When the smartphone industry exploded into a market worth billions, it triggered massive improvements in smartphone technology. Perhaps when the construction industry fully incorporates the tools currently available, it will trigger similar advancements to the benefit of all.

*Sam Dougherty is a design engineer with Cary Kopczynski & Co.*

## MASS TIMBER

CONTINUED FROM PAGE 3

Weber Thompson, is a much larger building which maximizes the longer spans allowed with dowel-laminated timber panels. DLT allows for larger structural bays, providing more flexibility for office tenant space planning.

Unlike NLT and CLT panels, dowel-laminated timber uses hardwood dowels, not glue or nails, to laminate wood members. This allows for more freedom to mill and fabricate panels and better aligns with the material requirements of the Living Building Challenge, of which the building is pursuing Petal certification along with land use incen-

tives through Seattle’s Living Building Pilot. Currently wrapping up design, Living Stone looks to set a precedent of what the healthy and sustainable office of the future can look like.

There are many more reasons to be excited about the future of mass timber office buildings. Material and construction costs are competitive with steel and concrete, and mass timber can greatly reduce the amount of embodied carbon in a building’s construction. Advances in design and fabrication technology are creating opportunities to visually express the sculptural qualities

of wood, even beyond the capabilities of steel or concrete.

By embracing mass timber for commercial design, we have the opportunity to honor the history of our timber industry while focusing on its health and wellness benefits. With wood, we can create workplace environments that are just as warm and welcoming as your home that boost your mood and creativity.

Mass timber is ready to tell its story, are you ready to listen?

*Cody Lodi is a principal at Weber Thompson.*

## DATA PROBLEM

CONTINUED FROM PAGE 6

responses were housed in discrete project folders.

So we created a centralized, standardized SQL (structured query language) database where of all our occupancy evaluations to date now live. A SQL database allows us to cross-reference multiple projects and identify trends across our entire portfolio of work — and by project typology — rather than just focusing on one discrete project at a time and then archiving it.

Our theory is that a number of years from now we will have ingested enough relevant and consciously gathered data that a machine learning algorithm might be able to identify correlations between the way we design buildings and the wellness and satisfaction of the occupants.

This means that we are focused on the long game: building a good foundation of data to train a machine learning algorithm, rather than building a machine learning solution that uses unhelpful or unorganized data to produce unhelpful results.

### Our test bed

We are, however, already deploying machine learning on a different scale. One promising avenue of exploration is computer vision. We recently set up cameras in multiple locations within our Seattle office.

The camera feeds anonymized data into our machine learning-based tool that is trained to recognize thousands of objects, and can categorize them — chair, table, TV monitor, person — as well as their position in space and the time the event occurred. The speed and resolution of the data, relative to capturing it by hand with traditional occupancy evaluations, is extremely high.

The tool’s potential uses include observing the number of chairs in a space and comparing that to the number of occupants to determine utilization rates, identifying televisions in a space and tracking the amount of time they are on as a reflection of amenity utilization, as well as measuring the flow rates of circulation spaces such as stairways and corridors.

The ability to have a single piece of inexpensive hardware (a camera) track and understand a wide variety of objects, occupants and behaviors becomes an incredibly powerful way to quantify the usage and overall success of a space.

Previously, we might have relied on Microsoft Outlook calendar data to gauge how often a given conference room might be booked (an indicator of whether there were too many or too few collaboration zones in an office for the number of people working there). But as we all know, people often book spaces on a recurring basis when they don’t necessarily need to, and not everyone who accepts a meeting invite actually shows up.

We continue to use our office as a test bed and will continue to assess the viability of tools like this one before deploying them on a client project.

Ultimately the resulting data, like occupant satisfaction feedback, is bolstering our understanding of the effects our spaces have on the occupants that live and work within them — and not just through observation, but scientific rigor.

*Dane Stokes is ZGF Architects’ computational design specialist. He is based in Seattle and supports firmwide project teams and R&D initiatives.*

## NET ZERO

CONTINUED FROM PAGE 4

concept can be adapted to the unique and exciting opportunities associated with each future building location.

To achieve these long-range objectives while responding to the university’s near-term needs, the SRG team utilized a unique design process focused on the development of a prototype. SRG’s designers and higher-education thought leaders collaborated to develop a new model for OSU-Cascades’ new academic building.

Rather than using a traditional department- and room-based programming approach, the new model focused on the range of activities that the building would need to accommodate and defined a flexible planning framework that could support

them all. The resulting prototype is replicable for future buildings and is tailored specifically to its site, program requirements and specific functional requirements.

Academic Building 2 will not only serve the needs of a growing campus, but is slated to become a new hub of student activity and a pivotal step in defining the future of the OSU-Cascades experience. The ideas embedded in its concept will serve as a prototype for future sustainable campus expansion while the completed building will bolster the identity and reinforce the mission of OSU-Cascades as it grows.

*Carl Hampson is a design principal at SRG Partnership.*

## MOBILITY OPTIONS

CONTINUED FROM PAGE 5

palities to identify future mobility needs at a new or renewed development site, assesses the impact of that development, and assesses appropriate fees to ensure the project succeeds from a transportation standpoint.

Reducing pollution from automobile use increases the LEED score for every LEED category. Developers can encourage reduced vehicle travel by selecting sites close to transit, developing pedestrian and bike paths, reducing parking facilities, and adding electric vehicle charging infrastructure, thus reducing its carbon footprint.

The Living Building Challenge includes evaluating transportation impacts and pollution, while promoting people-powered modes of travel including walking and bicycling, supplemented with shared transit. Other recommended solutions include transit subsidies and infrastructure. The Living Building Challenge also focuses on equity, requiring equal access to all primary transportation regardless of socioeconomic status.

For new development, and increasingly as a retrofit, electric vehicle infrastructure is becoming a need as the fleet of electric vehicles continues to grow nationwide. As we progress towards more vehicle electrification, architects and developers need to account for this trend and install electric vehicle chargers for residents, employees

and visitors.

### Getting EV-ready

One of the most significant changes to transportation is the effort to reduce our carbon footprint by converting from fossil fuel to electrically powered vehicles. Seattle is among a few cities that are leading this charge under its Drive Clean Seattle initiative and Climate Action Strategy.

