
Equity by Design
DesignIntelligence
Quarterly

PAUL VANDUYNE
IMEG Corp.

ADAM MCMILLEN
IMEG Corp.

MIKE LAWLESS
IMEG Corp.

Equity by Design

Overcoming bias and capitalizing on data to reach broader outcomes.

Paying Attention

The growing spotlight on social inequity in the U.S. has led many corporations to take a closer look at how their companies might be contributing to the problem, be it due to unintended bias, lack of staff diversity, or failure to connect the dots from a completed project to a negative effect on a disadvantaged segment of the population.

Though not part of the general public's consciousness, awareness of the built environment's effects on social inequality has been growing, gradually, within the AEC industry. This nascent awakening is just the start for most of us in the field. But there are signs that we are at the very least beginning to see how we — and the buildings and infrastructure we design — can be part of the solution instead of the problem.

Earlier this year, for example, the Wisconsin chapter of the American Council of Engineering Companies asked one of our firm's senior engineers to write a guest blog about a new fire station that is filling several gaps in an underserved part of Madison,WI as a result of the city's Racial Equity and Social Justice Initiative.

Our engineer wrote that the new station cut emergency wait times from 15 minutes to five for the racially diverse, socioeconomically disadvantaged neighborhood. The facility — easily accessible via new bus routes and clearly designed pedestrian pathways — additionally provides residents the use of a community room. While the author also discussed the highly efficient systems we designed for the LEED Platinum station, the fact that he first pointed out the project's positive impacts on the community speaks volumes.

Bit by bit, our engineering consulting firm (IMEG), the AEC industry in general, and building owners of all types are beginning to pay attention — not only to how a building's design and programming can serve its stakeholders and the environment, but also how it can help in the quest for equity in our communities to support the change we seek to create the world we envision.

A Revolution Brewing

For our firm and others like us, this is a revolution in the ongoing evolution of building design. For most engineers, the early years of their careers were spent thinking about simply making a building work — i.e., stand up, operate, and function. Around the turn of the 21st century (with the arrival of the USGBC's LEED certification program), high performance became the focus — e.g., energy efficiency and sustainability of products (and, eventually, net zero energy).

Bit by bit, our engineering consulting firm (IMEG), the AEC industry in general, and building owners of all types are beginning to pay attention — not only to how a building's design and programming can serve its stakeholders and the environment, but also how it can help in the quest for equity in our communities to support the change we seek to create the world we envision.

The City of Madison (WI) Fire Station 14 helps to provide equity to the neighborhood's underserved community as a result of the city's Racial Equity and Social Justice Initiative. *(Photo © Wayne Johnson/Main Street Studio, courtesy IMEG Corp.)*

Most recently, the relatively new WELL Building Standard and the COVID-19 pandemic have shifted the focus to occupant wellness — airflow and pressure relationships, filtration, clean air, daylight, connection to nature, and other broadly based factors.

These iterations of mission in the design and construction industry have succeeded in serving the general good of those who own, benefit from, or spend time within buildings. But now we are starting to consider the impact a building can have on occasional visitors and those who may never step foot inside of it. As illustrated by our engineer's blog, we are beginning to understand how our design practices can impact diversity, inclusion, equity, and other social issues.

These ideas have been visibly bubbling to the surface during the last 10 years or so, and for decades in other forms. Building standards such as WELL and the Living Building Challenge, for example, include credits for "Health Through Housing Equity" and the "Equity Petal," respectively. IMEG has designed several WELL-certified buildings (including our own WELL Gold office in Denver) and we have joined several sustainability initiatives that move us further along the social responsibility spectrum. These initiatives include the AIA 2030 Commitment, a data-driven effort to combat global climate change; SE2050, which seeks substantive embodied carbon reductions in the design and construction of structural systems; and the U.S. Department of Energy's Better Buildings Initiative, designed to improve the lives

of American citizens through energy innovation and efficiency. We also joined more than 130 leading AEC companies in signing a letter calling on the Biden administration to "build back greener" by adding sustainable building strategies to its climate agenda and environmental justice plans.

