



National Institute of  
**BUILDING SCIENCES™**

# 2021

**Annual Report**  
to the President  
of the United States

Innovative Solutions for the Built Environment

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Dear Mr. President:

On behalf of the National Institute of Building Sciences, it is an honor to provide you with this Annual Report to the President of the United States. The report highlights our work to improve the safety, performance, and resilience of the nation's buildings and communities; enable innovation across the industry; and ensure a competent and vibrant workforce.

Remaining true to the objectives in our enabling legislation, NIBS convenes the leaders of our industry to look to the future, and build alignment on those topics challenging our future so we may ensure our built environment enables the economic and social vitality of the United States.

NIBS establishes performance criteria, standards and other technical provisions to maintain life, safety, health, and public welfare. We develop recommendations suitable for adoption by the jurisdictions and agencies that regulate buildings, including test methods and other evaluative techniques relating to building systems, subsystems, components, products, and materials with due regard for addressing consumer problems.

Our eight volunteer bodies – the Building Enclosure Technology and Environment Council, Building Information Management Council, Building Seismic Safety Council, Consultative Council, Facility Management and Operations Council, Off-Site Construction Council, Multi-Hazard Mitigation Council, and Whole Building Design Guide Workgroup – engage with private organizations, institutions, agencies and federal, state, and local government entities, giving attention to the development of methods that encourage representation from all sectors of the economy, ensuring national interests are protected and promoted for the best results.

In 2021, as the world continued to adjust to new rules for engagement, we maintained the development of tools to help the industry evolve as we have become more reliant than ever on innovative technology to advance our mission.

We take our job very seriously.

Our members include the builders and tradespeople, who continue constructing and renovating homes, office buildings, and infrastructure, despite current and ongoing pandemic challenges. We represent building owners, property managers and agencies, who have adapted their properties to meet the needs of consumers. We also represent code officials, facilities managers, and operations personnel, who monitor and keep our built environment up-to-date on safety and standards every single day.

Last year was a year of building resilience for the industry. Building on the previous year's foundation at the start of the pandemic with the Building Industry COVID-19 Resource Hub on the Whole Building Design Guide website and our Consultative Council's series of COVID-19 virtual town halls, NIBS launched the Resilience 2021 webinar series.

Resilience 2021 received more registrations than any other series that we've hosted. Those 10 sessions covered a broad range of material, including the environmental costs of remote work, mitigating damage from tornados and hurricanes, rising sea levels and flooding mitigation, seismic functional recovery and community resilience, and building resilience through building information modeling.

Mr. President, your passage of the Infrastructure Investment and Jobs Act will help the nation and its communities place much-needed federal aid toward broadband access, clean water, electric grid renewal, highways, highway safety programs, and transit programs.

To that end, we created the Infrastructure 2022 series to cover transportation infrastructure and how this affects daily commutes, goods and supply chain challenges, lifelines and access to high-speed networks, and preparedness and mitigating the climate crisis. This quarterly webinar series sponsored by our Consultative Council comprises leaders from professional, trade and owner organizations representing the entirety of the industry dedicated to our built environment.

In addition to infrastructure, existing buildings are a key asset to the nation with more than 5.6 million commercial buildings and 118 million housing units in the United States.

But as the needs of society shift, policymakers, building tenants and owners place increased emphasis on revitalizing and retrofitting our buildings for improved performance, including sustainability, health and resilience.

Supporting innovation is a key goal of the U.S. National Building Information Management Program that NIBS launched in 2021. With participation from federal and state agencies and private sector owners and practitioners, the program aims to efficiently advance digital practices and standards to deliver and operate buildings and infrastructure.

To effectively execute retrofit measures and the ongoing operations and maintenance of buildings and infrastructure, the nation requires a properly trained workforce. We continue to support the development of the built environment workforce to make sure they are skilled and able to perform their jobs.

Also in 2021, we expanded awareness of the social equity issues in this country by conducting a Built Environment Social Equity Survey that collected the input from thousands working across the built environment. Among the results: 43% of employed/working respondents indicated their company has a dedicated program or initiative to diversity, equity and inclusion; and 65% of employees indicated it is important or extremely important to increase diversity of the built environment.

Clearly, there's more work to be done. NIBS maintains its commitment to diversity, social equity, and inclusion. We secured a number of signatures from leaders committed to supporting efforts to improving diversity of those in the built environment. The primary goals that CEOs agreed to include building diverse staff and volunteer leadership teams in their own organizations, sharing their best practices, and promoting this work with their organization's membership.

At the end of this report, you will find the 2021 Moving Forward Report: Findings and Recommendations from the Consultative Council, which further breaks down diversity challenges and social inequality and the enormous work that lies ahead for the building industry. It is our hope the Moving Forward report will initiate a broader discussion to shape the future of the industry and its workforce.

Thank you for this opportunity to share our work with you.



*Anne Ellis*

**Anne Ellis, P.E., HON.M.ACI, F.ASCE, NAC**  
Chair, Board of Directors  
National Institute of Building Sciences



*Stephen Ayers*

**Hon. Stephen T. Ayers, FAIA, NAC, CCM, LEED AP**  
Interim Chief Executive Officer  
National Institute of Building Sciences

# ABOUT NIBS

## About NIBS

Forty-eight years ago, the U.S. Congress established the National Institute of Building Sciences in the Housing and Community Development Act of 1974, Public Law 93-383.

Congress recognized the need for an organization to serve as an interface between government and the private sector – one that brings together local, state, and federal representatives, the professions, industry, and labor and consumer interests by supporting advances in building science and technology to improve the nation's built environment.

NIBS leads conversations to ensure our buildings and communities remain safe, and we work to seek consensus solutions to mutual problems of concern.



### Vision

Improving lives through collaboration to integrate science into the built environment.



### Mission

To serve the public interest by advancing building science and technology to improve the built environment.

NIBS represents an industry that has more than **733,000 employers\*** and creates over **7.56 million\*\* construction jobs**, as of December 2021. Each year, the industry creates nearly **\$1.4 trillion worth of structures.**



NIBS is a 501(c)(3) non-profit organization that conducts research, establishes performance criteria, standards and other technical provisions to maintain life safety, health and public welfare. NIBS' work is supported through membership, contributions, events, and government and private sector contracts.

\* <https://www.agc.org/learn/construction-data>

\*\* <https://www.bls.gov/iag/tgs/iag23.htm>

## Strategic Plan

The NIBS Board of Directors developed a three-year strategic plan to help guide the organization through September 2022. Early this year, the Board began the process to create a new strategic plan.

Board approval of a new plan is expected this fall.

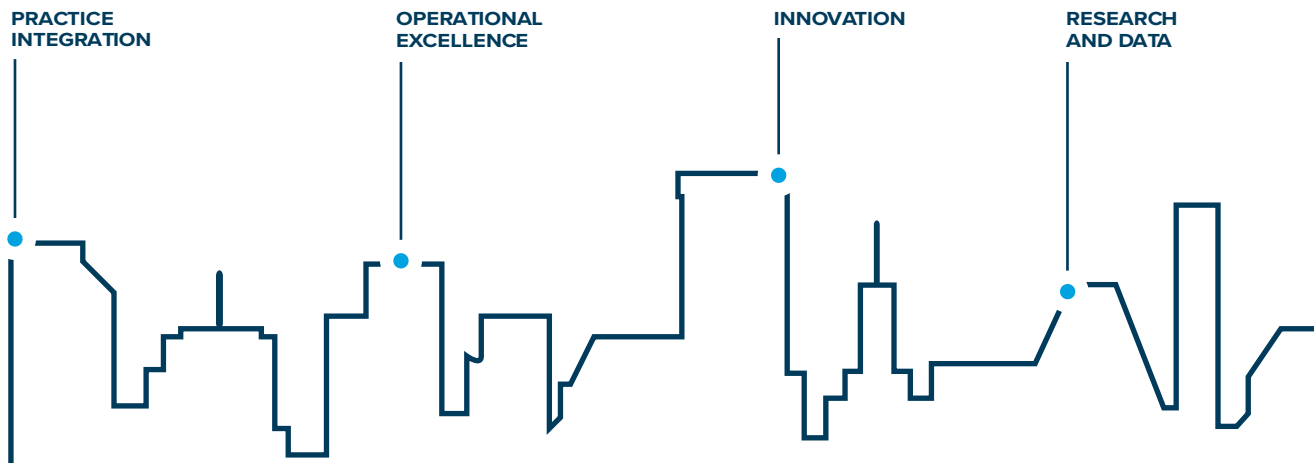
As it stands now, the current plan includes four major categories, each with a separate goal and multiple objectives to achieve maximum impact on the built environment. These categories include practice integration, operational excellence, innovation, and research and data.

The goal of practice integration is to facilitate cooperation across industry segments to integrate science and technology into the built environment. This will require fostering collaboration among influential people, public and private organizations, industry associations, academic institutions, and federal agencies, including policy makers and thought leaders. It also requires a partnership strategy that fosters engagement with our stakeholders.

Under operational excellence, NIBS aims to enhance organizational norms and expectations to drive efficiency and effectiveness. The approach is four-pronged: diversifying the organization’s business model; enhancing communication of outcomes, impact and value to increase awareness and adoption of innovative solutions; evaluating our programs to maximize stakeholder engagement and perceived value; and validating and enhancing a pricing strategy for products and services.

With regard to innovation, the goal is to foster new ways to deliver solutions for those who work, manage, and drive performance and sustainability in the built environment. The keys to this innovation involve advancing ideas within the building industry through solution-driven research. Reinvigorating our councils to serve as centers of innovation also is a crucial step in this part of the strategic plan.

Finally, the best research leverages evidence and information to advance the national dialogue on building sciences and technology. Successfully sharing research requires translating data to support the application of research findings within the built environment and developing and promoting research that supports science and technology. This strategic plan allows NIBS to achieve broader recognition as a trusted, unbiased convener of government and industry officials to come together as partners. NIBS also will achieve greater balance: A diversified and balanced portfolio of programs, products and services and sustainable business model that provides flexibility for the organization to carry out mission-driven activities.

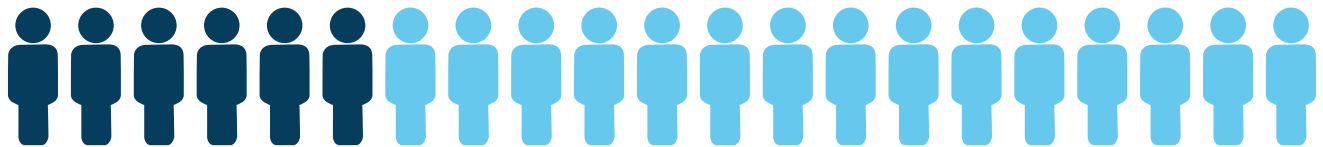




## Board of Directors

The National Institute of Building Sciences Board of Directors has up to 21 members. The President of the United States, with the advice and consent of the U.S. Senate, appoints six members to represent the public interest. The remaining 15 members are elected from the nation’s building community and include both public interest representatives and industry voices. A majority of board members is required by the authorizing legislation to be in the public interest category.

In 2021, we welcomed to the board three new members and four Presidential appointees whose term began October 1.



### CHAIR

Anne Ellis, PE, FAcI, F.ASCE, NAC  
Charles Pankow Foundation, McLean, VA

Paul R. Bertram, Jr., FCSI, CDT, LEED AP, BD+C  
PRB Connect, Casselberry, FL

### VICE CHAIR

Thomas H. Phoenix, Sr., PE, FASHRAE, LEED-AP  
Mechanical Contractors Inc., Greensboro, NC

Fiona Cousins, PE, FCIBSE, LEED FELLOW  
ARUP, New York, NY

Evelyn Fujimoto, Associate AIA, LEED AP, NCIDQ, RID  
STG Design, Austin, TX

### TREASURER

Darrell X. Rounds, FMA, CEM  
General Motors Company, Warren, MI

Brian E. Garbecki, PE, LEED AP  
Gilbane Building Company, Boston, MA

### SECRETARY

Charlie (Chuck) D. Curlin, JR., PE, CEM, CPD  
Shultz Engineering Group, Charlotte, NC

William “Bill” Holloway, AIA, LEED AP  
Bernardon, Wilmington, DE

Kimberly L. Jones, PhD, BCEE, F. AEESP  
College of Engineering and Architecture, Howard  
University, Washington, DC

### MEMBERS

Sandra K. Benson  
Procore Technologies, Atlanta, GA

Russell Manning, PhD, LEED AP, CEFP, CRL  
International Code Council, Denver, CO

Lane J. Beougher, FAIA, FCSI, LEED AP BD+C  
Ohio Facilities Construction Commission, Columbus,  
OH

Scott A. McDonald, CPM, CBO  
City of Denton, Dept. of Development Services, Denton,  
TX

# ABOUT NIBS

Daniel E. Nichols, PE, IAAI-FIT  
State of New York's Metropolitan Transportation  
Authority, Hyde Park, NY

Sez Atamturktur Russcher  
School of Engineering, Penn State University,  
University Park, PA

Lori Peek, PhD  
Natural Hazards Center and Department of Sociology,  
University of Colorado Boulder, Boulder, CO

Dominic Sims  
International Code Council, Birmingham, AL



*NIBS staff holiday lunch at Truluck's in DC.*

## NIBS Staff

### EXECUTIVE OFFICE

The Hon. Stephen T. Ayers, FAIA, NAC, CCM, LEED AP, Interim President and CEO

Jennifer Hitzke, Manager, Executive Office, Board and Volunteer Relations

### ADMINISTRATION

Rebecca Liko, Vice President, Finance and Controller

Jeanne Woodhouse, Accounting Manager

Vlad Mitrofanov, Finance Manager

Beverly Taridona, Vice President, Corporate and Foundation Relations

Sarah Swango, Senior Director, Membership and Development

Kristen Petersen, Managing Director, Marketing and Communications

Christine Cube, Social Media and PR Manager

Ana Valentín, Graphic Designer

Martha A. Smith, Receptionist and Office Manager

### TECHNICAL PROGRAMS

Roger J. Grant, FbSI, Executive Director, BIM

Jiqui “JQ” Yuan, PhD, PE, PMP, Executive Director, MMC and BSSC

Stephanie Stubbs, Assoc. AIA, PMP, Managing Director, Technical Solutions

Dominique Fernandez, Program Director

Kyle Barry, PMP, Director, Technical Solutions

Jay Kline, PE, LC, BIM Manager

Chelsea Kline, BIM Manager

Omar Martinez, BIM Manager

Stephanie Sneary, BIM Manager

Zoe Maymon, BIM Data Analyst

Mira Papinova, Project Manager

Robbie Johnson, Project Manager, Building Energy and Resilience

Bob Payn, Senior Director, Information Technology

Ben Nolan, Web Manager

DeeDee Banks, Web Production Specialist

Kelly Lloyd, Web Content and Criteria Manager



# NIBS MEMBERSHIP

## Membership Overview

Sometimes, it just takes joining the right network of professionals.