This year, Seattle passed sweeping new amendments to the city's land use code requiring new construction to be "EV-ready," requiring the installation of wiring and power outlets in new off-street parking to support future EV chargers.

Specific requirements depend upon the type of land use and type and number of parking facilities provided. For example, at least 20% of parking stalls in shared lots and garages for large multifamily housing must be wired with 208/240 volt, 40-amp power to support Level 2 chargers. For smaller projects, the ratios are higher including at least one pre-wired parking stall for each new single-family home or townhouse. For nonresidential uses, at least 10% of parking facilities must be EV-ready.

This is an important change relative to previous vehicle electrification requirements that were limited to the electrical code, which only required physical capacity for future upgrades

but no actual infrastructure, and single-family homes and duplexes were exempt.

Parking demand is beginning to fall in urban areas as citizens seek other travel modes. In order to determine actual parking needs, developers can work with cities to conduct parking demand and utilization surveys, projection of future parking demand, management strategies (such as dynamic pricing), payment strategies, signage/wayfinding, and identification of potential parking facility sites. Some communities are relaxing current "parking minimums" for new developments and redeveloped areas near bus, light rail and heavy rail facilities. LEED encourages minimizing the construction of parking facilities.

Transportation and development will need to work hand-in-hand as the Northwest densifies and technology continues to shape our engagement with the built environment. By keeping up with the state of the practice in transportation-related facilities, developers will improve their ability to meet client needs — which directly affects the bottom line.

*Brian Chandler is the director of transportation safety for DKS Associates.*

## WORKPLACES

CONTINUED FROM PAGE 9

ing relevance with a shifting talent demographic, questioning their identity after a merger, or trying to keep up with exponential market growth, they often believe that a new place will do the trick.

But tricycle companies know that place and people are tied to the same axle. Companies that address transformation, growth and change through designing places serve the evolving needs of their people. They also understand that place can't solve all the needs of people. Workplaces are primarily thought of as platforms for efficiency and productivity.

### Putting people first

However, in this age of innovation and creativity, it is imperative that workplaces support not only good thinking but good feeling. Our own research, and the research of others, has shown that people must feel deep emotional security to strive past "tasks" and actively think and do within the expanses of their creative potential. Sure, place can provide a sense of security, but ultimately this will be found in the trust and respect people have for each other.

Being human is hard and messy. Companies that embrace this actively cultivate relational conditions that allow for judgment-free vulnerability. They don't tolerate shaming and have worked hard to become inclusive communities of people.

When what's possible is given significant consideration, when clear direction and momentum exists, when the soft systems of culture and people are prioritized, place becomes especially powerful. Companies that understand the purpose of place are grounded in a future of possibility and people. When these companies design workplaces, it's not just more of the same. These places become formative, memorable, and grounding. They unlock latent value outperform. They are truly beautiful.

*Joel Fariss is a researcher, innovation leader and futures strategist at Gensler. He is interested in the opportunities that sit at the intersection of disciplines and in the forces that drive human behavior.*

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## CLT

CONTINUED FROM PAGE 7

ing to building tenants.

There are some design, engineering and assembly considerations that require more forethought when using CLT, however.

Since structural pieces are pre-manufactured off-site, there is less room for error when putting them together and a greater need for precision in the engineering phase. And while CLT floor assemblies are designed and installed to meet the same load-bearing requirements of composite steel and concrete or post-tensioned concrete, CLT is not quite as capable of supporting suspended point loads and may require more attachment points when hanging building systems.

With architects integrating CLT structural members into the interior environment of a building, design and engineering need to go hand in hand. Typically, architects and owners want to expose the beauty of the wood, which requires a lot more thought into the routing of building systems.

Beams and panels need to be pre-cut with openings for wiring, plumbing and other services in order to preserve the beauty of the wood. In addition, designers need to take into consideration the acoustical implications of an exposed hard surface on the interior

environment.

The technology of timber has improved considerably. Today's CLT products far exceed the performance of old school timbers and are changing the way the industry thinks about large-scale construction.

The 2021 International Building Code allows structures as tall as 18 stories with mostly CLT and other modern mass timber products. (Getting to these heights using CLT requires adding gypsum board coverings to some of the elements to achieve the necessary fire ratings.) But even buildings that exceed the 18-story limit can incorporate CLT into their design to capture some of the benefits described above.

While materials, design and construction have come a long way since the late 1800s, the renewal of mass timber as a primary structural construction material is a great example of how some things in the industry can come full circle. And for designers and building owners who are serious about sustainability and energy efficiency, CLT should be at the top of the list of material technologies to consider.

*Michael Frank is McKinstry's vice president of engineering.*

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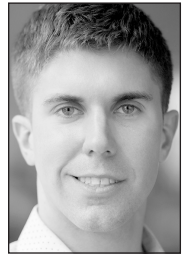
Congratulations to evolution Projects, Hess Callahan Partners, Stephen C. Grey & Associates and the rest of the project team for creating an authentic community gathering and work space with this beautiful commercial office building in Fremont!



# WHY ELECTRIC SCOOTERS COULD BE A GAME CHANGER FOR SEATTLE

New forms of mobility are giving car-congested cities a chance to reshape their urban fabric.

A westward walk from First Avenue to Alaskan Way has recently been transformed with the removal of the viaduct along Seattle's waterfront, opening up unobstructed views of Puget Sound from areas previously blocked by this seismically susceptible concrete structure.



BY GARRETT REYNOLDS  
BOHLIN CYWINSKI JACKSON

Built in the 1950s to facilitate unimpeded access throughout the city for personal automobiles, the removal of this car-centric infrastructure allows Seattle to reconnect areas of the city with a new public promenade along the waterfront.

As Seattle takes strides to provide pedestrian-friendly urban environments, the ultimate success of these projects will depend on their connectivity. Micromobility options including

electric scooters, and a supporting infrastructure, hold the potential to be the next game changer in our cities, reshaping urban centers and transforming the way we commute.

Over the past few years, cities around the world have seen an influx of rentable, dockless electric scooters. As people look for ways to move around increasingly congested cities, scooters have become a popular, alternative transportation option. They take up less space than cars and bicycles and are a more efficient option than walking.

In 2018 alone, over 38 million electric scooter trips were taken in the United States, according to the National Association of City Transportation Officials. Yet the electric scooter has prompted a range of reactions and emotions among urban dwellers.

