

International Conference on Sustainable Infrastructure 2019

Leading Resilient Communities Through
the 21st Century

Los Angeles, California, USA
6-9 November 2019

Editors:

Mikhail V. Chester
Mark Norton

ISBN: 978-1-5108-9955-1

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2019) by American Society of Civil Engineers
All rights reserved.

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact American Society of Civil Engineers
at the address below.

American Society of Civil Engineers
1801 Alexander Bell Drive
Reston, VA 20191
USA

Phone: (800) 548-2723
Fax: (703) 295-6333

www.asce.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Contents

Climate Change

Climate Change Resiliency of Natural Gas Pipelines: Overview of Land Subsidence and Associated Issues in Central California	1
S. Oruji, Mehrshad Ketabdar, Karineh Gregorian, and Ramin Motamed	
Challenges and Potentials for Technology Advancement of Bioretention Cells in Stormwater Management	9
Mohammadsoroush Tafazzoli, Ashkan Nochian, and Kishor Shrestha	
Evaluating the Effectiveness of Best Management Practices in the Los Angeles River Watershed	17
G. Martinez and S. R. Lopez	
Buried Corrugated Steel Culvert Failure Mechanisms Due to Environmental Deteriorations	29
E. Nakhostin, S. Kenny, and S. Sivathayalan	
Chasing Storage during Flood Events in a Small, Multi-Jurisdictional Urban Watershed	41
Shirley E. Clark, Christopher Homer, Jacob Hoffman, Angela Brackbill, Mitchell Brady, Huzeifa Amiji, Steven Gross, and Colton Bowen	
Energy-Positive Operations—City of Los Angeles Hyperion Water Reclamation Plant	49
Ibrahim Hafeez, David Copp, Mike Sarullo, Timeyin Dafeta, and Hi-Sang Kim	
Urban Flood Hazard Modeling and Mapping Using PCSWMM.....	57
Aysha Akter and Md. Torikul Alam	
Evaluating the Feasibility of a Decision Support System for Transportation Infrastructure Resiliency in Response to Extreme Weather Events	69
Joe Rosalez, Sonya Lopez, and Mehran Mazari	
Building Coastal Resilience for Disaster Risk Reduction and Climate Change Adaptation through Green-Gray Infrastructure	78
Janet Bruins, Emily Corwin, Jocel Pangilinan, Emily Pidgeon, Stewart Taylor, and Kit Ng	
City of Naples, Florida, Sustainable Stormwater Infrastructure Improvements for Improved Coastal Resiliency	89
Karyn Erickson, Christin Perkinson, and Gregg Strakaluse	

The Impact of Climate Change on Urban Environment in GCC Countries and Related Energy Systems: Mitigation Measures and Associated Challenges..... 100
Ivan Andrić and Sami G. Al-Ghamdi

Seattle Digs Deep for Sustainability with the Ship Canal Water Quality Project 110
Richard Fernandez and Jennifer Ninete

Adapt and Thrive: Strategies for Life along a Dynamic and Changing Coastline 120
Jennifer Zell, Barry Lehrman, and Chuan Ding

Influence of Effective Depth and Initial Chloride Concentration on the Load Carrying Capacity of Steel Fiber Reinforced Concrete Corbels Subjected to Chloride-Induced Corrosion..... 131
Vahid Eghbalifarkoosh and Samantha Sabatino

A Methodology for Climate Risk Assessments for First Nations Communities 145
Guy Félio and Elmer Licker

Construction, Materials, and Structures

The Safe Distance on a Roadway..... 156
Mohammed Bin Ahmed Bin Ali Al-Maashani

A Probabilistic Approach to Determine Adequate Concrete Cover for Desired Service Life of RC Infrastructure in Corrosion Prone Environment 163
B. Baten, T. Torsha, Md. F. A. Khan, Md. J. Hasan, and T. Manzur

Magnetic Corrosion Detection in Concrete Structures..... 175
A. Elyasigorji, M. Rezaee, and A. Ghorbanpoor