The National Institute of Building Sciences serves the public interest by advancing science and technology to improve the built environment.

Our members are building industry professionals – representatives of academia, non-profit associations, local, state and federal government, and the public and private sectors. These are the individuals we serve, and they are critical to our work.

Members develop and implement technical and procedural improvements through collaboration on our councils, events, and programs. This allows our members to effectively tackle the challenges faced in the built environment.

In 2021, NIBS launched #ThisIsNIBS, a membership campaign to raise awareness, attract and recruit individual and organizational members, and engage members who support our mission and success.

#ThisIsNIBS featured testimonial videos by members sharing their favorite part about being in our community. With this campaign launch, we saw a membership revenue increase of 72% over the previous year.

Membership with NIBS provides individuals and organizations with the opportunity to engage, collaborate, and network with other building industry professionals. This takes place through the events, educational opportunities, and the NIBS Engage platform.

NIBS offers three different individual membership packages and two different organizational member packages, offering a membership level that will suit any interested individual or organization seeking membership with our organization representing all aspects of the built environment.



## Organization Members

Membership provides access, at an individual or organizational level, to weigh in on member projects that shape our future. Organizational members often have multiple individuals, representing a variety of job roles, participating in NIBS councils.

### UNLIMITED MEMBER ORGANIZATIONS

Unlimited Organizational Membership is for organizations seeking unlimited access for their employees to participate in NIBS communities.

American Institute of Architects  
 FM Global  
 Gilbane  
 National Institutes of Health

Ohio Facilities Construction Commission  
 U.S. Department of State  
 U.S. Department of Veterans Affairs

### MEMBER ORGANIZATIONS

84 Lumber  
 AABC Commissioning Group (ACG)  
 American Institute of Steel Construction  
 American Iron & Steel Institute  
 American Wood Council  
 APA - The Engineered Wood Association  
 Architect of the Capitol  
 Armatherm  
 ASHRAE  
 Autodesk  
 BOMA International  
 BSI Group America, Inc.  
 Charles Pankow Foundation  
 College of Built Environments at the U of Washington  
 Compass Datacenters  
 Component Assembly Systems  
 Concrete Masonry Association of California and Nevada  
 Connex  
 Construction Specifications Institute  
 Dell Technologies  
 Design-Build Institute of America  
 Façade Tectonics Institute  
 Federal Aviation Administration  
 Fishbeck  
 General Motors Company

General Services Administration  
 Green Building Initiative  
 IIBEC  
 Insurance Information Institute  
 Insurance Institute for Business & Home Safety  
 International Association of Plumbing and Mechanical Officials  
 International Code Council, Inc.  
 McDonough Bolyard Peck, Inc.  
 MOD X  
 Modular Building Institute  
 National Association of Home Builders  
 National Fire Protection Association  
 National Ready Mixed Concrete Association  
 National Building Museum  
 New Horizons Foundation  
 NCSEA  
 NOAA  
 Onuma, Inc.  
 The Pew Charitable Trusts  
 Precast/Prestressed Concrete Institute  
 Procore Technologies, Inc.  
 Professional Roof Consultants, Inc.  
 RICS  
 SpacelQ

STG Design  
 Structural Engineers Association of California  
 Testing, Adjusting, and Balancing Bureau  
 Total Systems Commissioning, Inc.  
 Tremco Construction Products Group

U.S. Army Corps of Engineers  
 U.S. General Services Administration  
 U.S. Green Building Council  
 U.S. Resiliency Council  
 Vega Architecture

## Organization Spotlight

### Ohio Facilities Construction Commission

The Ohio Facilities Construction Commission (OFCC) is a state government agency that oversees capital projects undertaken by state agencies and state-supported institutions of higher education. In addition, we manage Ohio's comprehensive public primary and secondary school construction and renovation program. Our agency is responsible for bringing consistency to procurement standards and documents, and project delivery methods.

We became an unlimited organizational member with NIBS so that every employee could take advantage of the vast networking, professional development, and research resources that NIBS offers. As a state agency, we rely on NIBS' standing as an independent source of expertise in the built environment.

Under OFCC's school building program, Ohio has become a world leader in LEED-certified K-12 and careertech school buildings. OFCC led implementation of numerous energy performance contracts at our state's institutional campuses with investment of more than \$37 million in energy conservation measures and savings in the hundreds of millions of dollars. NIBS' development of a building envelope commissioning standard has been leveraged by OFCC to further advance and integrate building science into the facilities we construct.

A senior member of our team, Lane Beougher, has served on the NIBS Board of Directors for five years, served as board liaison to the BIM Council board of direction, and participated in the project committees for the National CAD Standard and the U.S. National BIM Standard.

The opportunity for more of our staff to participate in NIBS communities is an invaluable benefit of the unlimited organizational membership.

**Cheryl J. Lyman, Executive Director, Ohio Facilities Construction Commission**



# INDUSTRY SOLUTIONS

- Solutions for Natural Hazards
- Technology and Strategies to Create Efficiency
- Building our Workforce





## Solutions for Natural Hazards

In January 2021, The New York Times reported a [new U.S. strategy that would quickly free billions in climate funds](#) – up to \$10 billion that could be funneled into preventing climate disasters.

NYT reporter Christopher Flavelle wrote about how the Biden administration aimed to overhaul climate policy, making available the funds with the Federal Emergency Management Agency.

“It would dwarf all previous grant programs of its kind,” said Daniel Kaniewski, a former deputy administrator with FEMA and managing director with Marsh & McLennan Companies, in the NYT piece, which quoted research from NIBS’ Natural Hazard Mitigation Saves report. Kaniewski chairs the Multi-Hazard Mitigation Council’s Committee on Finance, Insurance and Real Estate (CFIRE).

According to the story, the “FEMA plan would use a budgeting maneuver to repurpose a portion of the agency’s overall disaster spending toward projects designed to protect against damage from climate disasters.”

### The New Funding is Much Needed

Fast Company reported in January 2021 that [billion-dollar natural disasters hit the United States a record 22 times in 2020](#).

This was six more disasters than any previous year, the National Oceanic and Atmospheric Administration announced.

“Such disasters affect millions of Americans and are particularly devastating for low-income communities and communities of color,” the Fast Company story stated. “They destroy homes, schools, and businesses. They put lives at risk.”

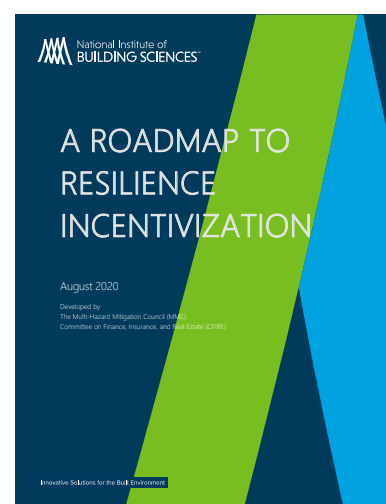
The story continues: The “National Institute of Building Sciences estimates that updating and improving building codes alone could save \$4 for every \$1 spent and create 87,000 new jobs. Similarly, reforming land use and zoning rules can help avoid putting families at risk. An estimated 41 million Americans currently live in homes at risk of flooding and millions more are at risk from wildfires.”

### Building a Roadmap for Incentivization

In 2020, CFIRE published [A Roadmap to Resilience Incentivization](#), which calls for public and private incentives for owners of buildings and other infrastructure to facilitate the upgrade of existing structures and better design of new ones.

Through this report, NIBS issued a call to the industry for the incentivizing of more resilient buildings, advocating for strategic collaboration across the building science, finance, insurance and real estate industries.

At the end of 2021, Multi-Hazard Mitigation Council (MMC) and NIBS leadership met with FEMA Administrator Deanne Criswell and her team to discuss continued partnership and mutual interests, as well as share information about MMC initiatives, including the TurboGrants portal and CFIRE’s Resilience Incentivization.



In related news, NIBS continues to provide FEMA with independent panels of technical or scientific experts, called Scientific Resolution Panels (SRPs), to review data submitted by community officials that tends to negate or contradict the information upon which FEMA has based proposed changes to Base Flood Elevations (BFEs) and Special Flood Hazard Areas (SFHAs). SRPs are comprised of experts in hydrology, hydraulics, and other pertinent sciences, as they apply to the development of Flood Insurance Rate Maps utilized for the National Flood Insurance Program (NFIP).

## Community Resources to Prepare for Risk

For its part, the federal government has stepped up its efforts, with initiatives such as FEMA's Building Resilient Infrastructure and Communities (BRIC) program, the U.S. Department of Housing and Urban Development's Community Development Block Grant Mitigation (CDBG-MIT), and many other programs administered by federal agencies.

While communities rely on these sources to better prepare for risk, they also face many challenges and obstacles, especially in marginalized communities. For example, understaffed/small communities may not be aware of the existence of these grant programs. And for many of the programs, the eligibility standards are broad and not always helpful when communities try to determine the funding source that might best serve them. Often, there are complex technical barriers, such as conducting benefit cost analyses to be eligible to apply.

A U.S. Government Accountability Office (GAO) resilience study stated that between 2010 and 2018, 88% of FEMA hazard mitigation grant funding was awarded after disasters struck, while 12% was used for pre-disaster grant programs. Sixty-six percent of these funds went to just three states: New Jersey, New York, and Texas. Ten out of the 12 state and local officials interviewed by the GAO described the grant application process as complex and lengthy.

## Helping Underserved Communities

To help the process of disaster resilience, the MMC carried out a national survey on streamlining hazard mitigation grants, surveying more than 400 emergency management professionals in 48 states.

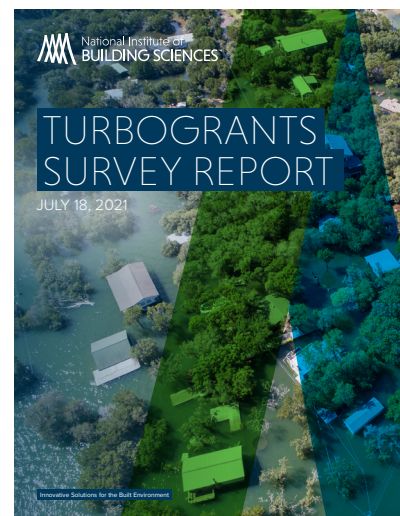
The MMC's [TurboGrants Report](#) shares insights on current practices and barriers to applying for mitigation grants, the need for tools and assistance to align the grants programs with communities' demands, how to support underserved communities including using Census and Social Vulnerability Index data in decision-making, and streamlining the application process across government agencies.

## Case Study: Oregon's Seismically Resilient Runway

In 2021, Oregon took on its own analysis to review the value of mitigation investment.

NIBS found that a seismically resilient runway to serve Portland International Airport (PDX) ultimately would save \$50 for every \$1 spent on mitigation. Oregon could experience a magnitude-8.7 or larger earthquake within 50 years, and the benefits of a seismically resilient runway would broadly be shared by agencies in and around the Portland area.

"A resilient runway helps everyone in the region," said Keith Porter, principal of SPA Risk LLC and lead investigator for the PDX case study by the MMC. "It helps those whose buildings might be damaged and may need safety evaluation. It also will provide a more stable economy and connection to the outside world."



## Reducing the Risks From Future Earthquakes

In 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act, (Public Law 95-124, as amended), establishing the National Earthquake Hazards Reduction Program (NEHRP) "to reduce the risks of life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program."

This act authorized NEHRP funding for four designated federal agencies: Federal Emergency Management Agency, U.S. Geological Survey, National Science Foundation, and National Institute of Standards and Technology.

A series of publications – the NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (NEHRP Provisions), which is developed by the BSSC – is among the most important NEHRP products. In February 2021, the NIBS Building Seismic Safety Council (BSSC) produced a retrospective report – [The Role of the NEHRP Recommended Seismic Provisions in the Development of Nationwide Seismic Building Code Regulations: A](#)



### The Role of the NEHRP Recommended Seismic Provisions in the Development of Nationwide Seismic Building Code Regulations: A Thirty-Five-Year Retrospective

FEMA P-2156 / February 2021



**35-Year Retrospective.** This document captures the history of the NEHRP Provisions and the many great benefits it has introduced.

## Celebrating 40 Years of the NEHRP Provisions

BSSC has coordinated the efforts of federal agencies, the building industry, and thousands of subject matter experts to develop this resource, which serves as the foundation of the nation’s seismic standards and model building codes. Last spring, the council celebrated the completion of the 10th edition of the NEHRP Recommended Seismic Provisions.