Some fondly reminisce about their childhood "toy of the year" Razor scooter with a newfound use in their daily commutes. Others express recalcitrance by setting them on fire, tossing them off buildings and

even throwing them in the ocean to demonstrate against urban clutter and risk to pedestrians.

## Change ahead for scooters?

Due to ongoing resistance toward electric scooters on Seattle's streets, the city has been late to the game in setting regulations that would effectively introduce scooters throughout the city. However, this may change in the near future.

In mid-August, Seattle's Department of Transportation initiated a plan to begin a public engagement period as part of a three-stage initiative to introduce electric scooters in Seattle. As this multi-stage process begins, it is important to gain perspective from once-emergent transportation technologies that have also produced contentious arguments around their use and integration in our cities.

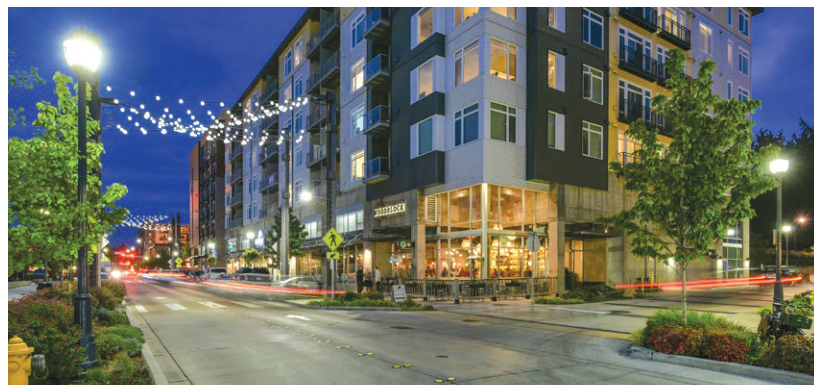
Beginning with our two feet, modes of transportation have long defined

In 2018, 38 million electric scooter trips were taken in the United States, yet scooters have prompted a range of reactions and emotions among urban dwellers.



LIME PHOTO

ELECTRIC SCOOTERS — PAGE 20



Redmond's Cleveland Street & Downtown Park Fieldhouse



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# HOW UNDERSTANDING BUILDING CODES CAN HELP YOU GET MORE OUT OF YOUR PROJECT

When code restrictions complicated plans to renovate Kirkland's Village at Totem Lake, code consultants helped provide a solution.

How often have you had to downsize a project because building codes required you to provide setbacks, limit the building height, or otherwise restrict your design?

Take for example, the Village at Totem Lake, a recent project in downtown Kirkland. The structure was originally built in 1973 as an enclosed two-story mall space with limited interconnectivity and aging aesthetics. The proposed upgraded design plans included a seven-story podium building with retail on the ground floor, parking, and three levels of residential occupancy.



BY VINCE COLLINS  
CODE UNLIMITED

It was inevitable that a project of this size and complexity would face issues with limitations due to existing structures and code restrictions. For example, a key constraint was an existing retail building of combustible construction right next door to the new structure.

## Defining the problem

Anyone who has worked in the shrinking space of the Seattle metro area knows that every foot farther from the property line you build means fewer square feet of leasable retail and residential space. Depending on the amount of square footage, this could make the difference between financial success or failure for the project.

For the Village at Totem Lake, this issue was solved through a



A proposed renovation at the Village at Totem Lake in Kirkland faced limitations due to code restrictions.

IMAGE COURTESY OF GBD ARCHITECTS

step-by-step approach and analysis, starting with a thorough design review to clearly define the problem.

"This was fairly unique for this project because the owner chose to subdivide the lot into parcels, creating the lot lines which therefore created code restrictions on unprotected openings abutting the lot line and above the adjacent roof," said Chris Wayburn of GBD Architects, the leading firm for the project.

The second step of this type of approach is to consider the parameters. The local building official was not only experienced and knowledgeable about the building code, but also willing to consider well-reasoned arguments that could demonstrate the project would maintain appropriate levels of safety.

However, for a presentation of

a code appeal to be successful, the presenter must have a thorough understanding of the codes involved and the fire science behind them. The capabilities, knowledge and perspectives of the local officials need to be considered alongside every facet of the appeal, including any potential concerns or perceived shortfalls of the strategy being put forth.

Once the problem and stakeholders have been defined, the third step of finding a solution through research and analysis can be put into action.

In this case, an assumed lot line was being introduced, requiring a simulation of building up to the edge of the property line to gather data. While adjustments could not be made to the preexisting building's firewalls, a plan for the new building could

be developed through heat-transfer analysis — to document the thermal resistance of the exterior walls during a simulated fire using computational fluid dynamics.

At this location, the new proposed design consisted of a 3-hour-rated wall surmounted by a 3-hour-rated horizontal barrier supported by 3-hour fire-resistance-rated columns, which is not specifically addressed by the code. This further established the need for customized fire model to confirm that the horizontal barrier would provide protection.

Although in reality the fire would burn out once the entire fuel was consumed, a conservative approach was chosen wherein the fire was allowed to continue at the peak heat-release rate for the duration of the run. Also, although sprinkler protection was to be provided for the area, the fires were modeled without sprinkler protection to produce the most extreme case, where sprinklers fail to control the fire.

## Extra precautions

Despite the worst-case scenario fire model parameters selected, the resulting temperature profiles and calculations showed that the proposed design functioned equivalently or better than a code-prescriptive, continuous 3-hour fire wall separating the two buildings.

However, even with this analysis, extra precautions were taken. Wayburn said, "As part of this

project Code Unlimited worked directly with the jurisdiction and our sprinkler contractor to develop the sprinkler curtain for the lower portion for the building. The city required this compromise, so the code consulting crew acted as intermediaries between the sprinkler design builder and the local jurisdiction to come up with a water curtain design that was acceptable to all parties."

In addition, a 15-foot "no build" covenant was established for future planning in order to address unprotected openings in exterior walls.

"This allowed the application of restrictive covenants on to the adjacent property to prevent vertical development in the future — which allowed us unprotected openings," Wayburn said.

Unique conditions such as this one found at The Village at Totem Lake are becoming more common, with property values and exchanges continuing to evolve, and designers pushing the boundaries of the industry.

