Moving to Life-Cycle Performance

People, Processes Tools and Technologies to Reach Resilience

Our Resilient Future: Defining the Challenges of Today and Tomorrow

Ryan M. Colker, J.D.
Director, Consultative Council/Presidential Advisor
National Institute of Building Sciences
1090 Vermont Ave., NW • Suite 700
Washington, DC 20005, USA
202-289-7800 x133
rcolker@nibs.org
@rmcolker
Record Number of $1 Billion Disasters

Billion-Dollar Disaster Event Types by Year (CPI-Adjusted)

- Winter Storm
- Wildfire
- Trop Cycl
- Severe Storm
- Freeze
- Flooding
- Drought

5-Year Mean

http://www.ncdc.noaa.gov/billions/time-series
Current and Future Workforce

Construction companies face worker shortage

Krystal Nichols, The Tennessean 8:10 p.m. EDT April 16, 2014

NASHVILLE, Tenn. -- A recent development boom here has sparked worries among construction industry leaders about a looming worker shortage.

The Associated General Contractors of America, which represents 30,000 companies nationwide, estimates that a majority of the 2 million construction workers who lost their jobs during the Great Recession have either retired or found new jobs.
The Future of Code Officials

- Institute conducted demographic survey of nearly 4,000 code professionals for ICC
GAO High Risk List

GAO’s 2015 High Risk List

- Limiting the Federal Government’s Fiscal Exposure by Better Managing Climate Change Risks
- Managing Federal Real Property
- Establishing Effective Mechanisms for Sharing and Managing Terrorism-Related Information to Protect the Homeland
- Ensuring the Security of Federal Information Systems and Cyber Critical Infrastructure and Protecting the Privacy of Personally Identifiable Information
- National Flood Insurance Program

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Past/Current Workflow

High-Performance buildings mean a building that integrates and optimizes on a life-cycle basis all major high-performance attributes, including energy [and water] conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.

-Energy Independence and Security Act of 2007 §401 (PL 110-140)
It’s High Performance
Not High Desires!
Attacking on Multiple Fronts
Engaging Community Leaders

1. Adopt and enforce the latest building codes
2. Have city buildings and infrastructure lead through exemplary practice
3. Support education of the next generation buildings workforce
4. Evaluate community infrastructure, lifelines and interdependencies
5. Implement policies and incentives that encourage investment in sustainability and resilience
6. Focus on policies that support achievement of desired performance outcomes
Outcome-Focused Goals

- Greenhouse Gas Emission Reductions
- Zero Energy Buildings
- Energy Use Reductions
- 111(d) Plans

Incentives
- Utility
- Tax
- Permitting

Policies
- Benchmarking and Reporting
- Target Setting
- Compliance

Regulation
- Taxes
- Audit and Retrofit

Codes
- Metering
- Reducing Uncovered Loads

Building Industry
- Contracting
- Operations and Maintenance Training
- Licensure/Professional Ethics
Productivity and the Workforce

Tackling Productivity in the Building Industry

Collaboration
People and their effective engagement in project teams are the foundation of a project’s success. Project management and the project manager’s role must transform to achieve integrated, cohesive teams that enable productivity.

Contracts/Risk Allocation
Contract and risk allocation structures should enable collaborative and cohesive relationships. Contracts should support collaboration and performance-focused delivery processes that engage design, construction, and operations stakeholders. Risks should be identified, discussed openly, shared fairly, and problems resolved cooperatively and be allocated to the entity best positioned to mitigate their risk.

Technology/BIM
Technology, including BIM, virtual and augmented reality, gaming, and 3D printing, provide a wide range of opportunities to improve productivity throughout the project life cycle, as well as to attract new talent to the industry. Systems and processes that encourage the sharing of knowledge to drive continual improvement should be implemented.

Metrics & Knowledge Sharing
Consistent metrics must be developed and adopted for use across projects and the industry. Systems and processes that encourage the sharing of knowledge to drive continual improvement should be implemented.

Safety & Quality
Incremental during the design stage for the entire facility life cycle should be eliminated through use of strategies like Prevention through Design. Such strategies can reduce injuries, the physical challenges of construction work to reduce manpower needs and increase attractiveness of the industry to young people. A proactive and effective focus on quality from early design and throughout the project will enable productivity improvements and deliver higher-quality facilities.

Life-Cycle Focus
Projects should be focused on delivering the best possible performance across the life cycle to include design, construction, operations and reuse/ Redevelopment. Contracts and project teams should be set up to focus on optimizing life-cycle performance.

Workforce
Efforts should continue and expand to expose more high school and college-age students to career opportunities and provide them with the basic skills they need to work in the industry. Such programs include career and technical education opportunities. Advance training of the existing industry workforce through competency-based programs that demonstrate individual mastery which leads to performance improvements.

Off-site Construction
Off-site construction offers many advantages including better control of quality, schedule, jobsite safety and budgets. Consider collaboration of off-site construction early in the project and in a collaborative manner to capture the most benefit. Off-site productivity enhancers facilitate the expansion of off-site construction including BIM, collaborative delivery methods and project management strategies.

Recommendations from a Representative Hearing on Productivity and the Workforce

National Institute of Building Sciences
Sponsored by Autodesk
Supported by ICC International Code Council
Key Pieces in the Puzzle

Data

Finance

Policy
“The overall project delivery process and the allocation of total project funding (both in time and by actor) will need to change. Owners will need to recognize that they are investing in a project delivery process and not the individual components within that process. A long-term contract between architects, engineers, contractors, owners, and operators with engagement or recognition of other important participants (specialty designers and contractors, finance, insurance, etc.) may be required.”
IS INTEGRATED PROJECT DELIVERY TOO RISKY FOR YOU?