During the celebration, the BSSC recognized individuals and organizations that have provided significant leadership to BSSC’s mission of enhancing public safety by fostering improved seismic planning, design, construction and regulation in the building community. The BSSC Leadership Awards recipients include Senator Dianne Feinstein, FEMA National Earthquake Hazards Reduction Program (Edward Laatsch, Michael Mahoney, Mai Tong), James Harris, Loring Wyllie, Jr., Williams Holmes, Ronald Hamburger, and David Bonneville. The BSSC also recognized individuals who have made a significant difference in advancing seismic design and construction over the past 40 years, and the BSSC Excellence Award recipients include Robert Bachman, Kelly Cobeen, C.B. Crouse, Daniel Dolan, S.K. Ghosh, John Gillengerten, Joe Hunt, Charles Kircher, E.V. Leyendecker, Philip Line and Harry Martin.

## Design Examples and Kicking Off the 2026 NEHRP Provisions

By the end of 2021, the BSSC developed the 2020 NEHRP Provisions: [Design Examples](#), [Training Materials](#), and [Design Flow Charts](#). These were developed to illustrate and explain the applications of the 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-2082), ASCE/SEI 7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures, and the material design standards. The council also put together an 11-webinar series around the Design Examples that began in 2022.

Also late in 2021, BSSC kicked off the 2026 NEHRP Provisions Development, which will include important topics like develop framework for functional recovery and seismic resilience-based design.

**2020 NEHRP Recommended Seismic Provisions: Design Examples, Training Materials, and Design Flow Charts**

FEMA P-2192-V3/November 2021

Volume III: Design Flow Charts




## Technology and Strategies to Create Efficiency

A study released February 2022, by market research company Global Industry Analysts Inc. and titled [Prefabricated Buildings - Global Market Trajectory & Analytics](#), reports new information on opportunities and challenges in today's marketplace.

According to GIA, the global prefabricated buildings market is expected to reach \$153.7 billion by 2026. The U.S. market is estimated to reach \$21.2 billion in 2022.

### Toolkit: Manufactured Housing Construction Guide

In 2021, NIBS co-authored with ICC NTA, LLC, a toolkit for developing real estate projects for Fannie Mae called "[Manufactured Housing Construction Guide: MH Advantage Eligible Subdivisions.](#)"

The toolkit provides an overview of the manufacturing process, outlines each step in the planning and construction of MH-Advantage-eligible subdivisions, explains the regulations that govern manufactured housing, and provides essential resources for lenders, developers, and other stakeholders. The toolkit was designed to help builders and developers target prospective building sites, expedite projects while reducing costs, and mitigate the challenges unique to manufactured housing.

### Projects for the General Services Administration

Last year, NIBS worked on a number of projects used by the U.S. General Services Administration to help the agency, its regional divisions, tenants in federal buildings, and its myriad A/E contractors understand and manage the costs of designing and operating federal buildings across their lifecycle. The cost-study projects for the year centered on updating the National Cost Management Tool (NCMT) used for planning, estimating, tracking and reconciliation; developing project benchmarking tools; and refining the agency-wide cost study for Federal medical facilities.

The GSA POE Program conducts a series of post-occupancy evaluations on six to seven GSA-owned buildings per year to enable the agency to improve design, construction, and operations for the federal building stock. Using a multidisciplinary team of subject matter experts, NIBS leads the POE team in the evaluation of in-use buildings and their surrounding sites, in terms of structural, mechanical, architectural, interior, and lighting and energy performance.

COVID-19 restrictions severely limited access to federal buildings in 2021, however, the team was able to conduct two evaluations during “lulls” in the virus’s surges. In these evaluations, SMEs collect firsthand data through direct observations and on-site interviews to determine how an existing GSA facility actually is functioning.

## The GSA Streamlining Policy Project

A series of intensive workshops with the GSA brings together representatives from GSA’s national and regional leadership with the building industry’s top subject matter experts to share knowledge and best practices on topics of immediate concern.

GSA’s sixth annual Streamlining Policy workshop, themed “Ramping Up the Speed of Project Delivery: Resources—Process—Tools” took place in May as an all-virtual forum in the midst of the COVID-19 pandemic.

The three, three-hour workshops centered on:

- Aligning Program Development with Resources: What Does Your Agency Do Right?
- Aligning the Processes and Managing Resources: Can We Acquire Better, Faster, Cheaper?
- Tools to Leverage Technology into Operations: Are We There Yet?

In related news, GSA hired NIBS’ team of subject matter experts to deliver workshops on two of an eight-module series of Building Enclosure Commissioning (BECx) workshops.

The series of workshops will lead to a certificate, developed in cooperation with ASTM International and the International Institute of Building Enclosure Consultants (IIBEC, formerly RCI). More than 200 GSA employees participated in the two two-hour BECx workshops.

## Supporting Military Healthcare Facilities

In 2021, NIBS assisted the U.S. Department of Defense, Defense Health Agency to maintain a medically ready force by supporting facility lifecycle management initiatives that prioritize enhancements of its military healthcare facilities.

NIBS works with DHA to continually assess metrics that have a financial impact in the construction and operating of its facilities. NIBS provides valuable analysis related to investing in facilities. This analysis is used to influence and model capital investment decisions to fulfill operational excellence within the DHA Facility Enterprise division.

NIBS also continues to support DHA programs that address challenges posed by the continued pandemic. Using technical expertise and valuable data analysis tools, DHA has received refined facility budget cost models of real property portfolio. NIBS provided guidance to DHA on proposing the framework of the CIDM 6.5 (Capital Improvement Decision Model) process.

Additionally, our experts produced recommendations in the areas of space planning of facilities, which led to strategic policies to produce a minimal viable clinic space. In 2022, NIBS will continue working on newly-awarded task orders that facilitate DHA’s initiative to share data with other federal agencies and consider lifecycle

management principles in sustaining and maintaining medical facilities.

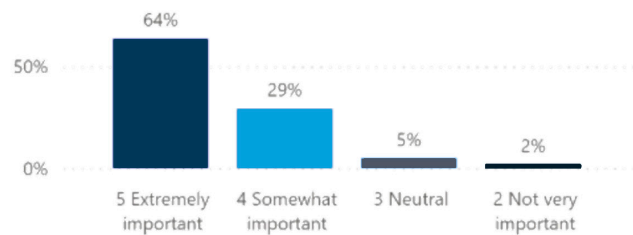
## Supporting Computer-Aided Design and Building Information Modeling Standards

The NIBS Building Information Management Council continued to support the national computer-aided design (CAD) and building information modeling (BIM) standards – the United States National CAD Standard® (NCS) and National BIM Standard–United States® (NBIMS-US™).

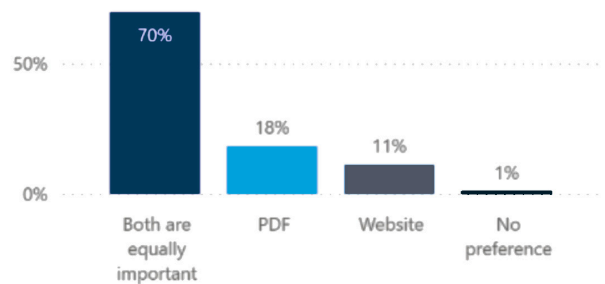
In June, the council sent out a publishing survey to members and industry to determine the preferred format for publishing the next version of the NBIMS-US and how users will consume the standard. The main takeaways from respondents were:

- A National BIM Standard that will be easy to use and accessible
- Ability to easily reference individual sections and lines for accuracy
- A product in a web-based and downloadable PDF format
- A final product that could be accessible by mobile device as a convenience rather than a requirement

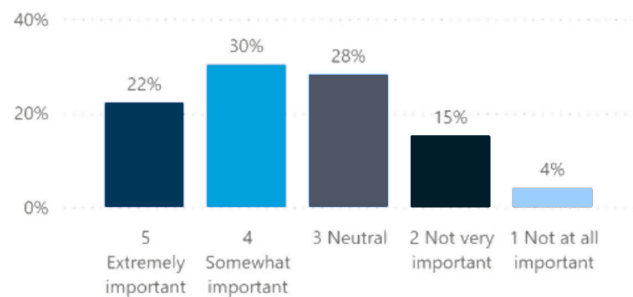
**REFERENCING THE STANDARD: How important is the ability to easily reference sections/lines of the Standard?**



**FORMAT: What is your preferred format?**



**MOBILITY: How important is it to have access to the standard from your mobile device?**



## The Next Edition of NBIMS

The challenges driving the NBIMS-US effort since its inception are the issues around information management in a fragmented networked industry. Emerging database technology, such as BIM, enable designers, contractor, and owners to create and exchange information in unprecedented ways. However, to implement these technologies in practice the construction industry needs to be able to specify the data structure and content as well as establish coordination processes and practices across the industry network. This is where the standard plays a role – to create standard data requirement specifications and structures for BIM uses and information exchange.

The BIM Council's NBIMS-US Planning Committee (PLC) continued to oversee the development of the next edition of the NBIMS with workgroups addressing core content (Core BIM requirements, construction to facility management handover (COBie), BIM Uses, BIM Execution Plans and Information Exchanges).

The modules are slated to be released during the summer of 2022, as part of the next edition of the NBIMS-US™ V4. In early 2021, the BIM Council chair and vice chair published their vision and goals for the next version of the standard in the [NIBS Quarterly Connection](#).

## Reorganizing and Updating the National CAD Standard

The BIM Council National CAD Standard (NCS) Steering Committee worked on the reorganization and update of the next edition of the NCS. The aim is to help make the constituent source documents a unified standard and make presentation of the content easier to understand and read. An example: Clarifying normative requirements for NCS compliance and differentiating from optional recommended practices.

With the support of a consultant, the NCS Steering Committee edited and, in some cases, rewrote sections that discussed technology to bring current and remove outdated practices and references. The committee anticipates completing the update of the standard by early 2022 and ballot major changes in the spring with a view to deliver the new version of the standard by late summer 2022.

While the next version of the two standards continue to be developed, the BIM Council continues to push for the development of a complimentary U.S. National BIM Program, working with representatives of leading owners, AEC professional firms, industry organizations, and academia.

With ASHRAE, NIBS is developing a new ASHRAE/ANSI Standard on Building Information Management for Owners based on the NIBS National BIM Guide for Owners. NIBS and ASHRAE are also collaborating on U.S. review and adoption of ISO standards for building information management.

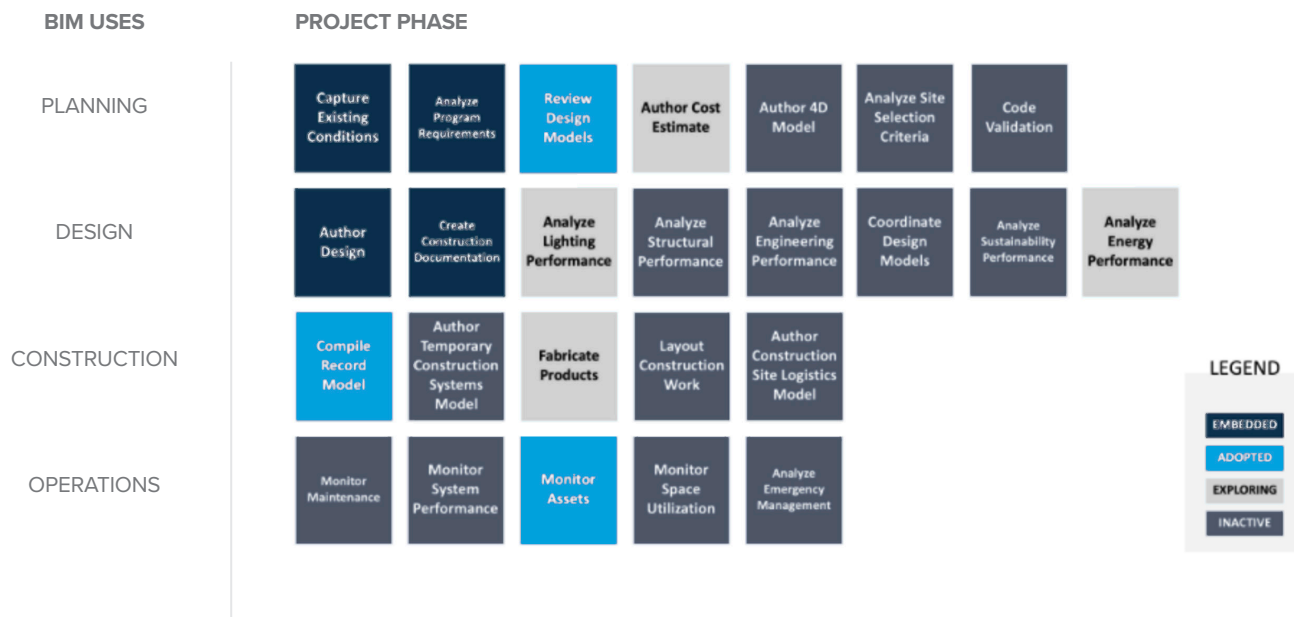
## The Department of State OBO BIM Roadmap

NIBS continued work on the multi-year project with the U.S. Department of State Bureau of Overseas Building Operations (OBO) Building Information Management and Digital Design Review Roadmap Program. NIBS continued to develop and implement integrated workflows for using BIM in space and facility planning, standards and criteria updating, design development and review, existing conditions modeling, and asset management.

In addition to data management support, the team worked with OBO to revise and update OBO BIM requirements; evaluate design and construction standards including holding workshops with other federal agencies through the Whole Building Design Guide Steering Committee and international allied partners from Canada and the United Kingdom; continue to expand and update space plan modules and groups; conduct project BIM submittal reviews; complete a study of record modeling practices for existing and historic buildings; and address the capture and management of facility data.



NIBS will continue to support implementation of existing BIM uses and supporting information systems, while helping OBO develop new uses and supporting data following the OBO BIM Roadmap for related design, specification, construction and operations phase uses, as shown in the OBO BIM Uses plan.



