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American Society of Civil Engineers



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2019 Fall Lecture Series

Resilience and Sustainability for Structural Engineers

Thursdays, October 3, 10, 17, 24 and November 7, 2019

Simpson Gumpertz & Heger, 480 Totten Pond Road, Waltham, MA

6:00 PM Registration/Refreshments, 6:30 – 8:30 PM Lecture

ASCE SEI Boston Chapter is pleased to present the 24th Fall Lecture Series entitled *Resilience and Sustainability for Structural Engineers*. Topics include ‘Key Roles that Engineers Must Play in the Development and Integration of Future-Ready Infrastructure’, ‘Offshore Wind and the Transition to Renewables’, ‘Resilient Design - A New Paradigm in the High-Performance Building Movement’, ‘Building Performance and Design for Multi-Hazard Resilience’, and ‘Current Efforts in Boston for Sea-Level Rise’

Lecture 1 – Thursday, October 3, 2019

Key Roles that Engineers Must Play in the Development and Integration of Future-Ready Infrastructure

Tom Lewis, PE, JD, President, Louis Berger U.S., a WSP Company

Truly “Future-Ready” infrastructure must take into account many considerations well beyond just being compliant with codes, regulations and standard specifications associated with the particular owner and type of infrastructure. And no professional is in a better position to do this integration of considerations and solutions than engineers working for the infrastructure owner, its investors/funders its regulators, its consultants, its contractors, and its operators/maintainers. As such, a Future-Ready-focused infrastructure engineer - as well as planner, scientist, manager, etc. - should take every opportunity as early in the project life cycle as possible to ask and assess whether the right project scope is being proposed... before focusing on doing the initially proposed project scope right. This includes asking and answering many key questions like, is there an alternative approach or are there better materials and design elements that are: more efficient? ...more synergistic with other community needs? ...more innovative? ...more in line with future demands and conditions that may be very different than those that exist today? ...more sustainable? ...more resilient and enduring?lower in negative environmental and social impacts? ...lower in cost all-in (i.e., across the entire life cycle and not just capital cost)? ...better able to integrate “smart” sensors and monitoring as well as take into account other current and future “big data” resources that improve user experience, preventive maintenance, life-span, and overall asset management? This lecture presentation will further assess these types of questions and offer integrated Future-Ready solution scenarios, examples, and events/organizations/resources for consideration by infrastructure engineers.



Supported by the staff of The Engineering Center Education Trust

Lecture 2 – Thursday, October 10, 2019

Offshore Wind and the Transition to Renewables

Eric Hines, Ph.D., PE, *Professor of Practice, Tufts University*

Dan Kuchma, Ph.D., *Professor, Tufts University*

Over the next 30 years, the US must expand and modernize its power grid while retiring half of its existing power plants and transitioning to a low-carbon energy system. Along the nation's coastlines, it is now realistic to imagine geographically distributed networks of privately developed but coordinated offshore wind plants as a major contributor to this evolution. However, the current project-by-project and short-term approach to developing this new US industry cannot deliver and sustain the anticipated deployment levels required to meet the demands of this transition. Bringing these new power networks to scale and realizing their maximum social value by 2050 will require harmonization of diverse domains and stakeholders.

Lecture 3 – Thursday, October 17, 2019

Resilient Design – A New Paradigm in the High-Performance Building Movement

Derek Kelly, PE, *Principal, RWDI*

Since the 1970's RWDI has seen a global five-fold increase in the number of catastrophic weather events and a twenty-fold increase in annual insured disaster claims. In Canada alone insurance claims resulting from extreme weather events have exceeded a billion dollars each year for the past 5-years, totaling \$8.25 billion over that time period. The June 2013 floods in Calgary, Alberta alone resulted in insurance claims exceeding \$1.7 Billion (preliminary). Are you ready? Since their inception in 1972 RWDI has been a leader in the development of advanced technics to understand and model the climate and have worked on all 7 continents and every climate zone to development climate responsive, resilient design solutions. In this session they will be sharing, through examples of their work, methods and means: to understand climate; develop resilient passive architectural solutions; design for wind, snow and rain; and the benefits of a low energy building in our every changing climate.

