

Sights on 2050: How Digital and Physical Technologies are Shaping the Future of the Built Environment

May 20, 2025 | 9:20 a.m. Technologist Track

Presenters



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Challenges facing the built environment have become increasingly extreme during the last quarter-century.

As we embark toward 2050, the building industry is reckoning with significant threats, but we are also seeking collaborative solutions.

Among these solutions are physical and digital technologies that, together, can make buildings more resilient, sustainable, and optimized for the well-being of occupants.

This session will explore the technological systems and solutions—both physical and digital—that can empower building owners, occupants, and communities and shape the future of the industry.

Learning Objectives

- 1. Understand the role of technology in building resilience and sustainability: Learn how physical and digital technologies can enhance the resilience, sustainability, and well-being of building occupants.
- 2. Explore advancements in building technology: Discover the latest trends in building technology that drive decarbonization, energy savings, and future innovations in design and construction.
- 3. Improve design and construction processes with digital tools: Understand how digital technologies like 3D Revit models, BIM, and digital twins improve design efficiencies, collaboration, and project outcomes.
- 4. Utilize air quality data for healthier buildings: Learn how real-time indoor air quality sensors can provide actionable insights to improve building health, energy efficiency, and occupant well-being.

How Product Technology Contributes to Resilient and Sustainable Buildings

Looking at how the intersection of trends and technology leads to innovative solutions

- **The Situation** Trends driven by climate, technology & industry forces
- **The Approach** Building Science and impact on the occupant
- The Result Green solutions that make business sense



The Situation - Trends driven by Climate, Technology & Industry Forces

To thrive a growth business needs to balance short-term and long-term goals

- Clean Energy
 - Global temperature rise...GHG
 - Extreme weather events...resilience
 - Artificial Intelligence...grid stability
- Construction Labor Shortage
 - Aging workforce
 - Decline in vocational training
 - Immigration policies
- Future & Sustainable Spaces
 - Return to work...flight to quality
 - Green certifications
 - Regulatory



The Approach - Building Science & the Occupant Experience

Expanded set of disciplines are needed to explore innovative & sustainable solutions

- Armstrong has become a market leader by developing sustainable products that contribute to the aesthetic and acoustical performance of a space
- Our strategy has moved AWI towards a holistic IEQ approach to spaces that include Thermal, Sound, Air, and Light
- **IEQ is impacted by key elements of a building** including the building envelope, services (HVAC), external environment and the occupants
- To continue to be a leader in interior spaces, it needs to provide innovative product solutions which require deeper technical knowledge of building systems and services and how they interact with our products and their occupants





The Approach - Building Science & the Occupant Experience

Modern construction industry no longer looks at buildings as collection of individual pieces but as a system



The Result – Green solutions that make business sense

Dedicated to contributing to healthier, safer spaces where we live, work, heal and play

Energy-Saving Solutions

- Phase change material
 - Templok Energy Saving Ceilings
- Energy modeling
 - Integrated Environmental Solutions (IES)
- Sustainable Materials
 - Low-embodied carbon materials
 - Product circularity
- Construction Efficiency
 - SurveyLink
 - Modular grid panel
 - Overcast Innovations





Innovating the Design and Construction Process with Digital Technology

Illustrate how technology is revolutionizing design and construction efficiencies, collaborations, and project outcomes.

- The Situation
 - Trends for products, construction timeline and software tech
- The Approach
 - System focused, visualization of installation, and automation tools
- The Result
 - Service all customers in the construction value chain













Complexity of Solutions to achieve Design Intent





Direct Applied Ceiling Panels (1940's & 1950'S) - direct-attach ceiling design for a monolithic visual





Cubicles and Ceiling Integration (1960's & 1970's) - suspended ceiling design provided acoustic performance and created areas for lighting





Open Office Benching and Daylight (1980's & 1990's) - closed and open plan ceiling design took light reflectance into account





Coworking and Open Plenum (2000's & 2010's) - open plenum ceiling design led to increased use of specialty ceiling materials

Complexity of Solutions to achieve Design Intent



Wellness - Centered and Collaborative (2020's) – material options abound for ceiling design, but flexibility and preferences drive higher levels of system complexity