## Advisory Support of BIM for Infrastructure

NIBS provided another year of advisory support on bridge model standardization to the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Bridges and Structures (SCOBs) Technical Committee on Technology and Software (T-19) for a BIM for Bridges pooled fund project (TPF5-372).

NIBS continues to develop and deploy BIM for design and construction of bridges. In support of expanding from bridges to roads, NIBS participated in deployment activities for the Federal Highway Administration Global Benchmarking Study on BIM for Infrastructure.

## ProjNet™ Migration Into the SE Azure Platform

ProjNet™ is the secure, integrated, Internet-based suite of construction design, communication and database tools that enables owners to better manage design review through improved document exchange and examination, inquiry, comment, record storage and issue resolution among all authorized project business partners. With unparalleled security, the platform helps owners to organize and centralize critical design documents and information as well as improve design review communications among all project stakeholders.

This streamlined real time communication means that the job of each partner is made easier. Contractors, suppliers, AE firms, consultants and other authorized business partners benefit from on-demand live access to the most up to date documents and decisions.

In 2021, ProjNet.net began its migration into the SE-Azure cloud service provider owned and maintained by the U.S. Department of State. Roles and responsibilities between NIBS as the distributor of ProjNet™, OM Group, subcontractor to NIBS, as the primary support entity for operations and maintenance for ProjNet™, Department of

State Cloud PMO, and the OBO Information Management Resources Division were negotiated and agreed to for holistic support of the application and the hosted infrastructure.

ProjNet.net was identified as the flagship migration into the SE Azure platform. The ProjNet.net subscription and framework were provisioned, and data was migrated from AWS archive into SE Azure. Additionally, a bulk upload utilizing Microsoft Databox was employed from the on-premises datastores into SE Azure.

The ProjNet.org Microsoft Azure cloud migration was delayed until 2022, pending government CIO approval.

## Member Spotlight

### Salla Eckhardt, MSc Architecture

Director of Digital Building Lifecycle and Innovation, Microsoft  
Chair, National BIM Steering Committee



As the built environment industry is going through digital transformation, it is also going through generational transformation. The vast growth of metropolis regions as well as urbanization of the American heartland requires well determined digital strategies and coherent collaboration between current leaders. As the U.S. is planning further to become a digitally advanced nation empowered by a network of smart cities, it is imperative to volunteer and contribute knowledge and experience of emerging technology, re-engineering of processes, and change management for the benefit of all stakeholders.

NIBS membership is very important because the people who are working with NIBS are the industry champions for the U.S., and the alliance we have been able to build is based on open innovation and collaboration. Transformation does not happen in a silo; it happens in collaboration with networks of people who learn from each other. The built environment industry business is global, powered by local technical talent. To build better than ever, everyone needs to be on the same digital transformation journey that is now BIM centric.

I joined NIBS as a member in 2021. The most valuable thing about being a member of NIBS is the incredible people I get to interact with, exchange thoughts with, and learn from. NIBS has opened doors to meeting people I might not otherwise connect with. The more we get to interact with others, the more consensus we all have on what is best for our society and our industry.

NIBS is a very inclusive and open organization. The people are open to different perspectives and ideas. It has been a delightful and welcoming experience.

## Supporting Best Practices for Anti-Terrorism Security

Working in partnership with the U.S. Department of Homeland Security (DHS) Science & Technology (S&T) Office of Safety Act Implementation (OSAI), NIBS supported the Best Practices for Anti-Terrorism Security (BPATS) assessment tool for commercial facilities to help assessors and building owners conduct facility security assessments.

NIBS hosted the BPATS Tool, provided online training in its use and supported the application process for commercial facility owners and assessors.

## Building our Workforce

Improving diversity, equity, and inclusion goes well beyond a “nice to have.” It’s the direction the built environment is headed, and it’s important for organizations to recognize this critical solution that may be the key to fixing continued workforce shortages.

The Consultative Council’s 2021 Moving Forward report at the conclusion of this annual report goes into greater detail about the work that remains to improve DEI in the building industry.

In March, the National Institute of Building Sciences launched the [2021 Built Environment Social Equity Survey](#) with the help of market research and consulting firm Avenue M Group.

Organizations that participated in the survey included the American Institute of Architects, American Society of Civil Engineers, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Building Owners and Managers Association International, Construction Management Association of America, Construction Specifications Institute, A Council for the American Society of Interior Designers, Design-Build Institute of



America, Energy & Environmental Building Alliance, Green Building Initiative, Institute of Real Estate Management, International Code Council, International Institute of Building Enclosure Consultants, New Buildings Institute, Northwest Energy Efficiency Council & Smart Buildings Center, Regional Hispanic Contractors Association, RMC Research & Education Foundation, and U.S. Green Building Council.

## Two in Five Indicated Their Company Has a Program Dedicated to Diversity

Among the findings, the survey reported that more than two in five (43%) employed/working respondents indicated their company has a program or initiative dedicated to diversity, equity, and inclusion.

Other highlights:

- Around two-thirds (65%) of employees indicated that it is important or extremely important to increase the diversity of the built environment.
- The majority of survey respondents were employed full-time (71%) and have been in the built environment for more than 20 years.
- Nearly three-fourths (74%) of survey respondents identified as White.
- Sixty-three percent of respondents work in private industry or business and 23% work in government.
- Nearly two-thirds (65%) of respondents were men, and almost three in 10 (28%) were women.
- Sixty-six percent of women respondents indicated they experienced discrimination or prejudice in the built environment based on gender.
- Younger respondents and women were more likely to indicate the importance to increase the diversity of the built environment.
- Black or African-American respondents (91%), South Asian respondents (89%), East Asian respondents (84%), and Hispanic or Latina/Latino/Latinx respondents (79%) were more likely than White respondents (64%) to indicate it is important or extremely important to increase the diversity of the built environment.





## The Built Environment Needs a Workforce and Culture Transformation

The survey was a major step toward establishing baseline data in setting actionable goals.

By October, NIBS secured the signatures of 20 CEOs, committing to support greater diversity in the built environment. The primary goals that CEOs agreed to included building diverse staff and volunteer leadership teams, sharing best practices, and promoting this work with association membership.

The organizations that committed to joining NIBS in these goals included the American Institute of Architects; American Society of Civil Engineers; American Society of Heating, Refrigerating and Air-Conditioning Engineers; Arc Skoru Inc.; ASTM International; BOMA International; ConnexFM; Construction Specifications Institute; Design-Build Institute of America; Energy & Environmental Building Alliance; Green Building Initiative; Green Business Certification Inc.; Institute of Real Estate Management; Insurance Institute for Business & Home Safety; International Institute of Building Enclosure Consultants; Modular Building Institute; NAREIM; New Buildings Institute; RICS; and U.S. Green Building Council.

As part of this commitment, NIBS also signed the PricewaterhouseCoopers (PwC) CEO Action for Diversity & Inclusion, joining 2,000 CEOs who have signed the pledge. The pledge aims to cultivate trusting workplaces that can have complex, and sometimes difficult, conversations; implement and/or expand unconscious bias education; and share best and unsuccessful practices.

# INDUSTRY ENGAGEMENT



## Association Collaboration

The National Institute of Building Sciences brings together a variety of interests from across the building industry. Our mission is to serve the public interest by advancing building science and technology to improve the built environment. Each organization and association represent a vital piece and specific constituency of the greater building sciences map.

**Adhesive and Sealants Council** – NIBS worked with the national Adhesive and Sealants Council (ASC) to publish a new section on the Whole Buildings Design Guide that connects the stakeholders from manufacturer to design professional to end user with guidance on sealant technology in vertical wall assemblies. This successful effort serves as a model for other associations, who might wish to share their realms of expertise within WBDG.

**American Association of State Highway and Transportation Officials** – NIBS provided support for the American Association of State Highway and Transportation Officials (AASHTO) Committee on Bridges and Structures T-19 Software and Technology Subcommittee, and the TPF(5)-372 BIM for Bridges Pooled Fund. NIBS presented on the National BIM Program in AASHTO's Joint Technical Committee on Electronic Engineering Standards BIM for Infrastructure webinar series on September 21, 2021.

**American Institute of Architects** – NIBS BIM Council members participated in the review of the American Institute of Architects (AIA) Documents Committee update of its BIM documents in 2021.

**American Society of Heating, Refrigerating and Air-Conditioning Engineers** – Building on the National BIM Guide for Owners, NIBS and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) continued working on and have nearly completed a draft for review of ASHRAE Standard 224 BIM for Owners that will complement the NBIMS-US and ISO 19650 Organization and Digitization of Information about Buildings and Civil Engineering Works, including a building information modeling (BIM) standard.

**BIMForum** – NIBS BIM Council and the BIMForum signed a MOU in February 2021, expressing their intent to work together on BIM standards development and dissemination. Following the MOU, the NBIMS Planning Committee provided review of the 2021 update of LOD specification and participated in discussions on Level of Development (LOD) for Infrastructure.

**Building Enclosure Technology and Environment Council/Building Enclosure Councils** – The Building Enclosure Technology and Environment Council (BETEC) and Building Enclosure Councils (BECs) are joint ventures between NIBS and the American Institute of Architects (AIA). BETEC members represent every facet of the building industry involved with building facades, from architects and engineers to material suppliers. BECs is a joint venture between AIA and NIBS under the aegis of BETEC, hosting some 4,000 members in 34 local chapters. Like BETEC, the BECs bring together members of all facets of the building industry, and they do it on the local level. The two groups collaborated in 2021 to produce BESTfest, a four-hour summary of innovative developments in building enclosure.

**Building Seismic Safety Council Standard Development Organization (SDO) Advisory Committee** – BSSC formed an advisory committee to strengthen the role and influence that all standard development organizations (SDOs) have in our process. The SDO Advisory Committee will work closely with the BSSC for the NEHRP Recommended Seismic Provisions development and also go beyond to include areas, such as functional recovery design, measures to improve existing buildings, extension of our activities to include provisions for lifelines, and innovation. Initial SDO Advisory Committee members include representatives from the American Society of Civil Engineers (ASCE), International Code Council (ICC), American Concrete Institute (ACI), American Institute of Steel

## Member Spotlight

### Kylash Ramesh, MSISTM, PMP, LSSBB, ProFM, FAC-COR III

ORF IWMS Nuvolo Product Owner & Facility Asset Program Manager, Division of Facilities Operations & Maintenance, Office of Research Facilities, National Institutes of Health

I joined NIBS through the organizational membership of NIH in 2020. Prior to that, I had been attending Roger Grant's FedBIM Working Group meetings since 2018. These are monthly meetings held the last Thursday of every month, and it's a community group open to any federal employee, where we brainstorm and share ideas about data management related to facilities and infrastructure, software, and building information modeling.

I graduated from the University of Maryland, College Park in 2016. I went straight to NIH and started as a Pathways intern, while attending graduate school. My role today at NIH is all related to software, data, and workflows around the NIH facility lifecycle, specifically asset management, operations and maintenance, regulatory compliance and accreditation, capital planning, and design and construction.

Currently, I am leading a multi-year software modernization project that will consolidate multiple legacy tools into a single integrated workplace management system (IWMS).

Once implemented, the ORF IWMS will manage the entire NIH facility lifecycle.

NIBS membership is huge. It's super helpful. It helps to speak with other federal peers, see what they're doing, let them know what we're planning, and comb through lessons learned. It helps with decision-making when you can hear from other people and their projects.

The most valuable part of being a NIBS member is the access to federal peers and resources. I'm so glad NIBS exists to help us agencies. If we didn't have NIBS, I don't know what we'd do. NIBS collaborates with other international groups – even outside the U.S. federal government – and combines the ideas together, while understanding the constraints we typically face as federal agencies.

NIBS membership is worthwhile, especially for larger organizations. If you work in the federal space of buildings and infrastructure – I'm of the opinion there aren't many authoritative resources to go to. I trust the resources NIBS is producing versus an individual or trade organization that may be in it for profit. NIBS is non-profit and was created by Congress. Those two things give me the comfort that NIBS is here to help us as agencies.





Construction (AISC), American Iron and Steel Institute (AISI), American Wood Council (AWC), Federal Emergency Management Agency (FEMA), and National Institute of Standards and Technology (NIST).

**Design Build Institute of America** – NIBS, along with Department of State Overseas Building Operations and Onuma, presented during Design Build Institute of America’s Federal Design-Build conference on Data as an Asset at the Department of State Overseas Building Operations.

**General Service Administration** – The General Service Administration’s Public Buildings Service (PBS) Office of Design & Construction (ODC) once again partnered with NIBS in 2021 to facilitate the sixth in a series of workshops to streamline and improve design and construction. All virtual in format in 2021, the workshop centered on “Ramping Up the Speed of Project Delivery: Resources—Process—Tools.” GSA and NIBS invited other federal owners and industry partners to participate, including AIA, Smithsonian Institution, U.S. Army Corps of Engineers, Veterans Administration, American General Contractors, and Design-Build Institute of America.

**UK Department of Business, Energy and Industrial Strategy (BEIS)/Centre for Digital Built Britain (CDBB)/Global BIM Network** – NIBS signed a MOU with the UK BEIS and CDBB to collaborate on the NIBS National BIM Program development in the U.S. As part of the MOU, NIBS participated as member of Global BIM Network Steering Committee. Van Woods, member of the NIBS BIM Council board of direction and BIM Program Manager with the U.S. Army Corps of Engineers, represented NIBS. NIBS presented on BIM standards in the United States during the UK’s Digital Construction Week program in May 2021.



# NIBS EVENTS

## Women Executives in Building: Virtual Leadership Series

The Women Executives in Building virtually met four times in 2021. These leaders covered building a personal brand, elevator pitches, “being the only” (the first woman, for example, to be in a department or serve as leadership), and honoring their authentic self.

Former NIBS CEO Lakisha A. Woods said sharing your story – as well as promoting others – is an important step in brand building.

