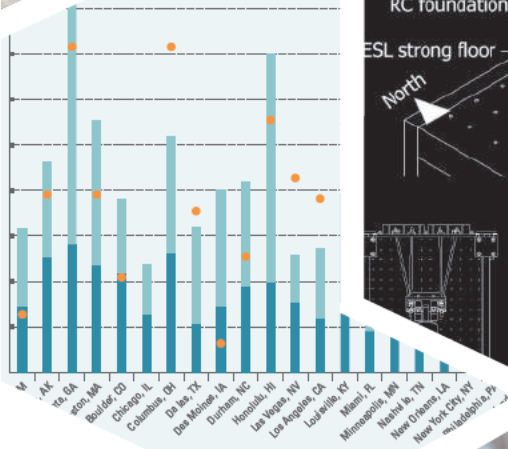
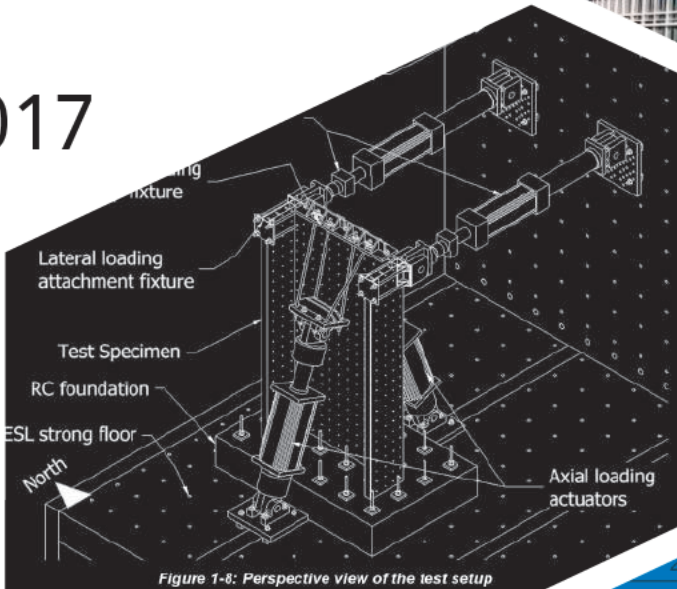


2017



IMPACT

Annual Report



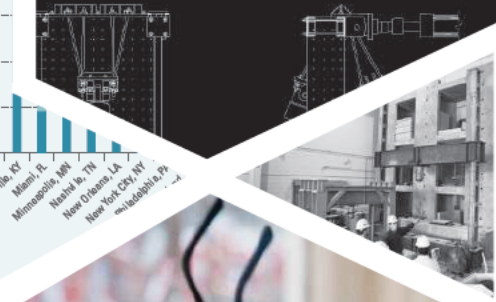
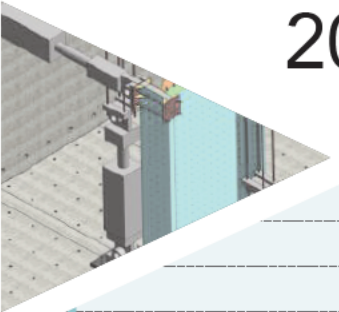
CHARLES PANKOW
FOUNDATION

Building Innovation through Research

$$I(x) := \frac{p \cdot t_p^3}{12} \left[\frac{y(x)}{t_p} \right]^2 \left[\frac{t_s(x)}{t_p} \right]^2$$

$$S(x) := \frac{p \cdot t_p}{\max(y(x), t_p)} \left[\frac{y(x)}{t_p} \right] \left[\frac{t_s(x)}{t_p} \right]^2$$

$$f(x) := \begin{cases} 0 & \text{if } 0 \leq x \leq \frac{l_e}{2} \\ \frac{2}{l_e} \left(x - \frac{l_e}{2} \right) & \text{if } \frac{l_e}{2} \leq x \leq l_e \\ \frac{(x - l_e)^2}{l_e^2} & \text{if } l_e \leq x \leq l_e + \left(\frac{t_{wo}}{2} - \frac{t_{s1}}{2} \right) \end{cases}$$



President's Message



“What’s your criteria to fund research?” we’re continually asked. I confidently respond that our number one criteria is **IMPACT**. Our funding and leadership participation must lead to timely and meaningful results. It must provide practical and immediate benefits to U.S. building design and construction teams. The research must have impact.

Let me illustrate what high impact research looks like to the Charles Pankow Foundation. In 2017, we released a major update to the [Tall Building Initiative: Performance-Based Seismic Design Guidelines for Tall Buildings v2.03](#). Originally funded and published by the Charles Pankow Foundation in 2010, this update incorporates the latest seismic design methodologies and important advancements.

Our funding partners – including the Federal Emergency Management Agency, the American Institute of Steel Construction, the American Concrete Institute Foundation, the Structural Engineers Association of California, and the Structural Engineering Institute of the American Society of Civil Engineers – all believe in the importance of the project.