Lecture 4 – Thursday, October 24, 2019

Building Performance and Design for Multi-Hazard Resilience

Mehrdad Sasani, Ph.D., PE, *Professor, Northeastern University*

While safety and collapse prevention should remain the primary objectives in building design, it is important to recognize that building functionality and reparability, which are key factors to achieve multi-hazard resilience, are not explicitly addressed by current building codes and standards. Accounting for these key factors in design requires reliable evaluation of severity and frequency of hazards (e.g. hurricanes and earthquakes), associated building demands and capacities, and assessment of post-hazard conditions in metrics such as extent of damage and time to recover. These, along with identifying a desirable level of rapidity in bouncing back following hazardous events, can help develop provisions in future building codes that quantify and enhance multi-hazard resilience.

Lecture 5 – Thursday, November 7, 2019

Current Efforts in Boston for Sea-Level Rise

Julie Eaton, PE, *Lead Resiliency Engineer, Weston & Sampson*

This presentation will discuss infrastructure issues associated with potential sea rise due to climate change. The focus will be on guidelines prepared for the City of Boston. Currently, the City is preparing for 40 inches of sea level rise by 2070. The Climate Ready Boston initiative is working to identify vulnerabilities and provide conceptual solutions throughout neighborhoods in Boston; the Coastal Resilience Solutions for East Boston and Charlestown Final Report was completed in 2017, the South Boston coastal resilience report is underway, and more studies are planned to follow. The City experienced significant coastal flooding during two Nor'easters in 2018. Recent findings of the Feasibility of Harbor-wide Barrier Systems: Preliminary Analysis for Boston Harbor, prepared by the Sustainable Solutions Lab at UMass Boston, indicate that shore-based climate adaptation solutions have significant advantages over a harbor-wide strategy for the City. With the growing number of conceptual solutions, emphasis on shore-based flood protection, and urgency for action, the City proactively identified that a framework for designing and evaluating climate resilient projects was needed to protect the public right-of-way.

Note: No Lecture on October 31, 2019

SPEAKERS

Tom Lewis, PE, JD, *President, Louis Berger U.S., a WSP Company*



Mr. Lewis is President, in charge of Federal Programs and Logistics for WSP USA. Prior to its acquisition by WSP, he previously served as president of Louis Berger's U.S. Division, and prior to that as its senior executive lead on environment, renewables, climate resilience, disaster and emergency management, and hazardous materials and waste services for federal, military, state/local, and commercial sector clients. Mr. Lewis previously sat on Louis Berger's board of directors, was a founding board member for the Berger Charitable Foundation, and has held multiple other corporate, philanthropic and industry organization board and committee positions – including more than 15 years with the Transportation Research Board and with the Zofnass Program for Sustainable Infrastructure Advisory Board at the Harvard University Graduate School of Design. He is a licensed professional engineer (PE) and passed the bar in multiple states, holds both a BS and MS in Engineering from the University of Connecticut, and holds a Doctorate of Jurisprudence with focus on environmental law/regulation from Rutgers. He has over 30 years of technical/management experience in the following services: transportation/infrastructure; emergency management; sustainability and climate change; contaminated sites investigation/remediation; environmental and IH/hazmat; geotechnical/geoenvironmental; environmental planning, assessments, impact statements; global infrastructure and development support projects; litigation, claims, permits and brownfields redevelopment; eco-restoration, sediments and water quality support; general civil and environmental engineering; and waste/landfills.

Eric Hines, Ph.D., PE, *Professor of Practice, Tufts University*



Mr. Hines, Ph.D., P.E., F.SEI has over 20 years of experience as a structural engineer designing innovative infrastructure and large-scale testing programs. Dr. Hines designed the Wind Technology Testing Center in Charlestown, MA and advised the Massachusetts Clean Energy Center on the development of the New Bedford Marine Commerce Terminal. As a Professor of Practice at Tufts University, he has led the POWER-US convening initiative and directs the Tufts University Offshore Wind Engineering Graduate Program. Formerly a partner of LeMessurier Consultants in Boston, Dr. Hines has over 70 publications and numerous awards related to systems design, industry-driven research and higher education. Dr. Hines completed his Ph.D. at the University of California, San Diego after studying the relationship between engineering and public policy as an undergraduate at Princeton University and as a Fulbright Fellow in Germany.