Like other companies that are designing to the newest, occupant-focused standards and joining climate-related industry initiatives, we realize we have a long way to go. We also understand that if we genuinely want to provide equity by design, we must first seek diversity, equity, and inclusion in our own business operations. Some industry organizations have begun to chart this course. For example, the AIA's "Guides for Equitable Practice" is designed to help firms ensure they have the talent, passion, and creativity of a diverse cohort of students, professionals, and leaders to be able to "meet the challenges of society's most pressing issues." The comprehensive guide offers detailed information and recommendations as well as key ideas for starting the process, including the need to "focus on self-awareness of your own cultural patterns and biases."

Finding Bias

IMEG has begun to look inside our own organization and see our unintended biases, a realization that has already influenced our decision-making at the leadership level that will lead to awareness training throughout the company.

Becoming aware of our biases is crucial as we strive to build, support, and encourage diversity and foster a culture of inclusion within our employee-owner staff. We understand the benefits of diverse perspectives among our team members, and we recognize how these perspectives can help drive us to greater success. We have been intentional, for example, in expanding the number of our female engineers and supporting them in their careers. Our 2025 Club empowers, educates, and advocates for IMEG's female professional and technical staff, focusing on the unique challenges of being a woman in a heavily male-dominated industry. Diversity initiatives also have been part of our key performance indicators to help drive the practice.

We also strive to make a difference outside of our own walls, expanding our outreach efforts not only into colleges but also into K-12 schools in diverse neighborhoods, where minority students often lack the opportunity to learn about opportunities in the construction industry. Our St. Louis office, for example, partnered with the National Society of Black Engineers to have a high school student join us for a summer internship in partnership with a healthcare client. This provided the student with exposure not only to engineering but to construction management, skilled trades, and architecture.

Beyond increasing diversity and social equality at our own firm and collaborating with our clients to do the same, we also need to seek equity by design in our projects.

Data will enable us to analyze relationships between indoor environments and occupants, such as the effects of daylight on student test scores. *(Photo © Paul Wedlake Photography, courtesy of IMEG Corp.)*

Emerging Duties

At the most basic level, it is our duty as engineers to provide buildings that are safe for all occupants and the surrounding community. This means everything from fire alarm and life safety systems to ensuring effluent from laboratories is discharged safely away from buildings and neighborhoods. We also minimize the negative effects that emergency power generating stations have on neighborhoods — something we hope to improve upon in the future by replacing traditional carbon-emitting, noise-producing generators with photovoltaic arrays and storing the renewable energy they produce in batteries to be ready for use during a power outage.

With hospitals and related facilities accounting for nearly 40% of our practice, IMEG also plays an important role in helping to safeguard the delivery of healthcare to our communities. During the COVID-19 pandemic, for example, we ensured that our clients' facilities provided proper ventilation and often quickly designed temporary infrastructure to ensure oxygen systems were able to meet patient surge demand. We also provided emergency departments with the appropriate pressurization to protect non-COVID patients and safely house potentially infected patients while they were evaluated and treated.

Data-Driven Equity by Design

Across all markets, data — and our analysis of it — will be increasingly important in the quest for equity by design. By partnering with firms that analyze health-related metrics and that share our vision for social equity, we will be able to create irrefutable links between building decisions and the effects of those decisions on communities.

For example, all buildings are connected to a local electricity grid, which is attached to any number of power-generation plants, many of which are fossil-fuel-based and create pollution that impacts the surrounding communities. Datasets are available to better understand these connections. On the Toll From Coal website you can click on any power plant on the U.S. map for a report on the number of schools, hospitals, community spaces, and residents within a 12-mile radius of that plant. The impact is translated into negative health outcomes per year (asthma attacks, work-loss days, etc.) and a breakdown is provided of the at-risk population (including the percentages of people of color and those living in poverty compared to the rest of the state). Within this context, energy efficiency and renewable energy design options can be seen more holistically than by just looking at simple ROI alone, showing that such decisions not only improve an owner's long-term bottom line but also reduce unintentional harm and make a positive impact on communities.