Most major US cities consider these guidelines state-of-the-art for projects designed with performance-based seismic design methodology. Design solutions achieved through performance-based seismic design are not only more cost-effective, but result in better seismic performance. In this, the final product has demonstrated impact.

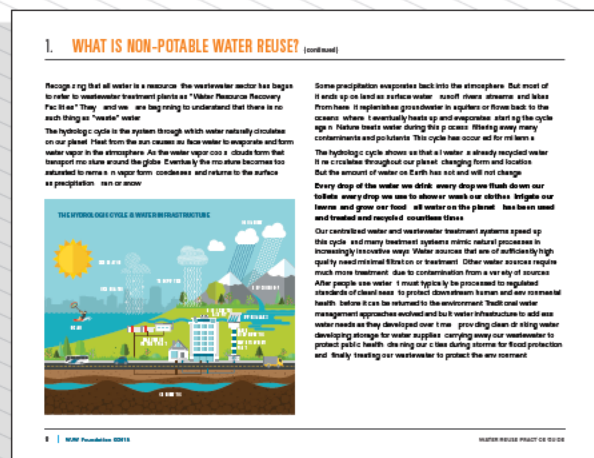
The design guide update was completed in just over a year, as compared to the decades-long process of updating prescriptive codes, a testament to what’s possible with effective leadership, focus, and funding.

This year, we look forward to completing several exciting projects: two important sustainability-related publications, a new BIM tool, an Integrated Project Development (IPD) Guide, and continued work on the major initiative to update the building codes for high strength steel reinforcing bar.

To all of you who support the Charles Pankow Foundation either directly or indirectly, thanks so much for all you do to make an **IMPACT!**

Richard M. Kunnath, PE
Board President, Charles Pankow Foundation





IMPACTing the Water Supply Through Onsite Reuse

The Urban Fabrick Collaborative (now the William J. Worthen Foundation) has completed [Onsite Non-Potable Water Reuse Practice Guide](#) to increase architects' and engineers' core competency with water reuse. Onsite non-potable water systems collect wastewater, stormwater, and rainwater, and treat it to be reused for non-potable needs such as irrigation, toilet flushing, and cooling.

The guide addresses scope definition, design, system specification, permitting, and operation of onsite non-potable water reuse technologies. The guide also includes onsite treatment strategies and conservation measures, the value of a more collaborative and integrated design process, the water-energy nexus, and strategies for communicating the value of water reuse systems to clients.

William Worthen, the principal investigator for this project, unexpectedly passed away in January 2017. Brett Rosenberg, project manager for the guide, and I are grateful for the continued support from the Charles Pankow Foundation, Google, Magnusson Klemencic Associates, the American Institute of Architects California Council, the Water Environment & Reuse Foundation, and other co-sponsors to ensure the guide pressed forward in Bill's honor.

We are committed to carrying on Bill's legacy of collaborative leadership and advancing a climate-positive future through policy, practice, design, innovation, and education. This project would not have occurred without Bill's commitment, tenacity, and charm.

Kyle Pickett
Managing Principal, Urban Fabrick



Research Grants Awarded 2017

\$120k

BIMForum

Building Information Modeling Execution Plan (BxP) Guide

\$260k

Purdue University

Development and Splice Lengths for High-Strength Reinforcement

\$150k

University of Kansas

Reinforced Concrete Coupling Beams with High-Strength Steel Bars

\$150k

University of Washington

Integrated Project Delivery Practitioners Guide

\$165.8k

University at Buffalo

R-Factors for Coupled Composite Plate Shear Walls—Concrete Filled

\$85k

University of California,

Los Angeles

FEMA P695 Study – “Enhanced Ductility” Reinforced Concrete Coupled Wall Systems

\$11.3k

University of Florida

Evaluating the Impact of BIM on Project Performance

\$8.3k

Penn State

Evaluating the Impact of BIM on Project Performance

What Could Have More IMPACT than Saving Our Planet?

The built environment accounts for more carbon emissions than any other sector. These emissions are typically quantified using life cycle assessment (LCA), a method that tracks environmental impacts produced by materials and construction (embodied impacts), building operations (operating impacts), and end-of-life.

To expand the use of LCA more broadly across the building industry, practical guidance on LCA methods was needed. The Charles Pankow Foundation, the Oregon Department of Environmental Quality, and Skanska USA sponsored this multi-stage project.

The first stage resulted in an Embodied Carbon Benchmark Study, which compiled the largest known building embodied carbon database and presented the results in an [interactive website](#) that enables users to explore the data.

The next stage, to be completed in 2018, is the **LCA Practice Guide**, which introduces the purpose and basic steps of LCA to building industry professionals. This guide was developed in tandem with a technical guidance document for LCA tool developers and experts to perform building LCAs in North America. Together, these guides enable broader adoption and more consistent application of LCA in the building industry, all to support the larger goal of reducing carbon impacts from the built environment.