While the building code can be a good guideline for generic and prescriptive life safety, thorough planning along with research-backed appeals and engineering judgments offer the opportunity for the code to evolve as well.

Vince Collins is a principal and fire protection engineer at Code Unlimited. Collins has more than 30 years of experience with building code, fire protection systems, jurisdictional communications and hazardous materials in multiple market sectors.

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# WHICH PROJECT DELIVERY METHODS WORK BEST?

Practices that allow flexibility and embrace integrative design principles are gaining steam.



BY JASON COLLINS & VALERIE HENDEL  
PCS STRUCTURAL SOLUTIONS

For decades, teams in the AEC industry have been working to put a dent in the productivity problem.

The post-1960s industry drive, which McKinsey & Co. calls “the construction productivity imperative,” has created a pressure cooker of alternative processes and delivery methods seeking to move the needle. Alternative delivery methods have been worked and reworked — an alphabet soup of organizational models navigating partners toward positive outcomes.

The first integrated project delivery project, for example, was completed in the United States in 2005. Lean construction principles took on lagging efficiency and building-information modeling (BIM) enabled rapid information sharing among multiple partners. Collaboration broke down silos, and teams began to collectively tackle inefficiencies.

As structural engineers working throughout AEC markets, we must dial in to the unique needs and challenges of our clients. It’s a constant examination of fundamental questions: What practices should we bring to best serve our teams? And in this scramble for productivity, which ideas work?

## Drivers in today’s markets

Today, a shortage of skilled labor and a large quantity of existing buildings that need upgrades or replacements drive development of public projects. In addition, sustainable design takes a prominent role in educational environments. In the private market, the feasibility stage is expedited, and owners require sophisticated information up front to make decisions.

Health care entities face the challenges of navigating a shifting political landscape and an aging demographic and infrastructure. Providers are scrambling to deliver care in appropriate locations. Project teams must offer proactive insights, cost-effective design and quick turnaround.

The integrated project delivery (IPD) legacy has had an inter-



The NBBJ-designed Seattle Children’s Bellevue Clinic and Surgery Center was the first project in Washington state to use integrated project delivery.

PHOTOS COURTESY OF PCS STRUCTURAL SOLUTIONS

esting evolution. Anchoring the behaviors of the team in an IPD model is a multi-party, shared-risk/shared-reward contract, the purpose of which is to invest all parties in efficiency and success through collaboration.

University of Washington researchers Yong-Woo Kim and Carrie Dossick identify five elements that contribute to the integration of project delivery: “contract type IFOA (integrated form of agreement), culture, organization, lean construction and BIM.”

Although up-to-date metrics on the number of pure IPD projects (those using an IPD contract) are difficult to find, a July 2014 American Institute of Architects California report estimated at the time there were “over 200 projects that use multi-party contracts.”

While IPD hasn’t enjoyed broad success as a contractual delivery model, it continues to generate interest in the industry and has undoubtedly left a legacy informing the way AEC firms do business. IPD has evolved from its pure multi-contract form, and terms like IPD-lite or IPD-ish are commonly used to describe the philosophy without the shared risk/reward contract.

The IPD genes that flourish today are the concepts that support efficiency within market constraints, namely Lean design principles, collaboration and BIM, evidenced by the fact that these practices bring value across all delivery types.

Lean is rarely mentioned in the public market, although lean construction concepts — based on minimizing waste and maximizing value — have found their way into team structures. Likewise, private owners don’t talk about Lean explicitly, although key lean principles appear actively at play: team members are quick to identify value and are highly motivated to eliminate



While IPD — used for this Seattle Children’s project — hasn’t enjoyed broad success as a contractual delivery model, it continues to generate interest in the AEC industry.

waste and improve processes. Because structural engineers are pulled in about the same time regardless of the delivery type, PCS Structural Solutions has found opportunities to bring lean principles to the table like pull planning and BIM.

Collaboration is highly valued across markets and provides partners the best opportunity to impact cost. Complex or specialized structures or sites require rigorous collaboration to deliver the level of complexity that make the structure function. Increasingly, owners are selecting for teams who are highly collaborative — they know they get the best value from a team that can perform well together. The secret sauce is a unique combination of individuals who are able to challenge each other to find better solutions.

## Alternative delivery

Alternative delivery methods, such as design-build and its variations, are gaining quickly. Design-build got a big push from a series of catastrophes and

natural disasters in the early 2000s which required fast, efficient response. Design-build’s success seems to be in striking middle ground, allowing flexibility with regard to lean principles and owner needs.

According to Kristin Hill, director of education programs at Lean Construction Institute, “Design-build allows a high level of lean integration. It blows the doors off of what teams are able to accomplish — they can go as deep with implementing lean as they find possible.”

All 50 states have since adopted procurement laws that allow public projects to use design-build delivery.

Competitive bidding remains a fixture in public markets to provide public accountability. For instance, most of Tacoma Public School’s K-12 projects are using design-build delivery, and higher education is adopting alternative deliveries like GC/CM and design-build more frequently. These delivery models provide owners the resources that help them control costs and sched-

ules while still delivering quality projects within the mandated bidding structure.

A negotiated bid process meets the needs of private owners who highly value qualifications and teamwork. Health care developers seem to be headed to middle ground with regard to delivery: GC/CM, GMP, negotiated bid and design-assist bid. Although health care entities differ in their preference, many work with contractors in a design-assist role to help with cost preparation. Bidding remains important to the health care owner because it allows the owner to secure resources as the project progresses.

## Moving forward

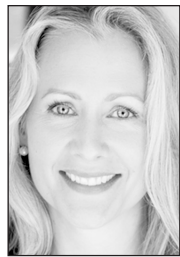
Time will tell which alternative practices can prove nimble enough to weather changes and improve productivity in the AEC landscape. Delivery methods that allow flexibility and embrace integrative design principles continue to gain steam.

DELIVERY METHODS — PAGE 20

# THESE 3 NORTHWEST PROJECTS SHOW HOW LISTENING TO CLIENTS PAYS OFF

Whether creating a park or wayfinding program, achieving a great design means asking the right questions and showing sensitivity to cultural and environmental context.