Other ways to build your brand, according to the Women Executives in Building:

- Leverage the relationships you’ve built with various institutions.
- Share your success stories beyond your personal family-and-friend circle.
- Elevating your accomplishments doesn’t need to sound like you’re rehashing your resume.
- Look for good examples of professionals on LinkedIn who can serve as mentors.
- Younger professionals are putting themselves out there. You can, too.

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**“For a while, I saw ‘being the only’ as a lonely place. [Later], all the things that made me ‘the only’ became my superpower.”**

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**Michelle Buczkowski**  
*Vice President, Talent Management, 84 Lumber*

 National Institute of  
BUILDING SCIENCES™

[nibs.org](https://nibs.org)

## Your Elevator Pitch: Part Marketing, Sales and Personal Brand

It turns out there's a lot riding on a person's elevator pitch. You also can't go into too much detail, and you've only got about 30 seconds to make an impression.

"Always tailor your speech to the group," said Miriam Keith, President of Kayleb Consulting LLC. "Your elevator pitch often is referred to as the BLUF: bottom line up front. Then give details."

Done well, the right pitch allows you to be proactive, rather than reactive.

Other elevator pitching tips from these executives:

- Speak with confidence and know your value.
- Keep your message short and concise.
- There's a fine line between sharing your professional background and boasting too much.
- It's OK to keep your pitch to the company or its mission.
- It's also OK to humanize yourself in the right setting.
- Key words or phrases are good. Some considerations include value proposition, change leadership, trend watcher, and sustainability.

## When 'Being the Only' is Its Own Superpower

Sometimes, 'being the only' can be an isolating place. It's no secret the built environment is a mostly male-dominated profession.

That's why it's more important than ever for women executives in the built environment to come together, support one another, and share thoughts and ideas on how they are providing value.

"You bring strength to your role," Woods said. "When you are 'the only,' it's important to showcase your success and advocate for other women to grow within the company."



The Women Executives in Building shared many tips about managing professional life. They include: not falling into the role of validator or accepting everything; making that change and going out on a limb; keeping up with professional networks for support and guidance; and building a personal board of directors – you need coaches, mentors and advocates in your circle.

## Building Innovation 2021: Virtual Edition

For the second consecutive year, NIBS virtually held the annual conference, Building Innovation.

BI2021 attendees convened over three days – September 27 -29 – to receive information across three tracks: resilience, technology and workplace.

Popular topics, such as climate change solutions, cyber security, sustainability, and diversity, equity and inclusion, offered continuing education credits for attendees.

BI2021 also offered four topic-driven networking receptions, focused on the following trending areas: disaster preparedness and mitigation; off-site construction and affordable housing; BIM and digital construction; and women executives in building.

NIBS remains grateful to our BI2021 presenters, attendees, and sponsors. The presenting sponsor was the International Code Council. Other generous BI2021 supporters included 84 Lumber Co., The American Institute of Architects, BSI America, National Ready Mixed Concrete Association, Precast/Prestressed Concrete Institute, International Association of Plumbing and Mechanical Officials, Autodesk, Building Owners and Managers Association International, Green Building Initiative, IREC’s Green Buildings Career Map, Insurance Institute for Business & Home Safety, MADCAD.com, MBP, National Energy Management Institute, Onuma System -BIMgenie, Procure Technologies, Inc., Testing, Adjusting and Balancing Bureau, The Marshall Group Ltd., Willseal, Associated Air Balance Council, AABC Commissioning Group, and Energy Management Association.



National Institute of Building Sciences  
**BUILDING INNOVATION**  
Virtual Edition

KEYNOTE

**Innovating During Times of  
Uncertainty: Adapting Your Business  
for the New Normal**

Jessica O. Matthews  
Founder & CEO, Uncharted

SEPTEMBER 27, 2021

REGISTER NOW AT [BUILDINGINNOVATION.ORG](https://buildinginnovation.org)

## Resilience 2021 Series

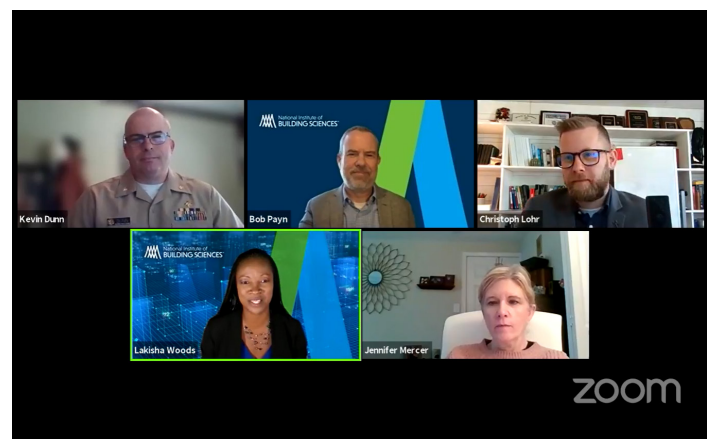
Remaining true to the objectives in our enabling legislation, the National Institute of Building Sciences continued the mission to provide an open forum for discussion among the various facets of the building sector.

And despite lingering challenges with COVID and in-person meetings, NIBS launched a year-long Resilience 2021 webinar series to address how a year of unique challenges ultimately can build resilience in our communities, our infrastructure and the places we live, work, learn and play.

Resilience 2021 looked at everything from natural disaster mitigation and the pandemic's impact on technology in the built environment to building information management.

We began the year with a detailed discussion on the hidden costs of environmental savings from remote work. We learned that while lockdowns were expected to cut carbon emissions by 4-7% last year, the decrease ultimately was insignificant in the long run. That's because reduced activity has the appearance of bringing the world to a standstill, but carbon emissions actually continued nearly unabated.

NIBS hosted a total of 10 Resilience webinars last year. We concluded the series mid-November with a talk about the shift from relief and response to hazard mitigation.



## Member Spotlight

### Ryan E. Smith

Founding Partner, MOD X  
Director, School of Design + Construction, Washington State University  
Member-at-Large, Off-Site Construction Council

I became aware of NIBS when I was a beginning professor at the University of Oregon, teaching structures to architecture students. I was searching for resources to augment my teaching and came across the Whole Building Design Guide. When I started charting a research path as an academic with a focus on off-site construction, I realized there were a number of trade associations that had special interest and advocacy in different categories of off-site construction, but there was not an organization broadly dedicated to research, education, and outreach of it. So, Tom Hardiman with the Modular Building Institute and I approached NIBS, and we were invited to a Board of Directors meeting to discuss a proposal to start a council focused on off-site construction.

The council began in 2013 and became a source of collaboration, knowledge creation, knowledge sharing and education that I was seeking. I was the inaugural chair of the Off-Site Construction Council. In 2016, I was awarded the NIBS Membership Award, something that I think reflects not only my work, but that of the council members to foster knowledge in off-site construction.

NIBS' councils provide peer review and a network of stakeholders for industry decision-making. NIBS is also able to partner with key organizations at the federal, state, municipal and private industry scales to find solutions and disseminate knowledge. The crossover with other councils is a valuable aspect of NIBS. Off-site construction is a different way of delivering construction that can be quite different in achieving building performance and leveraging digital workflows.

As a member of NIBS, I know there is a network of individuals dedicated to moving the industry forward in a positive, more equitable and sustainable manner. I see NIBS as a platform for research, education and outreach work. It's also a neutral playground for progressing what I am trying to accomplish as an academic, and it allows me to contribute to something much larger and have greater impact than what I can accomplish on my own.



## Annual Awards

On the final day of Building Innovation 2021, NIBS recognized several individuals and organizations for their efforts, advancement, innovations and dedication to the built environment. The 2021 award winners were:

- National Institute of Building Sciences Lifetime Achievement Award – Robert Ivy, FAIA, EVP/CEO, American Institute of Architects
- Diversity, Equity & Inclusion Leadership Award – Structural Engineers Association of Northern California
- Innovator Award – Procore Technologies
- Future Leaders Award – Amrinder Singh, Code Enforcement Manager & Building Code Official, Municipality of Norristown
- Exceptional Woman in Building Award – Nancy Novak, Chief Innovation Officer, Compass Datacenters
- Distinguished Service Award – John Messner, Chair, U.S. National BIM Standard, Professor, Penn State University

NIBS also awarded two students with the Betty and Mort Marshall Memorial Scholarship. Mort was the first member of the National Institute of Building Sciences.

In memory of Betty and Mort Marshall, a memorial scholarship was established to promote diversity in the building sciences and benefit students pursuing a career in architecture and engineering at a historically Black college or university.

The 2021 scholarship winners were Trajan Baker, architecture major with Hampton University, and Shergaun Roserie, engineering major with Howard University.



# NIBS COUNCILS



Building Enclosure Technology  
and Environment Council

**The Building Enclosure Technology and Environment Council (BETEC)** fosters a better understanding of how building components interact with each other and with the environment in order to optimize energy use.

In 2021, BETEC members once again worked virtually to update the exterior wall section, fenestration, and masonry sections of the Whole Building Design Guide. New sections on Adhesives and Sealants (done in conjunction with The Adhesive and Sealant Council) and Post Occupancy Evaluation were published in 2021.

**Chair:** Stephen Shanks, CxA, BECxP, NDT Level III Senior Consultant at Building Science Solutions

**Vice Chair:** Dudley McFarquhar, PhD, PE, Owner, McFarquhar Group Inc.

**Secretary:** Keith Simon, Terracon

Janna Alampi, AIA, NCARB, BECxP, CxA+BE, President + CEO, EPICx Studio

**Members-at-Large:** Justin Boone, Associate Principal & Unit Manager, WJE Associates

Brian Stroik, Director of Building Enclosures, Tremco Commercial Sealants & Waterproofing

**AIA/BETEC Liaison:** Cheryl Smith, AIA, LEEP AP, Principal, NELSON Worldwide

**The Building Enclosure Councils (BECs)**, a joint venture between the American Institute of Architects and NIBS under the aegis of BETEC, consists of 4,000 members in 34 local chapters. They employed a variety of means to connect members and continue building enclosure education through webinars and virtual meetings throughout 2021. BETEC and the BECs came together to create and present BESTfest, a four-hour summary of innovative developments kicked off with a keynote on “Achieving Zero Carbon “by Vincent Martinez, Chief Operating Officer, Architecture 2030.

**BEC National Chair:** William Babbington, AIA, Principal, Studio NYL

**BEC National Vice Chair:** John Burningham, Principal, UNVC

**NIBS Board Liaison:** Paul R. Bertram, Jr., FCSI, PRB Connect

**NIBS Staff:** Stephanie Stubbs, Managing Director, Technical Solutions





**The Building Information Management (BIM) Council** is a unique organization helping the North American real property industry become more efficient. The BIM Council leads in the creation of tools and standards that allow projects to be built digitally before they are built physically through the use of building information modeling.

Its vision is to achieve a sustainable and efficient architecture, engineering, construction, owner and operator industry enabled with effective work processes based on collaboration, information technology and open standards. Its mission is to lead the development and deployment of broadly adopted national information standards and best practices for the built environment, with a focus on significantly improving project delivery and operational processes.

BIM Council membership is comprised of individuals and organizations representing government agencies, academia, and the private architect, engineer, and construction firms. It includes 160 participating organizations.

**Chair:** Rachel Riopel, AIA, Digital Practice Leader, HDR Inc.

**Vice Chair:** Nancy Novak, Chief Innovation Officer, Compass Datacenters

**Secretary:** Alex Belkofer, CM-BIM, VDC Director, McCarthy Building Companies, Inc.

**Member-at-Large:** Shawn Foster, Director, Business Development & Customer Success, Allegion

**Past Chair:** Van Woods, BIM Program Manager, Seattle District, U.S. Army Corps of Engineers

**NIBS Board Liaison:** Russell Manning, PhD, LEED AP, CFP, CRL, International Code Council, Denver, CO

**NIBS Staff:** Roger J. Grant, CSI, CDT, Executive Director, Building Information Management, National Institute of Building Sciences

Dominique Fernandez, Program Director, National Institute of Building Sciences



**The Building Seismic Safety Council (BSSC)** deals with the complex technical, regulatory, social and economic issues involved in developing and promulgating building earthquake risk mitigation provisions that are national in scope. It brings together the needed expertise and relevant public and private interests to resolve issues related to the seismic safety of the built environment through authoritative guidance and assistance backed by a broad consensus. It enhances public safety by providing a national forum that fosters improved seismic planning, design, construction and regulation in the building community.

BSSC was established in 1979, as one of the important initiatives under the National Earthquake Hazards Reduction Program (NEHRP). Over the past 43 years, BSSC developed 10 editions of the NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (Provisions), collaboratively working with the United States Geological Survey and Federal Emergency Management Agency to develop and update the national applicable seismic maps, advised government bodies on their programs and seismic research, and encouraged and promoted the adoption of the seismic provisions in model building codes.

**Chair:** Charles J. Carter, SE, PE, PhD, President, American Institute of Steel Construction

**Vice Chair:** Kent Yu, PhD, SE, Principal, SEFT Consulting Group

**Secretary:** Roberto Leon, P.E., PhD, Professor, Via Department of Civil and Environmental Engineering, Virginia Tech

**Member-at-Large:** Craig A. Davis, PhD, PE, GE, Water System Resilience Program Manager & Seismic Manager, Los Angeles Department of Water and Power (retired)

**Member-at-Large:** Joann Browning, PhD, PE, Dean, College of Engineering, University of Texas at San Antonio

**Past Chair:** James Cagley, PE, SE, President, Cagley & Associates

**NIBS Board Liaison:** Sez Atamturktur Russcher, Head of the Department of Architectural Engineering, Penn State

**NIBS Staff:** Jiqiu (JQ) Yuan, PhD, PE, PMP, Executive Director of Multi-Hazard Mitigation and Building Seismic Safety Council





**The Consultative Council** assembles high-level building community representatives to make recommendations directly to the executive and legislative branches of government to improve our nation's buildings and infrastructure. Each year, the Consultative Council publishes the Moving Forward Report to investigate key issues, offering solutions to overcoming these challenges.