A QUIZ FOR BUILDING OWNERS, DESIGNERS AND CONTRACTORS

☐ IPD multi-party contracts cover costs, put profits at risk and may contain 'no sue' clauses.
   True  False

☐ IPD contracts are seen as dysfunctional regarding cooperation and blame.
   True  False

☐ IPD is covered by new insurance products.
   True  False

☐ IPD largely dispenses with competitive bidding.
   True  False

☐ IPD often mandates team decisions with no owner veto power.
   True  False

☐ IPD has been tested in the courts.
   True  False

Answers discussed on p. 22.
The departmental philosophy is that the City is a "facilitator partner" in a development. That partnership approach creates an environment where staff can be a partner by guiding the applicant where solutions can be implemented to move forward. Although inspection includes detailed minimum standards for approval, the partnership approach places the inspector in a "coaching" position which expedites corrective action and allows the project to pass approvals.

The Mercy project became an excellent demonstration of how a project can be quickly facilitated while protecting the health/safety/welfare of those who are occupants in the facility.

http://wbdg.org/references/cs_men.php
Zero Energy Building (ZEB):

- An energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy.

The designation Zero Energy Building (ZEB) should be used only for buildings that have demonstrated through actual annual measurements that the delivered energy is less than or equal to the on-site renewable exported energy.

Interdependencies Across Lifelines

Significant portions of the human, material and economic losses from disasters occur because such events disrupt the delivery of vitally necessary services of interdependent lifeline critical infrastructures, including energy, water, transportation, communications and emergency services, without which communities can neither recover nor long survive. Any one infrastructure is interdependent with others, so the direct loss of one is exacerbated as an initial failure may cascade to other infrastructures in a “chain reaction” that can spread losses widely throughout a region and beyond.
Transforming the Process

Information Hierarchy – GIS-CIM-BIM Relationship

Key:
- GIS
- CIM
- BIM
Completing the Circle

FOR IMMEDIATE RELEASE

APPA to Launch ANSI Standards Development Activity Addressing “Total Cost of Ownership” for Buildings, Facilities

October 22, 2015, Alexandria VA – APPA announced today its plan to develop an ANSI Standard that addresses facilities asset decision making, costs, and facilities assets to accurately project financial expenditures throughout the building lifecycle.

Institute Kicks Off Effort to Develop National BIM Guideline for Owners

The National Institute of Building Sciences (NIBS) is kicking off development of a new guideline to help building owners and their design teams utilize building information modeling (BIM) during the building design, construction and operations process and to better support owners’ performance requirements.

The National BIM Guideline for Owners, to be developed under the auspices of NIBS, The American Institute of Architects (AIA), Building Owners and Managers Association International (BOMA), International Facility Management Association (IFMA) and ASHRAE, will provide uniformity in the delivery of BIM projects to federal, state and local government building owners, as well as institutional and commercial building owners.
Governor Deukmejian Courthouse, Long Beach

- Public-Private Partnership/DBFOM
- The performance-based contract allowed the courthouse to be constructed without any public funding and provides for the ongoing maintenance and performance of the facility. Under the terms of the agreement, the Judicial Council can deduct a specific amount from the availability payment if components of the building do not work. For example, there is a $5,000 deduct for every two hours that certain elevators are inoperable.
7. CLIN 0005 – M&V and Warranty Period Verification. The Government will retain a pre-determined amount of dollars from the overall contract award during performance evaluation. Release of payment for this withheld amount will be contingent upon final confirmation that the energy performance standards for the facility (i.e. actual BTU/GSF saved) have been achieved as verified by the M&V and Warranty Period testing to be conducted within 365 days from final completion. The basis for the pre-determined amount shall be equal to .5% of the proposed construction price.
Olympia, Washington Government Project

1063 Block Replacement Project

Click on the images above for a larger version.

The 2013 Legislature authorized, with some conditions, Enterprise Services to replace the 1063 Capitol Way S. block with:

- a 200,000-225,000 square foot;
- high-performance multi-tenant office building;
- using the design-build procurement process (RCW 39.10);
- with a five-year performance guarantee on energy, operations and maintenance;
- tenant lease cost of no more than $26 per gross square feet.

Project Updates/Announcements

Sellen Construction Co. of Seattle and ZGF Architects of Portland have been selected as the apparent successful design team. Read the press release.

Subscribe for Updates
We **research** materials, design techniques, construction procedures, and other methods to improve the standard of practice.

We **educate** our profession through continuous learning. Through coordinated and continuous learning, design, construction and operations professionals can provide their clients with proven best practices and utilize the latest systems and materials to create more resilient communities.

We **advocate** at all levels of government for effective land use policies, modern building codes, and smarter investment in the construction and maintenance of our nation’s buildings and infrastructure.

We **respond** alongside professional emergency managers when disasters do occur. Industry experts routinely work in partnership with government officials to survey damage, coordinate recovery efforts, and help communities rebuild better and stronger than before.

We **plan** for the future, proactively envisioning and pursuing a more sustainable built environment.
MARS CITY Facility Ops Challenge

Model by KieranTimberlake, Gilbane, Alderson

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