At Knot, whether we are working on embassies in sub-Saharan Africa or on parks in the Northwest, we hold firmly to the notion that great design fits beautifully within its context. Extreme sensitivity to cultural and environmental context is a key to achieving success.



BY MARILEE HANKS  
KNOT

We think like a large firm but act like a small one. We bring together diverse expertise and specialties in landscape architecture and experiential graphic design that allows us to collectively understand multiple scales of human experience, built craft and physical environment. The result is an informed approach to each project.

Over the years, as a landscape architect with Aecom in Seattle and Portland and now as principal with Knot, I have emphasized the need to be deeply invested in each individual client and project that comes through the office.

We have purposely built a diverse team both in discipline and background because we believe that broader understanding brings stronger solutions.

Three Northwest projects demonstrate our passion for interpreting a client's goals and commitment to consider the natural environment as we impact the land around us.

## Washington Park

Portland's Washington Park had outlived its 100-year lifespan when the Portland Water Bureau began the process for major reconstruction and restoration of public park features within the Washington Park Reservoir District.



Ridgewood View Park in Beaverton, Oregon, includes rain gardens, a trail loop, two bridges, a bocce court and seating areas.

PHOTO COURTESY OF KNOT

ervoir District.

The park is nestled in a wooded hillside overlooking downtown

Portland. The site of an arboretum, amphitheater and rose garden, the 410-acre park also plays an important role in the city's water system.

The Washington Park Reservoir was in need of major improvements and reconstruction. Working with the Portland Water Bureau, I led a team of architects and engineers through planning for major park upgrades.

The project needed to preserve the beauty of the historic structures while deftly adding modern landscape features such as plazas and promenades in a seamless fashion. A two-year

process led us through visioning and design conversations with the public, a community steering committee and the Historic Landmarks Commission — navigating the effort to add new park features and restoring historic structures.

This also involved working closely with park planners, landscape architects and engineers as well as contractor Hoffman Construction over a 2-year period. We continue to work with the Portland Water Bureau and Hoffman on this complex project. The design includes trail planning through environmen-



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Knot designed and developed a wayfinding sign program for Portland's Japanese Garden.

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tally sensitive areas as well as studying stormwater infiltration and habitat restoration, seeking a coexistence between historic and modern.

### Japanese Garden

Former Japanese Ambassador Nobuo Matsunaga called the Portland Japanese Garden “the most beautiful and authentic” Japanese garden outside of Japan.

For Knot, the expansion of this beloved Japanese garden presented an opportunity to show how our wayfinding program can perfectly complement an overall design.

After a half-century, the Japanese Garden received a major expansion that added 3.5 acres to the existing 9-acre garden. Working with architects Kengo Kuma & Associates and Hacker, we designed and developed both an interior and exterior wayfinding sign program as well as donor recognition. The expansion included a new Village House, new Garden House, Village Plaza, cabana garden, terraced garden, access gate, ticketing pavilion and Bonsai Greenhouse.

Custom signs were developed from pulling the architectural details and interior finishes. Larger sign structures appear weightless through the use of hidden fasteners. Knot’s

designed focused on the highest level of craftsmanship, infused with traditional Japanese design.

The garden required a design response that showed reverence to centuries-old Japanese traditions. Knot’s wayfinding signage provides a critical role in the expansion — as visitors now can experience an even more immersive cultural experience through educational activities. With our wayfinding design guidance, the Portland Japanese Garden has expanded to serve visitors’ needs in the 21st century while carefully respecting traditional design cues from its inspirational homeland.

### Ridgewood View Park

On the design of the Ridgewood View Park & Reservoir in Beaverton, Oregon, we worked closely with the Tualatin Valley Water District and Tualatin Hills Parks and Recreation District to develop a program for an 8-acre park.

The project challenged Knot designers to incorporate a series of uses in an elegant response to the clients’ and the public’s desires for a park that will host visitors of all ages. The design included a picnic shelter, rain gardens, a trail loop through a restored natural area, two bridges, a restroom, drinking fountains, bocce court and seating areas. The project also included construction of a new drinking



Washington Park Reservoir upgrades in Portland came together after a two-year visioning and design process.

RENDERING COURTESY OF KNOT

water reservoir and pump station.

Through an extensive public input process, our designers participated in a series of public meetings to refine their design approach. A series of rain gardens were designed to manage all runoff from impervious surfaces, including the large roof of the reservoir tank.

The rain gardens descend from the roof of the tank through a series of concrete and Gabon ramps and connect with an at-grade system of gardens circling the site. In addition, 4 acres of degraded natural area were restored, and a new trail loop constructed. Two bridges were installed to bring visitors through the natural area and along the bank of a stream.

Atop the reservoir, Knot designed new tennis and pickleball courts — demonstrating the most innovative approach to delivering multiple functions for public use, while also meeting state and federal requirements for clean storage of reservoir water.

For its sustainable design and construction, the park was awarded the Institute for Sustainable Infrastructure’s Gold Envision rating — making it the first project in Oregon to receive the award. Weaving a multitude of public uses into a complex, sustainable-design program, Knot demonstrated that a reservoir and park can be extremely functional while also beautiful.

With each of these projects, our team members sought out

many perspectives in order to align ourselves with our clients’ goals.

As a landscape architect, I place great emphasis on being a good listener. In fact, I spend a lot of time thinking about the right questions. I think the answers are the easy part. Being able to use design as well as verbal and visual communication to bring a group into agreement is deeply gratifying.

*Marilee Hanks, owner and principal at the Portland landscape architecture/experiential graphic design firm Knot, is passionate about shaping the human experience of place and reinforcing the natural systems that sustain us.*

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## SURVEYS

## BOHLIN CYWINSKI JACKSON

**Specialty:** Architecture, planning, interiors, design

**Management:** Bohlin Cywinski Jackson has nine shareholders, including two who lead the Seattle office. They are principals Ray Calabro and Robert E. Miller

**Founded:** 1965

**Offices:** Wilkes-Barre, Pennsylvania; Pittsburgh; Philadelphia; Seattle; San Francisco; New York

**Revenues:** N/A

**Projects:** Brio Tower, a 23-story, 259-unit apartment project in downtown Bellevue for Su Development; Bellevue fire station 5 and 10; Lightbox Studio, a photography studio and archival room in Point Roberts

Principal Robert E. Miller answered questions about his firm and trends and issues in the industry.