The 2021 Moving Forward Report focuses on the issue of diversity, equity, and inclusion in the built environment.

**Chair:** Katharine Morgan, President, ASTM International

**Vice Chair:** Brian Pallasch, CEO & Executive Vice President, IIBEC

**NIBS Staff:** Kyle Barry, PMP, Director, Technical Solutions



**The Facility Management and Operations Council (FMOC)** provides industry-wide, public and private support for the creation of higher quality facilities through improved maintenance and operation and real property management. In order to achieve this purpose, the FMOC has the following objectives: 1) to increase maintenance and operations influence in the facility acquisition process; 2) To promote the sharing and integration of facilities maintenance and operations procedures and information; and, 3) to identify and disseminate “best” practices for the maintenance and operations of facilities.

**Chair:** Rolf Alexis, Senior Global Capital Asset Analyst, Global Facilities, General Motors

**Vice Chair:** Emily Herndon, LEED AP, Senior Consultant, Woolpert, Inc.



**Member-at-Large:** Casey Martin, Senior Consultant & Program Manager, Jacobs

**NIBS Board Liaison:** Daniel E. Nichols, PE, IAAI-FIT, State of New York’s Metropolitan Transportation Authority, Hyde Park, NY

**NIBS Staff:** Jay Kline, BIM Manager



**The Multi-Hazard Mitigation Council (MMC)** brings together a body of experts in a multitude of related fields that can address the challenges associated with the identification and implementation of effective mitigation practices. NIBS is an independent entity that aims to inform decision-making, leading to effective public policy on many levels. Its goals are simple — promoting disaster resilience, while becoming a focal point of credible information and promoting whole building strategies.

**Chair:** Sara Yerkes, Senior Vice President of Government Relations, International Code Council (retired)

**Vice Chair:** Anne Cope, PhD, PE, Chief Engineer, Insurance Institute for Business and Home Safety

**Secretary:** Russ Strickland, Executive Director, Maryland Emergency Management Agency

**Member-at-Large:** Lauren Alexander Augustine, Executive Director, Gulf Research Program, National Academies of Sciences, Engineering, and Medicine

**Member-at-Large:** Bryan Koon, Vice President of Homeland Security and Emergency Management, IEM

**CFIRE Chair:** Daniel Kaniewski, PhD, Managing Director, Public Sector, Marsh McLennan

**NIBS Board Liaison:** Lori Peek, PhD, Director, Natural Hazards Center and Professor, Department of Sociology, University of Colorado Boulder

**NIBS Staff:** Jiqiu (JQ) Yuan, PhD, PE, PMP, Executive Director of Multi-Hazard Mitigation and Building Seismic Safety Council



### Off-Site Construction Council

Off-site construction is the planning, design, fabrication, and assembly of building elements at a location other than their final installed location to support the rapid and efficient construction of a permanent structure. Off-site construction is characterized by an integrated planning and supply chain optimization strategy.

In 2013, the National Institute of Building Sciences established the Off-Site Construction Council (OSCC) to serve as a research, education and outreach center for relevant and current information on off-site design and construction for commercial, institutional, and multifamily facilities.

**Chair:** Aundre Oldacre, Managing Partner, AoRa Development

**Vice Chair:** Ryan Colker, Vice President of Innovation, ICC

**Secretary:** Marc Bielas, Founder and CEO, Quilt Group

**Past Chair:** Laurie Robert, Horzion North (retired)

**Member-at-Large:** Ryan Smith, Founding Member, MOD X

**NIBS Staff:** Kyle Barry, PMP, Director, Technical Solutions



The goal of ‘whole building design’ is to apply an integrated design approach and an integrated team process to create a high-performance building – one that is cost-effective and created for quality-of-life, future flexibility, efficiency, security, accessibility, overall environmental impact, productivity, and enlivening occupants. This concept drives the WBDG–Whole Building Design Guide Workgroup in its mission to foster communication and knowledge-sharing among federal, industry and academic partners by leveraging the WBDG website ([www.wbdg.org](http://www.wbdg.org)) services to advance high-performing facilities.

The WBDG Workgroup’s membership consists of representatives from more than 15 agencies, including the Department of Defense, Department of Veterans Affairs, Department of Energy, General Services Administration, Department of Homeland Security and Department of State Bureau. These members along with private sector companies, non-profit organizations, and educational institutions provide expert resources contributing knowledge and experience to provide a wide range of building-related guidance, criteria and technology from a ‘whole buildings’ perspective.

### Highlights for FY21:

Expanded and updated the Federal Facility Criteria library with more than 1,100 documents from 18 agencies, while also adding resources from the Defense Health Agency.

- Completed revisions to the library of Space Types pages, while also updating several Building Type pages, including Archives & Records Storage, Land Port of Entry, Office & Warehouse.
- Updated the Sustainable Design Objective set of guidance as well as several other related resources to assist federal agencies to reach new goals from President Biden’s Executive Order 14057. These directives catalyze American clean energy industries and jobs through The Federal Sustainability Plan setting out a range of ambitious goals to deliver an emissions reduction pathway reducing U.S. greenhouse gas emission by over 50% from 2005 levels by 2030 and limiting global warming to 1.5 degrees Celsius, as the science demands.
- Added and updated dozens of new Continuing Education courses provided by the Department of Energy’s Federal Energy Management Program. Its training provides knowledge in meeting energy-related goals, identifying affordable solutions, facilitating public-private partnerships, and providing energy leadership.



**1,800,000**  
Yearly Visitors



**5,000 Federal**  
Facility Criteria



**600 Subject Matter**  
Expert Authored Pages

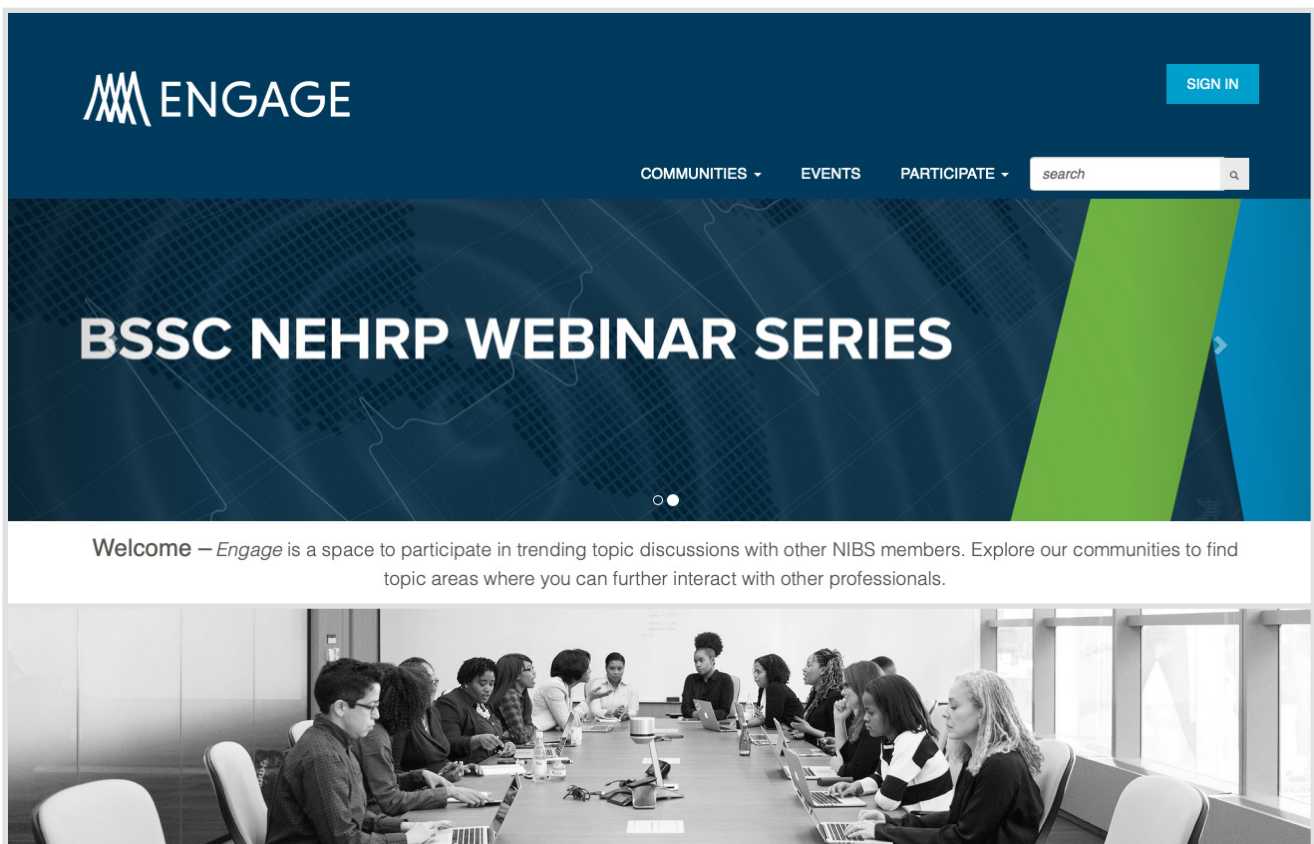
**Chair:** Donald L. Myers, Director, Facilities Standards Service, U.S. Department of Veterans Affairs

**NIBS Board Liaison:** Charlie (Chuck) D. Curlin, Jr., PE, CEM, CPD, Principal, Shultz Engineering Group

**NIBS Staff:** Bob Payn, Sr. Director, Information Technology

# ENGAGE

In an effort to encourage collaboration among members and councils, NIBS launched Engage ([engage.nibs.org](http://engage.nibs.org)) as a space for professionals to participate in trending topic discussions as well as the activities of NIBS councils. Users can explore relevant topic communities to interact with subject matter experts interested in those same topics.



Codes and Standards



Government Affairs



Mitigation



Resiliency



Seismic Safety



Building Technology



## Organization Spotlight

### **BSI and NIBS – a Partnership Based on Shared Purpose**

At BSI, we believe in helping to build a world where consumers trust organizations to do the right thing, balancing the drive for profit with the needs of the planet and its people. We are a trusted catalyst of positive change, helping to establish greater trust between stakeholders in a more ecosystem-driven environment, accelerating innovation, fostering progress and making the world a better place.

BSI began collaborating with NIBS on May 1, 2021, with the objective of sharing its extensive knowledge and expertise to help accelerate the implementation of building information modelling (BIM) in the U.S. At the same time, NIBS announced its memorandum of understanding with the UK's Centre for Digital Built Britain on the development of a roadmap for a U.S. National BIM Program. This timely partnership joined two organizations aligned in their purpose of creating and enhancing awareness of BIM.

BSI and NIBS collaborated throughout 2021, with BSI sponsoring Building Innovation 2021 and a webinar, Resilience 2021: Building Resilience Through BIM. BSI also has become a member of the BIM Council to further support continued adoption of standardization for BIM.

The relationship between NIBS and BSI continues to strengthen, due to substantial organizational alignment in the areas of digital transformation and sustainability in the built environment.

Andy Butterfield, Managing Director, Global Built Environment at BSI, stated, "BSI has become a member of the BIM Council to further support continued adoption of standardization for BIM. We continue to share our knowledge and expertise with many organizations globally to support the development of a BIM standards roadmap. We are also committed to the successful integration of innovative digital technologies, including BIM, and we are proud to be supporting NIBS to help them achieve this same goal in the U.S."

Collaboration is the foundation for BIM with technology enabling a controlled and coordinated exchange of information between organizations and supply chain partners, helping to increase efficiency, reduce waste, and improve the coordination of complex projects.



MOVING  
THE INDUSTRY  
FORWARD



## Introduction

The National Institute of Building Sciences (NIBS) serves as the unbiased forum for solving common issues and identifying opportunities within the building community. The NIBS Consultative Council assembles high-level building community leaders to make collective recommendations directly to policymakers to improve our nation's buildings and infrastructure. Members of the council include organizations representing consumers, architects, engineers, government officials, contractors, researchers, and housing officials.

The goals of the council are three-fold:

- **Convening Thought Leaders:** bringing together industry leaders and experts from across the built environment to improve our nation's infrastructure and buildings.
- **Identifying Challenges:** assembling experts who identify key issues they believe will be facing the industry in the year ahead.
- **Finding Solutions:** developing and publishing a yearly report that offers solutions to key challenges the built environment faces.

Each year, the Consultative Council publishes the Moving Forward Report to investigate key challenges facing the building industry and to make recommendations to help overcome those challenges. The 2021 Moving Forward Report examines the critical area of “driving workforce diversity, equity, and inclusion in the built environment.”

## Driving Diversity, Equity, and Inclusion in the Built Environment

NIBS and the Consultative Council believe that diversity, equity, and inclusion (DEI) are essential characteristics of the built environment, and that pursuing DEI initiatives across the industry can yield key advantages. From developing and nurturing a diverse, robust, and sustainable workforce, to enhancing occupant satisfaction in buildings and continuing to expand industry innovation, there are numerous benefits to amplifying DEI throughout the varied businesses and professions that compose the building sector.

Consider the case of the building sector workforce. As discussed in multiple Moving Forward Reports over the last decade, the U.S. is reaching a crisis point in terms of ensuring that a “full pipeline” of workers (and skilled workers, in particular) is available to meet the needs of a rapidly advancing building industry. The National Association of Home Builders Institute Fall 2021 Labor Market Report estimates that over the course of 2022-2024, the construction industry will require an additional 2.2 million net hires to fill the shortage of workers.<sup>1</sup> A business-as-usual approach will not meet this need. The construction industry and policymakers must explore all untapped sources of potential workers to help fill this gap. Critical to this effort is improving access, targeted recruitment efforts, and training for women and underrepresented groups, including ensuring fair and equitable opportunities for career advancement within the industry. As described in more detail below, findings from the NIBS 2021 Built Environment Social Equity Survey reinforce these needs.