- 4x the number of components
- Products transition seamlessly, interior to exterior
- Layout and configuration driven by position of singular elements
- 4x the traditional ceiling weight being suspended with real wood ceiling

Speed of Building Construction Timeline/Process



Critical Pain Points –

- Clarity on product layout and/or position of components
- Coordination and Integration of MEP
- Design and Product Changes, late in the process
- Value Engineering Process
- Understanding of all parts and pieces
 needed for proper installation
- Formal agreement and sign off for material order

Range of Software Technology used across the Industry

High Level Observations -

- Numerous ways project information can be presented
- Approach to digital data management thru project life cycle
- Opportunities still exist for manufacturers to improve Revit content
- Debate continues on utilization of surface modeling vs. solid modeling
- The transition from AutoCAD to Revit continues
- Level of development remains a key topic, as it relates to file size or "weighing down models"



Expand Products and Capabilities for the Total Building

Focus on complete ceiling systems









Quickly identify Construction Feasibility

Visualization of Installation Rules and Relationships, from simple to complex systems





Digital services can use advanced technology and digital twins of solutions to quickly evaluate construction feasibility

Elevate Technical Proficiencies

Digital Design tools and automation to support comprehensive project deliverables

Detailed Revit RCP and 3D Revit model of the EXACT ceiling layout (Level of Development ~ 300); can be linked into existing building model and includes grid, perimeter trim, and panels.



Service all customers in the Construction Value Chain

Manufactures Sales Rep + Architect & Designer Collab

Manufactures Sales Rep + General & Sub Contractor Collab



Wide range of configurable solutions across multiple material sets

Services and technology can drive new methods of collaboration



- Collaborative design sessions to discuss solutions that meet design intent
- **Real-time visuals** of different solutions and configurations within project
- Basic RCP layouts and budgets to assist with evaluation options
- Ensure safe constructability of design by analyzing installation details of applied solutions





Acquire accurate materials budget for each layout to assist with evaluating product/design options

Automation of Component Counts and Optimization of Material Usage

Digital models and drawing packages show layouts and schedules to guide construction documents



- Detailed panel, suspension, and hardware layouts/schedules improve project coordination and reduce bid challenges
- Panel & Perimeter Trim optimization capabilities to reduce waste & support sustainability goals
- Materials budget & specification guidance
- 3D Revit model can be linked to existing building plan to support project evaluations
- Model can be used for renderings and architectural walkthroughs, saving time and enhancing client visuals









Software/Services to provide Design and Construction Efficiencies

Suspension and hardware layout shows exact location of each component, for added construction clarity



- Comprehensive panel, suspension, and hardware quantities for **fast, accurate estimates** and takeoffs
- Detailed panel, suspension, and hardware layouts help with **on-site project coordination**
- Panel modification tags, generic installation details, and accessory drawing details **add construction clarity**
- Panel and Perimeter trim optimization capabilities reduce cost and material based on realistic scrap reusability
- Accurate bill of materials with item numbers and quantities, carton sizes for **simplified ordering**











HOW – AND WHY – TO ROLL OUT AN INDOOR AIR QUALITY PROGRAM

Maya Bliss, MPH

May 20, 2025

The New War on Bad Air

A century ago, a well-ventilated building was considered good medicine. But by the time Covid-19 arrived, our buildings could barely breathe. How did that happen? And how do we let the fresh air back in?

The New Hork Times

GIVE THE TIMES

Buildings affect cognitive function



The Opportunity







BACKGROUND

ESSENTIAL ELEMENTS FOR REAL-TIME IAQ PROGRAMS







The Science	Real-time Performance	Insights	Response	Communications
Legal, Risk Management	Facilities Managers	Facilities Managers, EH&S, Executives	Facilities Managers, EH&S, Executives	Employees and the Public
H.E.A.A.L. Thresholds image: state of the state of		Frudar 2024 February 2024 Carch		

Focus



HOW-TO

USE STRUCTURED ANALYTICS TO DIAGNOSE ISSUES



Data without analysis causes overwhelm





Organizing IAQ Data for Actionable Insights and Scoring using H.E.A.A.L.TM





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H.E.A.A.L. is patented (U.S. Patent No. 11940433) and trademarked by 9 Foundations, Inc.

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A dual focus on occupant health and energy efficiency







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