**Q: BCJ got into high-rise design fairly recently. How is that going?**

**A:** Our entry into high-rise design began in Bellevue and its successful outcome took us quickly to other cities such as Honolulu and Santa Clara, California.

Our design-first focus and

strength as problem-solvers has translated well to high-rise design. We've found it helps to be selective and seek like-minded clients. We've been fortunate to partner with several clients who allow us to be part of achieving their aspirations for unique and highly profitable structures.

**Q: A number of projects in Seattle are using stilt-like columns. Why are you employing them?**

**A:** We have been developing an architectural language as we enter the high-rise market. One of our early discoveries was the power of the columns. Not only could we find efficiencies in transferring loads through sloped columns rather than expensive beams, but we could utilize those same columns to create an interesting architectural expression.

The design now invites one to meander through the columns, which read like a loose forest. This is a less traditional experience, but hopefully memorable. The effect allows for greater flexibility as we fine-tune the experience of the park extension and podium.

**Q: New developments in Yesler Terrace seem light on retail, yet Su is proposing 10,000 square feet of retail/commercial space. Why that much?**

**A:** The retail program is in development. We believe there will need to be a critical anchor at this end of the park to activate the community and the open space.

While the expansive views of the Seattle skyline, accessible ramped walkways, and a series of follies will be a large draw, we want to support the community through creating flexible spaces than can adapt as the neighborhood evolves.

One of my favorite features is a large "market hall," which we hope will support many local startup businesses as an incubator and supplier of specialty goods based on the diverse community. We hope to embed vibrancy in the podium akin to Pike Place Market.

**Q: What can architects, developers and government do to make the Puget Sound region more liv-**

BOHLIN CYWINSKI JACKSON — PAGE 20



Brio Tower in Bellevue includes a mid-rise component geared toward families.

## JOHNSTON ARCHITECTS

**Specialty:** Architecture, interior design, and master planning services for a mix of public and private clients

**Management:** Partnership

**Founded:** 1990

**Headquarters:** Seattle

**2018 revenues:** \$2.4 million

**Projected 2019 revenues:** \$3 million

**Projects:** Stencil, Seattle; Lee Street Lofts, Seattle; Duvall Library, Duvall

Principal Jack Chaffin answered questions from the DJC about his firm and trends and issues in the industry.

**Q: In recent years, has the firm seen any of its specialties perform especially well?**

**A:** Public projects have finally crawled out of the shadow of the Great Recession. There are project needs at the state and local level that went unmet for the last decade because of low tax revenues, but that's changed now.

We anticipate seeing the public projects sector grow for the foreseeable future as federal, state, county and city coffers continue to recover.

**Q: Have you seen developers expanding their project types to include a more interesting mix of uses under one roof?**

**A:** We are seeing numerous new and innovative developments in the mixed-use sector. As the market continues at this unprecedented rate, development is getting more challenging. Property owners are finding creative ways to bring projects to life.

One excellent example is Shared Roof,

a new 35-unit, mixed-use apartment building in Seattle's Phinney Ridge neighborhood. It is unique in that it is being developed for families who are committed to living in a collaborative community. The developer will also live in the building and is committed to the idea of shared amenities and living spaces. This idea of shared resources has tremendously influenced the design of this project.

**Q: Can you describe a recent project that embodies your firm's design approach?**

**A:** As we have grown over the last few years, we have made a concerted effort to retain the culture and attributes of a smaller firm.

One of the best examples of this is our recent work for a new library in Winthrop. After an extensive programming and community engagement process we brought the entire studio together for a design charrette. The project team shared the data collected from the Winthrop community, the town's unique westernization design guidelines, and some very early concepts with the entire office and let the conversation begin.

One of the best parts of a small firm is the trust you build with one another. Everyone knows each other well enough that it feels safe to speak up, ask questions, and voice your ideas. I think it also lends to a self-enforcing positive environment that amplifies confidence.

For our projects and clients, this positive and creative exchange of ideas from our diverse team of designers is invaluable.



Shared Roof, a 35-unit apartment building in Phinney Ridge, will have shared amenities and living spaces.

IMAGE PROVIDED BY JOHNSTON ARCHITECTS

**Q: Do developers still have interest in high-level LEED and sustainable designs?**

**A:** We see our clients' commitments vary, but it's certainly trending higher. In general, Seattleites have a desire to live sustainably and have a commitment to reducing our impact on the environment, and developers know that.

**Q: Any forecasts for how business will be for you in the next year?**

**A:** With the sustained uptick in the

public sector and as Seattle's shortage of housing continues to require solutions, we are cautiously optimistic moving into the 2020s.

If there is a dark cloud on the horizon, it is the concerns we are seeing around volatile material prices paired with the strain on our construction labor pool. These two issues are impacting current construction costs and future escalation forecasts and it is beginning to affect the viability of some projects.

## SURVEYS

# WEBER THOMPSON

**Specialty:** Full-service design firm specializing in architecture, landscape architecture and interior design.

**Management:** Blaine Weber, Kristen Scott, Jeff Reibman, Amanda Keating and Elizabeth Holland.

**Founded:** 1988

**Headquarters:** Seattle

**2018 revenues:** \$14.7 million

**Projected 2019 revenues:** \$15 million  
**Projects:** Living Stone office building, Seattle; Orenda at Othello Square, Seattle; Nexus condominium tower, Seattle

Weber Thompson's Kristen Scott, Jeffrey Reibman, Blaine J. Weber and Amanda Keating answered questions about their firm and the industry.

**Q: Does sustainability still play a key role in your designs? What are some new advances or technologies you've employed?**

**Kristen Scott:** Sustainable design practices are deeply embedded in our approach to design. Every day there are new programs in development driving the adoption of these practices.

For example, we currently have several Living Building Pilot office projects. These projects are required to meet deeply reduced energy and water usage requirements that are measured post occupancy in addition to achieving Petal Certification through the International Living Future Institute. Meeting these requirements

requires new technologies and creative thinking!

We are collaborating early in the design process in a variety of ways, from biophilic design charrettes to advanced modeling and analysis with our consultants, all of which influence the direction of our design solution.