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<sup>1</sup> [http://hbi.org/wp-content/uploads/HBI\\_Fall\\_Construction\\_Labor\\_Market\\_Report.pdf](http://hbi.org/wp-content/uploads/HBI_Fall_Construction_Labor_Market_Report.pdf)

A focus on diversity and inclusion can also benefit the industry by increasing occupants' satisfaction with the built environments in which they work, live, and play, and by improving the communities where buildings are located. Buildings that are designed by a workforce drawing from a diverse set of cultural, geographic, and/or religious backgrounds can cater to a broader range of customer requests, preferences, and community needs. Structures that are built to satisfy and accommodate diverse audiences can be made accessible and more comfortable for all occupants, regardless of shape, size, disability, skin tone, or gender, among the many other dimensions of diversity. Industry research has identified and affirmed the relationship between occupant comfort and productivity.<sup>2</sup> In other words, all of society ultimately benefits if everyone can thrive in buildings that are universally designed, built, and operated for all peoples.

### Inclusive Community Engagement

NIBS encourages greater diversity among those voices that guide decisions about the built environment. Promoting equitable and inclusive access to decision-making bodies and public forums can help ensure that building projects and relevant policies consider the needs and experiences of those communities where buildings are located. One organization that has been active in this area is the NAACP, through its Centering Equity in the Sustainable Building Sector (CESBS) Initiative.<sup>3</sup> As part of CESBS, the NAACP developed resources and partnered with groups from across the industry to drive deeper community involvement in processes and proceedings that influence building sector policy and project development.



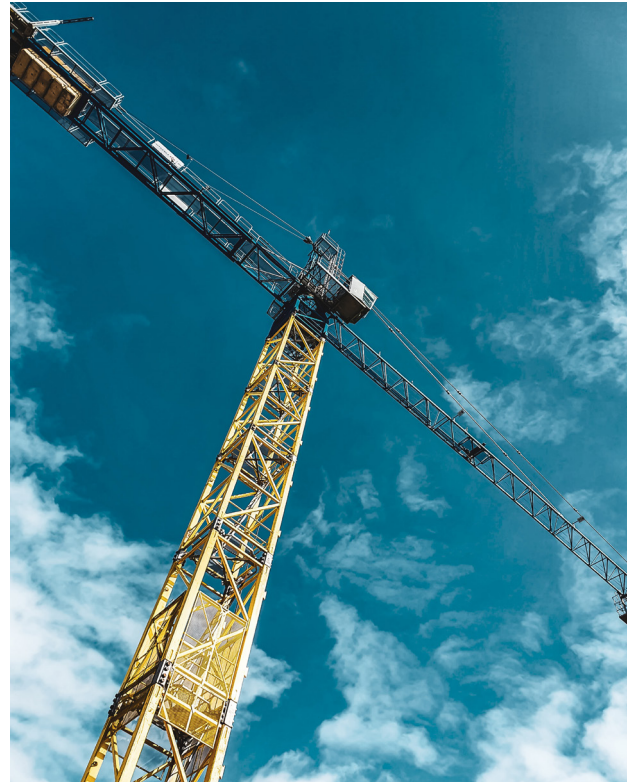
Importantly, greater diversity fuels continued innovation within the industry. By its very nature, diversity brings perspectives to the table that encourage new and different ways of thinking about projects, addressing obstacles, and proposing solutions that might otherwise be missed.<sup>4</sup> Continued innovation is essential as the industry evolves to drive greater accomplishments in the built environment and adapt to the consequences of a changing climate—designing, constructing, and operating buildings that are better, safer, smarter, and more efficient.

## NIBS 2021 Built Environment Social Equity Survey

In December 2020, the NIBS Consultative Council held a social equity roundtable with over two dozen organizations representing various facets of the built environment. A common concern among attendees was the need for reliable data and research from the many sectors of the built environment. In response, NIBS agreed to partner with Avenue M Group, an independent market research and consulting firm, to conduct a comprehensive study aimed at collecting critical demographic data on the workforce of the built environment, as well as this workforce's perceptions of diversity, inclusion, and discrimination in the workplace, for the purpose of informing future initiatives on social equity.

The following organizations agreed to participate as a partnering organization and to survey their contacts in the built environment:

- American Institute of Architects (AIA)
- American Society of Civil Engineers (ASCE)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Building Owners and Managers Association International (BOMA International)
- Construction Management Association of America (CMAA)
- Construction Specifications Institute (CSI)
- Design-Build Institute of America (DBIA)
- Energy & Environmental Building Alliance (EEBA)
- Green Building Initiative (GBI)
- Institute of Real Estate Management (IREM®)
- International Code Council (ICC)
- International Institute of Building Enclosure Consultants (IIBEC)
- New Buildings Institute (NBI)
- Regional Hispanic Contractors Association (RHCA)
- RMC Research & Education Foundation
- U.S. Green Building Council (USGBC)



<sup>2</sup> Kaushik, A., Arif, M., Tumula, P., & Ebohon, O. J. (2020). Effect of thermal comfort on occupant productivity in office buildings: Response surface analysis. *Building and Environment*, 180, 107021.

<sup>3</sup> <https://naacp.org/resources/guidelines-equitable-community-involvement-building-development-projects-and-policies>

<sup>4</sup> Global Diversity and Inclusion: Fostering Innovation Through a Diverse Workforce, *ForbesINSIGHTS*, July 2011. Retrieved from [https://www.forbes.com/forbesinsights/innovation\\_diversity/](https://www.forbes.com/forbesinsights/innovation_diversity/).

## The Progress:

- While nearly 75% of all respondents identified as white, considerably more racial diversity was present among younger professionals than their more experienced colleagues, particularly among those aged 34 or younger.
- Although nearly 66% of all respondents identified as male, results show that an increasing share of professionals entering the industry over the past two decades have been women. Furthermore, the racial diversity of this female workforce exceeds that of their similarly-aged male peers.

## The Perception:

- Almost 40% of respondents indicated the building industry is somewhat diverse, with another 33% indicating it is diverse or extremely diverse; however, about 33% indicated it is not diverse at all or only a little diverse.
- Around 66% of respondents indicated it is important or extremely important to increase diversity in the industry, but almost 20% indicated that increasing diversity is not important at all or only a little important.
- Compared to older and longer-tenured respondents, younger professionals were more likely to indicate that the industry is not diverse and to believe it is important to increase diversity.
- Women were more likely than men to indicate that the built industry is not diverse or only a little diverse, and that it is extremely important to increase diversity. Respondents identifying as one or more racial/ethnic minorities were also more likely to indicate the industry is not diverse, and to label increasing diversity and improving inclusion as important or extremely important.

## The Challenge:

- Only 40% of respondents indicated they had experienced no discrimination or prejudice in the built environment, whereas almost 30% of respondents indicated they had experienced discrimination/prejudice based on age, more than 25% based on gender, and 16% based on race and/or ethnicity.
- Among only those respondents who identified with certain demographic groups, incidences of discrimination or prejudice were significantly higher. Roughly 66% of women respondents, more than 50% of nonbinary and gender nonconforming respondents, almost 75% of Black or African American respondents, and around 50% of East, Southeast, and South Asian respondents indicated they had experienced discrimination or prejudice based on gender, race/ethnicity, socioeconomic class, and/or country of origin.
- Some form of discrimination or prejudice was reported by these groups across the areas of hiring, compensation, work assignments, promotions, and others.

Progress around the industry's diversity and inclusion challenges is on the horizon, as more than 40% of respondents indicated their company had a program or initiative dedicated to DEI, and nearly 20% indicated their company had instituted policies related to DEI, even if a formal program/initiative was not present. The importance of such efforts cannot be overstated. A significant share of the industry workforce—almost three-fifths of survey respondents—have 20 or more years accrued in the industry. Efforts to open the industry to greater participation by more diverse professionals will become more critical to the industry's future as this large and more experienced segment of the workforce approaches retirement age.

As an industry, the building sector is both blessed and challenged by the wide range of professions, career paths, and specialized skills that are required to design, construct, regulate, and maintain buildings. To function, the industry requires sufficient volume and diversity of new professionals to fill all vacancies with the skills and certifications needed to “keep the lights on.” NIBS' survey findings highlight that expanding the workforce pipeline

overall—including by developing novel and expanded pathways for a larger and more diverse range of new and seasoned professionals to enter relevant trades and careers—will become only more important as time goes on.

## NIBS and Consultative Council Activities

In 2021, NIBS and the Consultative Council focused many activities on promoting workforce DEI. These activities included a comprehensive survey (see previous), two Executive Roundtables focused on social equity, a pledge from council members to promote DEI within their organizations, and a networking and educational series focused on women executives in buildings. NIBS also developed a DEI web page to highlight the important work NIBS, the

### Member Spotlight

#### Kenneth Schram, PE, LEED AP

Associate Principal, R.G. Vanderweil Engineers, LLP  
Post Occupancy Evaluation (POE) team member

I have been engaged as a technical consultant for several NIBS projects and initiatives. NIBS is an organization that brings together multidisciplinary teams that conduct investigations and solve problems in ways that are rarely, if ever, addressed by single firms in the private sector.

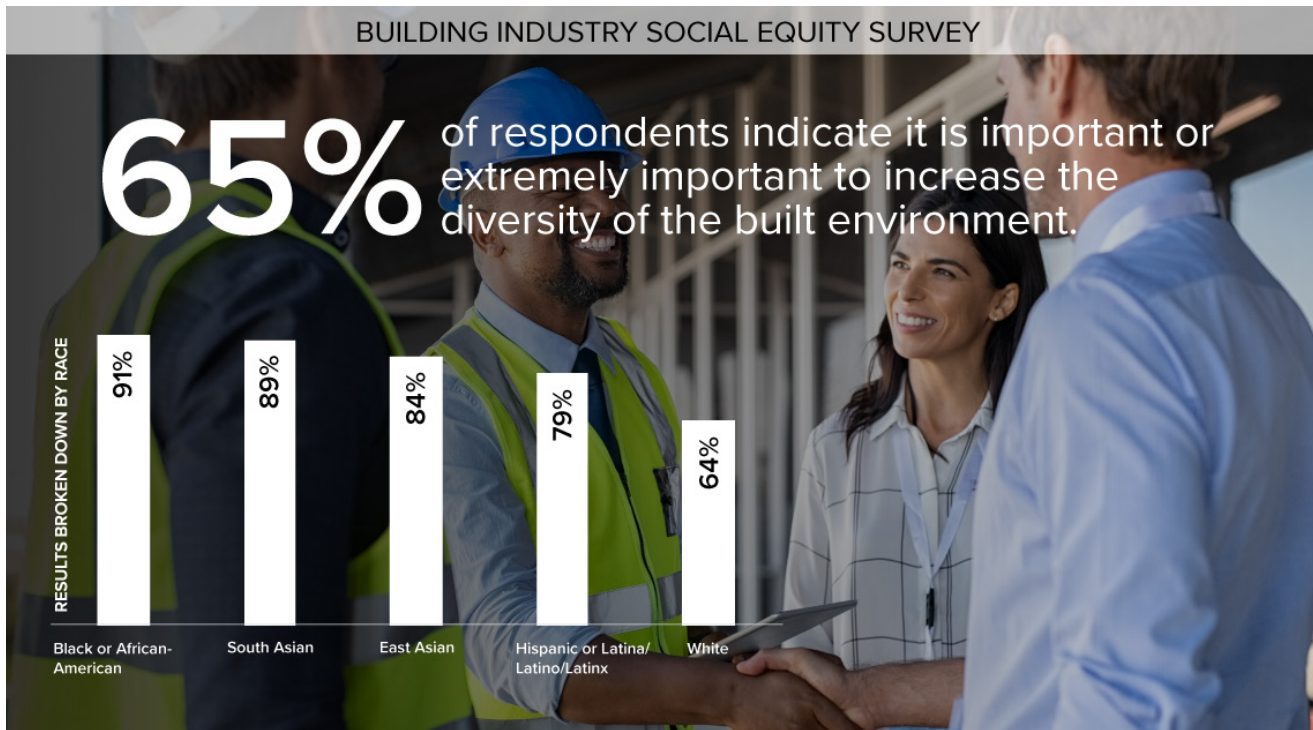
Several projects have been to conduct post occupancy evaluations (POEs) to dig further into the daily experiences of building operations staff and end users, at an important point in time a couple years after occupancy when facilities are still considered new or recently modernized with extensive renovations. The staff and occupants are able to share aspects that are improved as well as things that may continue to present difficulties or are distractions to their work.

The POEs also document impactful aspects of requirements, processes, and the most challenging issues that the design and construction teams experienced. As the POEs have been conducted for agencies such as the GSA, which is the nation's largest landlord, and the VA (Veterans Health Administration) which is the nation's largest healthcare system, the results are impactful as they are then used to retool the next generation of building construction standards and delivery processes. Insights into value gained -- bang for the buck -- are captured for use in strategic planning of these large organizations.

Other projects have directly addressed the risks and hazards and the value-benefits of redundancy and resilient operations.

Personally, working on projects that have a nationwide breadth and involve numerous types of facilities has provided me with a background that is tapped into almost every workday in meeting specific design challenges. In an age when a full spectrum of information is at everyone's fingertips, knowing NIBS' projects and seeing that they are doing this work in a manner to continue to be an authoritative resource, is very reassuring.





Consultative Council, and partners are doing to promote DEI in the built environment. Link here: <https://www.nibs.org/about/diversity-inclusion>.