Kathrina Simonen, AIA, SE, LEED-AP
Associate Professor, University of Washington





Research Grants Completed 2017

NORTHEASTERN UNIVERSITY

Jerry Hajjar, PhD, PE
Thermal Break Strategies for Cladding Systems in Building Structures

UNIVERSITY OF CALIFORNIA, BERKELEY

Jack Moehle, PhD, PE
Performance Characterization of Beams with High-Strength Reinforcement

UNIVERSITY OF TEXAS, AUSTIN

Wassim Ghannoum, PhD, PE
Defining Structurally Acceptable Properties of High-Strength Steel Bars Through Material and Column Testing

UNIVERSITY OF KANSAS

Andres LePage, PhD, PE, SE, FACI
High-Strength Steel Bars in Reinforced Concrete Walls: Influence of Mechanical Properties of Steel on Deformation Capacity

UNIVERSITY OF CALIFORNIA, BERKELEY

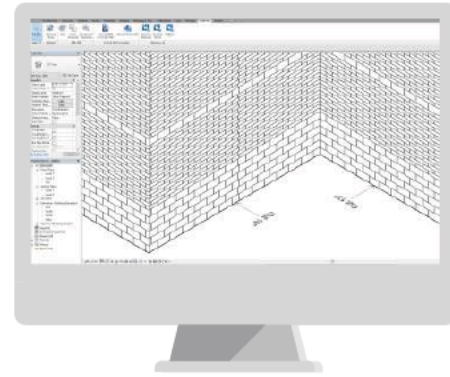
Jack Moehle, PhD, PE
Ron Hamburger, SE, SECB
Update to Performance-Based Seismic Design Guidelines for Tall Buildings

THE URBAN FABRICK COLLABORATIVE

Kyle Pickett
Design Professional's Practice Guide to Integrating Onsite Water Use and Reuse

UNIVERSITY OF WASHINGTON

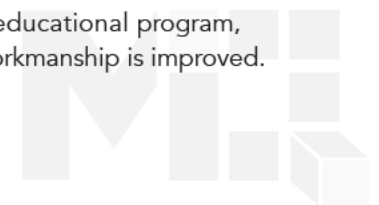
Kathrina Simonen, AIA, SE, LEED-AP
Life Cycle Assessment (LCA) for Low Carbon Construction



When Masonry IMPACTs BIM

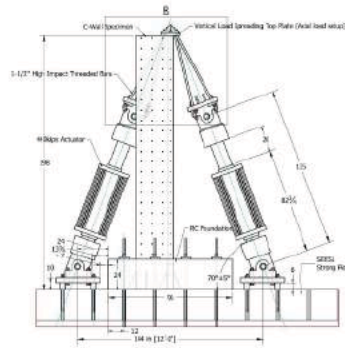
Charles Pankow Foundation is a longtime strategic partner, along with more than thirty other co-sponsors, of a major initiative called **Building Information Modeling for Masonry** (BIM-M). “Our goal is, simply, to make masonry easier to design and construct through BIM,” said David Biggs, PE, SE, BIM-M program coordinator.

One of BIM-M’s end products, **Masonry iQ** (an Autodesk® Revit® plugin) was launched in 2017. Before Masonry iQ, designers and contractors had few digital tools to incorporate masonry into their BIM model. Now, with the tool and an extensive educational program, masonry layout and field workmanship is improved.



Looking Ahead to an IMPACTful 2018

The Charles Pankow Foundation selectively confers grants to projects that have the potential for great impact. Research work is continuing at Purdue University and University at Buffalo on what might be the **most impactful project ever undertaken by the Charles Pankow Foundation**: concrete-filled composite plate shear walls. This new structural approach to core walls for high rise buildings has the potential for significantly reducing cost and schedule.



Another focus in 2018 will be the Charles Pankow Foundation itself. Many of us involved in the Foundation's leadership and operations are approaching retirement age. In late 2017, we held a facilitated strategic planning session, which we called "CPF 2.0." Succession planning is underway to assure that Charles Pankow Foundation will continue in a manner consistent with Charles Pankow's vision.



Charles Pankow Foundation Board of Directors and Staff:
(Left to Right) Ron Klemencic, Richard M. Kunnath, Mark J. Perniconi, and Timothy P. Murphy

The Secret's Out

The Charles Pankow Foundation and the Purdue University Lyles School of Civil Engineering sponsored a Structural Engineering Symposium in September 2017 featuring keynote speaker Ron Klemencic, PE, SE, Hon.AIA, Chairman & CEO, Magnusson Klemencic Associates, and Director, Charles Pankow Foundation.

[Watch Ron's presentation](#) and insights into the magic that has fueled his career.