Dan Kuchma, Ph.D., *Professor, Tufts University*



Mr. Kuchma has been a Professor of structural engineering at Tufts University since 2014. Prior to this, he was a professor at the University of Illinois for 17 years; he obtained his PhD at the University of Toronto. His research is primarily focused on the design, testing, and modeling of concrete structures. He serves on the Building Code committee of the American Concrete Institute (ACI), chairs an ACI committee on wind turbine support structures, and is a member of 8 other national and international technical committees. The areas of application of his research and instruction are in offshore wind energy, earthquake engineering, railway engineering, and more generally in the design of structural concrete subjected to complex states of stress.

Derek Kelly, PE, *Principal, RWDI*



Mr. Kelly is a Principal and Project Manager at RWDI where he has been employed since 1998. He received his Bachelor of Engineering Science (Civil Engineering) from the University of Western Ontario, Canada, his Master of Engineering (Civil Engineering) from McMaster University, Canada and is a licensed Professional Engineer. He has vast experience having worked in projects in New York, Boston, Vancouver and Kansas City just to name a few. These include projects such as Yankee Stadium, Empire State Building, Verrazano Narrows Bridge, George Washington Bridge and the New Tappan Zee Bridge in New York, Millennium Tower and The Boston Gardens in Boston, The Golden Gate Bridge in San Francisco and the k1CON Bridge in Kansas City.

Mehrdad Sasani, Ph.D., PE, *Professor, Northeastern University*



Mr. Mehrdad Sasani is a Professor at the Department of Civil and Environmental Engineering of Northeastern University. Sasani's research interests include progressive collapse of structures, earthquake engineering, and structural integrity, resilience and reliability. He is the principal investigator of a \$1.1M project on A Decision and Design Framework for Multi-Hazard Resilient and Sustainable Buildings, which is supported by the National Science Foundation. Sasani is a member of several professional committees, among which, he is the chair of American Concrete Institute Committee 377: Performance-Based Structural Integrity & Resilience of Concrete Structures, and a member of committee for General Structural Requirements of ASCE 7. He is a fellow of American Concrete Institute; American Society of Civil Engineers; and Structural Engineering Institute.

Julie Eaton, PE, Lead Resiliency Engineer, Weston & Sampson



Julie is the Lead Resiliency Engineer at Weston & Sampson. For over a decade, her professional and academic ventures have focused on looking at climate change resiliency and adaptation from policy and design/engineering perspectives. She specializes in using a risk-based approach to identify and prioritize adaptation strategies. In addition to the resiliency program, she is also a Geotechnical and Dam Safety Engineer with Weston & Sampson. She has a Bachelor's degrees in Political Science (University of Rochester) and Civil Engineering (UMass Lowell), and a Master's degree in Civil Engineering (UMass Lowell). Climate change adaptation has been her passion since Hurricane Katrina hit New Orleans during her

freshman orientation at Tulane University. Shocked from the devastation, she dedicated her first undergraduate career to understanding why it happened and how it could have been prevented from a political science and urban planning standpoint. She started taking engineering classes to understand how the levees failed and the role of the Army Corps of Engineers, which led her to her second Bachelor's and Master's degree. She is a licensed Professional Engineer (Civil) and Municipal Vulnerability Preparedness (MVP) provider in Massachusetts.

Registration Deadline: Friday, September 27, 2019

Register to attend individual lectures or the full lecture series and pay by credit card online at <http://bit.ly/BSCESFallLectureSeries2019>. To register online for an event at the BSCES member rate you must login using your BSCES assigned username and password. If you do not know your BSCES member login information call 617/227-5551. To register for multiple lectures, please complete the registration form below and mail, email or fax it to BSCES, One Walnut Street, Boston, MA 02108, bscesreg@engineers.org or 617/227-6783, respectively. Cancellations received after September 27, 2019 and no-shows will be billed.

Directions to Lecture Hall and Parking:

Lecture Hall: SGH Lecture Space, 480 Totten Pond Road, Waltham, MA

Parking: Parking garage entrances off of Totten Pond Road and Prospect Hill Lane

Handouts: Registered attendees will be provided a website reference for downloading handouts/notes.

Pizza! We begin each evening with pizza starting at 6 pm during registration.

Registration Form BSCES SEI Boston 2019 Fall Lecture Series

Thursdays, October 3, 10, 17, 24 and November 7, 2019
SGH Lecture Space, 480 Totten Pond Road, Waltham, MA
6:00 PM Registration, 6:30 – 8:30 PM Lecture

Registrant Information

Name: _____
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Registration Fees

Full Series of Five Lectures

- \$195 BSCES/ASCE Member
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- \$60 BSCES/ASCE Member
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