Other examples of data's potential for improving equity by design include:

- Decarbonization of the built environment. Climate change is increasingly showing its impact on human health, and various organizations are trying to lessen its effects. Health Care Without Harm, for example, works to reduce carbon emissions of healthcare facilities worldwide. Efficient operation of these facilities is critical and can be ensured through continuous commissioning throughout the life of the buildings. This leverages the power of data and automation to analyze key building performance parameters and alert operators when a system is not operating as intended. This single action not only reduces carbon and improves community health, it also can reduce waste and create jobs.
- Improving indoor environments. Data can also be used to measure and analyze conditions inside a building to help inform design decisions that lead to healthier and more productive indoor environments. It will be possible in the future to link daylight to student test scores, air quality to patient outcomes, and enhanced filtration in senior living facilities to lower hospitalization rates.
- Ensuring quality through digital twins. Virtual replicas of a planned building and its programming based on quantitative and qualitative metrics, digital twins will allow us to measure things we thought to be immeasurable — much the same way Major League Baseball teams are able to quantify defensive metrics by tracking the ball and the player with cameras.

We will be able to measure and link design decisions not only to building performance but also to the movements and collaboration of its occupants, helping to ensure a building enables — and even fosters — collaboration before design begins.

Steps to Equity

To reach a future that is more diverse, more equitable, interconnected, and has buildings that positively affect communities near and far, we need to take concrete actions and be unyielding in our commitment. This is a big challenge for us as a firm and certainly for the AEC industry. But by identifying critical steps along this path and starting on the journey, we can be successful in reaching an equitable destination. These steps include:

1. Expanding our awareness of unintentional bias. We can talk all we want about improving our own diversity, but we will never reach the desired outcome if we do not first overcome our unintentional biases. Making everyone aware of their biases and trying to minimize them will provide a solid foundation for building staff diversity and helping to ensure all our employees feel welcome, appreciated, and valued.

2. Encouraging diversity outside of our firms. Engage in partnerships with minority students, schools, and universities.

Work side by side with youth from disadvantaged and racially diverse backgrounds and start to understand their perspectives. Such early exposure could lead many of these students to a career in architecture or engineering, or into the trades, whose knowledge and skills build and operate our buildings and communities.

3. Making the health and social equity impacts of our buildings more tangible. Use data analytics to make the quantitative connections that encourage investments that improve communities in addition to the bottom line. Commit to communicating these metrics to clients and the public to encourage others to join in this mission.

4. Tracking impact. Measure success within your firm and in the greater community in which your projects exist. Track the quantitative metrics, but also listen to the qualitative responses to your actions. Engage your clients on this mission so that they can share in the goal to create a better, more equitable built environment.

If all of us in the design and construction industry take similar steps, we can evolve our mission as a group yet again, this time for the greater good, and move the needle on the spectrum of responsibility to help ensure more just and equitable communities for all.

Paul VanDuyne, PE, is President and CEO of IMEG Corp., a leading U.S.-based engineering design and consulting firm. Paul is an active industry leader and drives the firm's business objectives for growth, performance, industry collaboration, and staff development. He is a member of the Design Futures Council, NSPE, IES, and AEE, and serves on IMEG's Board of Directors. Additionally, Paul is a member of both Strategic Coach and Chief Executive Network and has served as chairman and board member of multiple not-for-profits, currently serving as vice chairperson for Palmer College of Chiropractic's Board of Trustees.

Mike Lawless, PE, FPE, LEED AP, is Director of Innovation for IMEG Corp. He is responsible for leading the strategic vision, development, implementation, and promotion of all innovation initiatives related to transformational changes in the construction industry.

Adam McMillen, PE, LEED AP BD+C, is Director of Sustainability for IMEG Corp. He leads the firm's high-performance building design and project sustainability efforts and builds industry relationships that positively impact the built environment.