Several of our newest projects are utilizing mass timber for their structural systems. In a typical five- to seven-story office building, mass timber can be left exposed, allowing everyone to reap the benefit of the beauty of a natural material as well as providing significantly reduced embodied carbon over other traditional structural systems.

New materials and technologies are a necessity if we are going to significantly reduce the impacts of new construction on climate change.

**Q: Do you expect the hospitality sector will continue to be strong?**

**Jeffrey Reibman:** Seattle already ranks among the most underserved markets in terms of hotel demand. With the convention center expansion and our strong economy, we expect that demand will only increase and hospitality will be a strong market for some time.

We're especially excited to see really innovative hotel providers working to meet a changing market with products targeted at younger travelers. As hotels expand in both quantity and variety here

in Seattle we're hopeful that the hospitality industry can take back some of the market share lost to short-term rentals.

**Q: What has Nexus tower meant for the firm's design reputation?**

**Blaine J. Weber:** It was a rare treat when Christian Chan of Burrard Development (our client for the Nexus tower project) asked that we design a deliberately iconic and cutting-edge residential tower that would be both sculptural and playful.

Of course, this invitation to innovate and "break out of the box" also came with the proviso to stay within a reasonable budget. During early design exploration, we landed on an idea to break the tower into a series of smaller cubes that would twist four degrees in opposite directions — for a total of eight degrees of separation. This subtle shift allows for a conventional tower structure whereby all structure remains in vertical alignment, in spite of the twisting.

Weber Thompson is committed to elevating the quality of our design game with each and every project, but we have to give credit to our client for opening the door to iconic innovation on this project.

**Are there any new sectors the firm has entered recently that show promise?**

**Amanda Keating:** We're currently working on our third student-targeted housing project in (or near) the U District, and it's very fun! Our deep portfolio of experience designing in a wide variety of multifamily housing types has translated seamlessly to the student realm, and in fact, has brought a new way of thinking to our broader market-rate multifamily projects.



Nexus is a condominium tower under construction in Seattle's Denny Triangle.

IMAGE PROVIDED BY WEBER THOMPSON

The issue of housing affordability in our urban area is not lost on us or our clients, and we're now exploring the concept of co-living in a handful of projects.

# CARY KOPCZYNSKI & CO.

**Specialty:** Structural engineering for urban buildings

**Management:** Cary Kopczynski, senior principal and CEO; Mark Whiteley and Joe Ferzli, senior principals

**Founded:** 1987

**Headquarters:** Bellevue

**Revenues:** N/A

**Projects:** 1000 Virginia, a residential high-rise in downtown Seattle; and Belltown 36, a 29-story residential tower in Seattle; Plaza 305, a hotel/residential tower in Bellevue

Cary Kopczynski, senior principal and CEO of Cary Kopczynski & Co., answered questions from the DJC about his firm and trends and issues in the industry.

**Q: What's the most unusual project CKC is working on?**

**A:** One of the most unusual is 9th & Howell, a high-rise hotel in Seattle for which we are using a structural steel frame, including a braced steel core.

Most residential and hotel towers are built in reinforced concrete. There are several reasons for this, one them being that flat slab concrete construction

provides benefit in minimizing the floor-to-floor height. Concrete slab soffits are textured and used as ceilings, so that the floor-to-floor height is the ceiling height plus the slab thickness.

For the hotel project I'm referring to, which is about 440 feet tall, we're using a jumbo metal floor deck which allows clear spans of approximately 25 feet between the beams. Further, the room layout modulates such that all beams are located directly over demising walls.

The net effect is that there is no height penalty for the beams and girders.

**Q: Which commercial real estate sectors do you see growing or faltering?**

**A:** From our vantage point, the multifamily housing and office sectors are continuing to be strong.

Our work volume in both remains high and we don't see much indication of a letup. We do hear anecdotal indicators that the growing barriers to urban market entry — taxes, levees, assessments, lengthened permit review time — are deterring

new players and disenchanting some veterans. This is true in many markets we work in, but especially in the Bay Area and Los Angeles.

Whether or not these higher barriers translate into a work slowdown remains to be seen. We know that a slowdown will eventually come but our business doesn't see any indicators of it yet.

**Q: What is the most cutting-edge trend in the industry?**

**A:** Modular construction. There is a steady and growing movement in the direction of constructing buildings with more of a Henry Ford mindset.

Too many buildings today are built as "one-off" structures. All of the systems are custom designed and built only once. When the next building comes along, you start all over again. That makes no sense.

The different systems for most buildings have a degree of commonality that can be repeatedly used from one building to the next. This is now being exploited in many ways, the goal being to do more work in a factory under plant-controlled conditions, and less work in the field where productivity is generally lower and the work less efficient.

**Q: Should Seattle require property owners to fortify their URM buildings?**

**A:** Upgrading deficient buildings in the interest of public safety makes sense. No thoughtful person would argue against that.

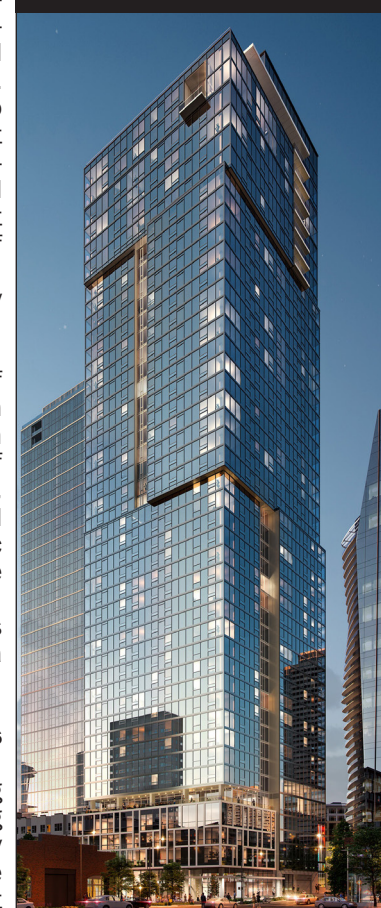
The question becomes who pays. In that regard, I don't believe that forcing building owners to shoulder the full financial burden would be fair, or for that matter wise. Many, if not most of these buildings were considered code compliant and safe only several decades ago.