## Social Equity Executive Roundtables

In December 2020 and July 2021, NIBS held two Executive Roundtables entitled “Improving the Workforce of the Built Environment through Social Equity.” Thirty-five C-suite executives from the building industry discussed the worker shortage, promoting sustainability, a review of internal and external best practices regarding culture, diversity, recruitment and retention, and strategic partnerships. Participants also discussed the results of the NIBS 2021 Built Environment Social Equity Survey, and the efforts they have made at their own organizations to promote DEI. A link to a summary of the Roundtable can be found here: <https://www.nibs.org/about/diversity-inclusion>.

## Built Environment CEO Commitment

Following the two Social Equity Executive Roundtables, NIBS and the Consultative Council requested a commitment from CEOs and their organizations to support greater diversity and inclusion in the built environment. The primary goals that CEOs agreed to include building diverse staff and volunteer leadership teams, promoting this work and sharing with their membership.

<sup>5</sup> Link: <https://www.nibs.org/blog/built-environment-ceos-sign-diversity-commitment>

Organizations who have signed the pledge include:<sup>5</sup>

- American Institute of Architects
- American Society of Civil Engineers
- American Society of Heating, Refrigerating and Air-Conditioning Engineers
- Arc Skoru Inc.
- ASTM International
- Building Owners and Managers Association International (BOMA) International
- ConnexFM
- Construction Specifications Institute
- Design-Build Institute of America
- Energy & Environmental Building Alliance
- Green Building Initiative
- Green Business Certification Inc.
- Institute of Real Estate Management
- Insurance Institute for Business & Home Safety
- International Institute of Building Enclosure Consultants
- Modular Building Institute
- NAREIM
- New Buildings Institute
- Royal Institute of Chartered Surveyors (RICS)
- U.S. Green Building Council

## Women Executives in Building

In 2021, NIBS continued its Women Executives in Building virtual meetings. Sponsored by 84 Lumber, NIBS held a series of web events designed for C-suite women executives to network and share ideas, challenges, and propose solutions to current issues. A list of the events (expected to continue in 2022) is listed below.

**February 25, 2021:** Building Your Personal Brand

**May 25, 2021:** Elevator Pitch Workshop

**August 31, 2021:** Being the Only

**December 7, 2021:** Honoring Your Authentic Self

A link to the virtual series can be found here: <https://www.nibs.org/events/women-executives-building/>



## Other Activities: NIBS Council Leadership

In 2020 and 2021, to promote DEI amongst its own leadership (including volunteer leadership), NIBS put into effect new bylaws designed to encourage more diverse and inclusive leadership among its councils. These efforts included adding the following statement on DEI to the council leadership selection process:

### Statement on Diversity in Nominations Process

NIBS and all of its Decision-Making Bodies shall strive to ensure that our membership reflects a diversity of experience and perspectives, including but not limited to diversity with respect to race, ethnicity, gender identity, age, geography, and areas of expertise. Having leadership with diverse perspectives is critically important. Each individual will bring their own personal and professional contacts and life experiences to their service. With a diversity of experience, expertise, and perspectives, our organization is in a stronger position to: plan for the future, manage risk, make prudent decisions, and take full advantage of opportunities. With NIBS choosing to focus on diversity, equity, and inclusion—our ability to respond to internal and external influences that are changing the built environment exponentially increases.



## Recommendations

- The Administration, U.S. Department of Labor, and U.S. Department of Education should extend their efforts to advance apprenticeships and workforce development to include careers within the buildings and construction workforce, with additional programs focused on promoting women, veterans, and historically excluded and underrepresented groups in the trades. While the recently passed Infrastructure Investment and Jobs Act provided additional funding for these programs in the transportation sector, consideration should be given to developing similar programs for other infrastructure areas, including the building space.
- With the support and engagement of the U.S. Departments of Labor and Education, the building industry



should establish a national campaign highlighting the exciting and well-paying careers in the industry. The effort should include development of resources for students, parents, and guidance counselors on career pathways and educational opportunities.

- Working with the government and representatives of community organizations, the industry should develop best practices for community engagement. Community engagement in project development and policy setting is essential to assuring resident needs and expectations are considered. Meaningful engagement also provides visibility to community members on the roles and responsibilities of different disciplines.
- The Consultative Council encourages leaders in the building community to commit to supporting greater diversity and inclusion in their organizations, as well as in the built environment, following the example of those CEOs who participated in NIBS' Social Equity Executive Roundtables.

## Consultative Council Members

- American Institute of Architects
- American Institute of Steel Construction
- American Planning Association
- American Society of Civil Engineers
- American Society of Heating, Refrigerating and Air-Conditioning Engineers
- Associated Builders and Contractors
- Associated General Contractors of America
- ASTM International
- AS Viable Solutions
- Building Owners and Managers Association International
- Connex FM
- Construction and Demolition Recycling Association
- Construction Management Association of America
- Construction Specifications Institute
- Continental Automated Buildings Association
- Design-Build Institute of America
- Energy & Environmental Building Alliance
- Green Building Initiative
- International Institute of Building Enclosure Consultants
- Insurance Institute for Building and Home Safety
- International Association of Plumbing and Mechanical Officials
- International Code Council
- Modular Building Institute
- National Ready Mixed Concrete Association
- New Buildings Institute
- Royal Institution of Chartered Surveyors
- U.S. Green Building Council



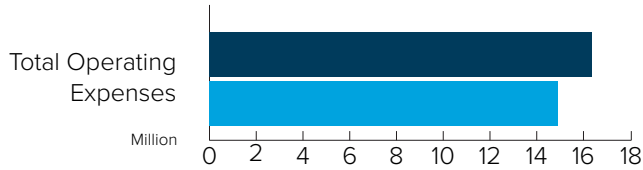
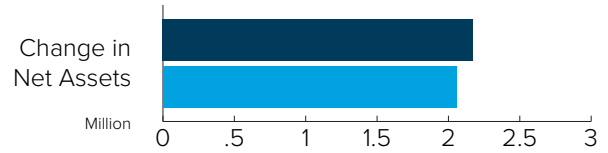
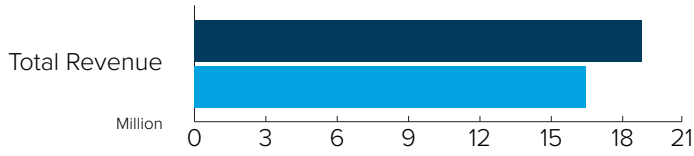
# FINANCIALS



## 2021 Financial Statements

The National Institute of Building Sciences has been guided by careful financial stewardship for more than 40 years, making NIBS the strong, resilient organization that exists today. The Fiscal Year 2021 saw an increase in revenue, which in turn allowed NIBS to cover an increase in operational cost. This increase in revenue created value by adding assets to the balance sheet. The increase to the total assets was largely due to an increase in cash. This current fiscal position provides NIBS with the ability to expand and engage in new projects that will allow for the organization's future growth.

	■ 2021	■ 2020		■ 2021	■ 2020
<b>Current Assets</b>			<b>Revenue</b>		
Cash & Cash Equivalents	\$ 10,997,219	\$ 5,530,182	Contracts & Grants	\$ 17,839,373	\$ 16,313,653
Certificates of Deposit	49,909	49,849	Other Publications Sales	32,306	48,837
Accounts Receivable	2,497,816	4,925,545	Member & Other Contributions	146,821	100,454
Contract assets	1,307,615	893,479	Investment Return	(12,206)	56,336
Prepaid Expenses & Deposits	219,152	176,654	Meeting and Other	674,112	305,194
Total Current Assets	<u>15,071,711</u>	<u>11,575,709</u>	Total Revenue	<u>18,680,406</u>	<u>16,824,474</u>
<b>Investments</b>	1,338,948	1,353,202	<b>Expenses</b>		
<b>Property and Equipment</b>			Program Services:		
Furniture & Equipment	521,330	643,869	Contracts and Awards	15,370,990	12,614,469
Leasehold Improvements	751,864	751,864	Publications	279,477	616,532
Software	192,150	31,483	Other	65,967	138,924
Total	<u>1,465,344</u>	<u>1,427,216</u>	Total Program Services	<u>15,716,434</u>	<u>13,369,925</u>
Less: Accumulated Depreciation & Amortization	<u>(880,396)</u>	<u>(755,059)</u>	Supporting Services:		
Total Property & Equipment, Net	<u>584,948</u>	<u>672,157</u>	General & Administrative Expenses	254,025	1,261,835
Total Assets	<u>\$ 16,995,607</u>	<u>\$ 13,601,068</u>	Membership	421,850	115,468
<b>Current Liabilities</b>			Total Supporting Services	<u>675,875</u>	<u>1,377,303</u>
Accounts Payable & Accrued Expenses	\$ 2,727,679	\$ 1,574,028	Total Expenses	<u>16,392,309</u>	<u>14,747,228</u>
Deferred Rent, Current Portion	77,440	58,627	Change in Net Assets	<u>\$ 2,288,097</u>	<u>\$ 2,077,246</u>
PPP Loan	--	635,500	<b>Net assets, beginning of year</b>	<u>9,994,568</u>	<u>7,917,322</u>
Contract Liabilities	1,238,952	592,776	<b>Net assets, end of year</b>	<u>\$ 12,282,665</u>	<u>\$ 9,994,568</u>
Total Current Liabilities	<u>4,044,071</u>	<u>2,860,931</u>			
<b>Deferred Rent, Net of Current Portion</b>					
	668,871	745,569			
Total Liabilities	<u>4,712,942</u>	<u>3,606,500</u>			
<b>Net Assets, Without Donor Restrictions</b>					
Undesignated	10,893,808	8,592,879			
Designated, Reserves	1,388,857	1,401,689			
Total Net Assets	<u>12,282,665</u>	<u>9,994,568</u>			
Total Liabilities and Net Assets	<u>\$ 16,995,607</u>	<u>\$ 13,601,068</u>			



## Member Spotlight

### Daniel Kaniewski, PhD

Managing Director, Public Sector, Marsh McLennan  
 Board Member, Multi-Hazard Mitigation Council  
 Chair, Committee on Finance, Insurance, and Real Estate

I became a member of NIBS in August 2020.

Natural Hazard Mitigation Saves is the definitive source for the value of hazard mitigation investments. Having served as the Deputy Administrator for Resilience at the Federal Emergency Management Agency, I can say that the report proved invaluable as we were developing the Building Resilient Infrastructure and Communities (BRIC) grant program. With its key finding that every \$1 invested in mitigation saves \$6 when a disaster occurs, Mitigation Saves provided strong justification to policymakers to support the proposed BRIC program. I'm not sure we would have BRIC today without Mitigation Saves.

Today, I frequently draw upon the NIBS research on hazard mitigation for my thought leadership, public speaking, and client engagements. With the ever-increasing library of empirical evidence produced by NIBS, I am optimistic that together we can inform policymakers and an array of stakeholders and increase resilience among individuals, businesses, communities and society as a whole.

NIBS connects me with stakeholders, who share my interest in strengthening the built environment with a goal of a more resilient nation. This also provides me a perspective beyond my own particular industry and keeps me abreast of building industry developments and policy proposals.

Anyone with an interest in disaster resilience will see value in NIBS. NIBS has the professional network, research, and experts that benefit members from the building industry and beyond.



## Thank you for supporting the nation's built environment.

The National Institute of Building Sciences serves the public interest through research, advancing building science, and coordinating the expertise necessary to overcome challenges.

We like solutions. Our goal is to build, rebuild, and reimagine a better tomorrow.

To our members, partner organizations, and local, state and federal government agencies who support our critical mission: Thank you for being a part of the solution.

Your hard work and dedication directly affect our communities, the building profession, and the people who work within this great industry.

NIBS serves the built environment at the pleasure of those who created us: Congress. But we receive no Congressional funding.

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Every dollar that is donated supports our mission and the U.S. built environment. Your donation may be tax deductible, please check with your tax advisor.

Thank you for your support.



## Organization Spotlight

### Procore Technologies

In 2021, construction technology platform Procore Technologies was named the NIBS Innovator of the Year. This was a new award for NIBS, and it was bestowed upon Procore for its ground-breaking advances, making significant technological contributions to the built environment.



But Procore considers its customers the real groundbreakers. They're the ones in construction who challenge the status quo – pushing the boundaries of construction – on the site, from the office, through their careers and roles, or with projects they choose and the businesses they build.

A changing world means more groundbreaking advances and more groundbreakers are needed. With increased globalization and mobility, we are witnessing the accelerated population growth, migration, and changes in the way we work, live, and play.

This is where Procore comes in. A cloud-based solution rooted in and solely dedicated to the construction industry, Procore connects all construction stakeholders on a single platform to increase collaboration, productivity and performance all through a single source of truth. From preconstruction to close out and beyond, owners, general contractors and specialty contractors have access to a unified source of data for accurate, real-time information across the entire project lifecycle.

Procore joined NIBS in February 2021 and sponsored Building Innovation. Several Procore staff members have joined various NIBS councils, and Procore's Global Head of Industry Transformation, Sandra Benson, joined the NIBS Board of Directors in October 2021.

Benson called the relationship between Procore and NIBS symbiotic.

"NIBS does the science, and we take that science and put it into practical use," she said. "We have similar missions. We are a collaborative platform, and our mission is to improve the lives of everyone in construction."

Procore's uncompromising focus on people who build the world means it's invested in advancing the construction industry through active membership in organizations like NIBS, providing more than 250 non-profit organizations the use of Procore free of charge and working with hundreds of educational organizations to train on Procore, empowering future generations to enter the construction workforce.

More about Procore:

- Procore has more than 12,000 customers and 2M annual users in 150+ countries
- More than \$1T of construction volume and 1M projects have run on the Procore platform over all time
- Offers nearly 350 Procore App Marketplace integrations
- Ranked No. 1 in Construction Project Management software in the 2021 ConTech Report by JBKnowledge

[www.procore.com](http://www.procore.com)





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