If these buildings complied with seismic codes at the time of construction, an argument can be made that upgrading them should qualify for some sort of public assistance or tax relief, since it is the public who will benefit. Mandating that seismic upgrades for these buildings be paid for fully by owners would undoubtedly price some owners out of business, resulting in a scenario where nobody wins.

**Q: What are the latest trends for parking structures?**

**A:** The latest trends in parking structure structural engineering involve a heightened industry commitment to broadening the understanding of strategies that

CKC is working on 1000 Virginia, a 484-foot residential tower in Seattle.



RENDERING PROVIDED BY WEBER THOMPSON

CARY KOPCZYNSKI & CO. — PAGE 20

# ELECTRIC SCOOTERS

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our cityscapes, and perhaps more importantly, our understanding of them. Mode of transport articulates exactly where people can and cannot live in relation to work and commerce.

Prior to World War II, dense downtowns were connected to one another by high-capacity railways radiating outwards with subways, elevated trains and electric streetcars to connect their urban cores. This mix of transportation options produced relatively high-density apartments in large cities and helped to decrease the amount of unsanitary tenement housing developed prior to these transportation innovations by providing additional housing options a short distance from city centers.

Fast forward to the 2000s. Automobiles have become commonplace in contemporary cities; their sounds, smells and uses permeate our sensory experience of our cities. However, this was not always the case.

The car began as a toy for the wealthy elite, used to reach their country estates and travel to getaways outside the city. Yet, at the time of their introduction, cars provided a very poor means of basic transportation to and from city centers due to a lack of accompanying infrastructure. As a result, commuting by car

was not much more convenient or expedient compared to existing mass transit options in most U.S. cities.

As technology improved and the cost of car ownership decreased, more and more people purchased automobiles. Small roads built for carriages, wagons and pedestrians soon became overcrowded and overtaxed.

Despite this increase in car ownership (alongside outcries against the car's desecration of the city), it wasn't until the advent of another innovation — the expressway — that the car became adopted en masse. The expressway enabled large numbers of people to travel long distances on a daily basis, facilitating commutes of up to 20 miles in 30 minutes and enlarging the potential size of cities to more than 1,250 square miles.

## Seattle's big chance

While changes in transportation technology from the mid-19th to the mid-20th century continuously reshaped American cityscapes, since the 1950s not much has changed with regards to transit. This is problematic since cities continue to grow as millennials express increased interest in moving back to urban areas.

Highways have become overcrowded with highway expansion being expensive and, in many cases, infeasible. Around the country, and particularly in Seattle, commute times continue to slow as congestion increases.

New forms of mobility are continuously being adopted in our ever-changing cityscapes. This makes mobility an important challenge with which architects and designers must grapple.

With the electric scooter providing a new form of mobility, it is imperative for us to embrace this technology and the change it could bring to how we think about urban spaces. We need to be open to reconsidering architecture and urban design in the 21st century. If the expressway enabled the rise of the automobile, what urban design innovation is needed to bring about the rise of the electric scooter in our cities?

This is a critical question for many stakeholders — architects, urban planners, policy makers, legislators, and academics — to consider. In the meantime, Seattle has an opportunity to catalyze the scooter's adoption. With impending legislation regarding the scooter, Seattle has a first chance to embrace this mode of transit and begin the process of reshaping its urban fabric. This

time, in a much smaller, walkable and "scooterable" way.

Garrett Reynolds is an architect at Bohlin Cywinski Jackson in Seattle. He was the 2015 recipi-

ent of AIA Seattle Emerging Professionals Travel Scholarship for his proposal to study small dwellings in dense, urban contexts and continues to engage questions of livability within our cities.

# CARY KOPCZYNSKI & CO.

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have worked for decades. Simplicity in layout. Member sizing and detailing that takes full advantage of high production forming systems for cast-in-place structures, and plant casting technology for precast structures. And, standardization of member sizes and bay spacing.

For most free-standing parking structures, two or at most three

column sizes are sufficient — ditto for the beams and girders. On the West Coast, cast-in-place structures remain dominant for seismic reasons, while elsewhere in the country precast and cast-in-place go head to head.

A refreshing trend in the last decade or two has been that far more attention is being paid to aesthetics.

# BOHLIN CYWINSKI JACKSON

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## able and sustainable?

**A:** The perceived livability in Seattle has taken a dramatic turn. I believe we need to address the issue of cost of living to effect change.

We need to invest in infrastructure that supports humane, high-quality environments in higher density, pedestrian-friendly neighborhoods. We need to combine this infrastructure with a graceful flow of people and goods to serve them effectively and efficiently.

I want to see an investment in quality design and construction to assure the Seattle of the future is one we can be proud we were part of generating. The city, architecture, and infrastructure needs to protect the environment and invest wisely in securing a net-positive restorative impact on the earth.

## work has grown the most in recent years?

**A:** Locally, we've seen growth in high-rise work. I suspect that trend will continue and that we will find innovative programs and construction techniques to keep it rewarding.

Also, recently our practice has delved into designing makerspaces for academic institutions such as Carnegie Mellon University, Kent State University and University of Illinois Urbana-Champaign. It's a rapidly maturing typology without ample precedent, but I suspect we'll continue to see more of this typology as institutions emphasize interdisciplinary collaboration as part of their pedagogy.

And, while we cannot predict the future, my hunch is that there will be a sizable portion of work in social good or philanthropic ventures.

## Q: Which sector of your firm's



**Design Excellence  
Building Quality**

# DELIVERY METHODS

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Lean construction principles remain highly relevant in an industry fixed on maximizing efficiencies and controlling time and costs. In an industry historically slow to adopt technology, BIM is now standard, connecting teams and providing rapid information that help reduce project errors. Early collaboration among partners ensures critical decisions are made early in a project, reducing the cost of design changes.

Critical to that piece is how partners foster collaborative cul-

ture within their organizations. At PCS, we know that a collaborative culture is the key to allowing us to best navigate the AEC landscape with our partners and make an impact in the quality, productivity and legacy of our projects.

PCS Structural Solutions Principal Jason Collins is a leader in the private development market and champions visual communication. Valerie Hendel, a marketing assistant, enjoys examining the impact of collaborative structural engineering.

- Mechanical engineering
- Electrical engineering
- Plumbing engineering
- Sustainability management
- Energy services
- Lighting design
- Commissioning services

# RUSHING

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