Disruptive Technologies

Regional Green Infrastructure (GI) BMPs 185
L. Tortuya and D. Sorem

Investigating Unmanned Aerial Vehicles (UAVs) for Vertical Structural Inspection and Analysis 193
Chris A. O’Riordan-Adjah and Audrey Whitfield MacKenzie

Construction Information Management Systems: Conceptual Model to Improve Residential Construction Project Resilience and Productivity in New Zealand and Saint Vincent and the Grenadines 205
Daniel T. S. Campbell

Interactions of Sustainability and BIM in Support of Existing Buildings 216
Pedram Razavi Ebrahimi, Sepehr Alizadehsalehi, and Mohammad Ali Mosaberpanah

Enhancing Sustainability with Battery Storage in Wastewater	226
Jesse Pompa, Jerry Burke, and Sarah Recinto	
Performance-Based Design of Flood Protection Infrastructure.....	237
Alessandro Fascetti and Caglar Oskay	
Solar and Energy Storage: Los Angeles Beacon Project Case Study.....	244
Paul S. Lee and Thomas Honles	
Breaking Down Silos: Trends in Resilient and Sustainable Infrastructure Planning.....	254
Alison Fritz and Elizabeth Bradford	
Assessing the Long- and Mid-Term Effects of Connected and Automated Vehicles on Highways' Traffic Flow and Capacity.....	263
A. Mahdavian, A. Shojaei, and A. Oloufa	
IoT Integration of Infrastructure Systems in Smart Cities: The Impact of Interdependencies in Building Energy Systems	274
Neda Mohammadi, Abigail Francisco, John E. Taylor, Gisele Bennett, and Heyward Adams	
Willingness to Pay in the Autonomous Vehicle Age	281
Mariana Torres-Montoya and Marco Innao	
<i>Education</i>	
Green Economy: Lessons Learned	292
Camil Boulos	
Pragmatic Evaluation of Owner and Manager Influence toward Effective Management of Small-Medium Construction Company in South Africa.....	301
I. J. Akinyede	
Campus Sustainable Infrastructure as Living Lab at California State University Los Angeles.....	309
David Blekhman, Masood Shahverdi, Mehran Mazari, Arturo Pacheco-Vega, Brad Haydel, Carmen Gachupin, Michael Dray, and Jeffrey Underwood	
<i>Finance and Management</i>	
Tender Pricing of Infrastructure Projects: Affecting Factors.....	320
Bassam A. Tayeh, Wesam Salah Alaloul, and Noor K. Al-Ghazalli	
Port of Baltimore—A Case Study for Asset Management as a Risk Reduction Tool for Sustainability Initiatives	330
Byron Dunlap	

Framework to Optimize Cost of Quality in Delivering and Operating Green Buildings	338
Ayman M. Raouf and Sami G. Al-Ghamdi	

Risk Assessment of Results-Based Funding Mechanisms for Infrastructure Programs	348
Kareem Zahran and A. Samer Ezeldin	

Policy

Envision: Implementation through Verification in Los Angeles	355
Chris Sheppard, Mike Sarullo, Cris B. Liban, and Denise Nelson	

Procurement and Policies for Soliciting Sustainable Infrastructure	365
Perrin Falkner and Denise Nelson	

Impact of Project Delivery Systems on Cost Overruns of Green Building Projects: System Dynamics Approach	371
Ayman Raouf and Sami G. Al-Ghamdi	

Franklin D. Roosevelt Park Regional Stormwater Capture Project	380
Joseph Venzon, Mackenzie Domann, Thuan Nguyen, and T. J. Moon	

Ladera Park Stormwater Improvements Project	387
Paul Alva, Bruce Hamamoto, and Armando D'Angelo	

Practice

Land Management for Healthy Watersheds: A New Financial Incentive in the Mid-Atlantic	392
Chandler Van Voorhis, Darren Coffey, and Denise Nelson	

Sustainability of Tire-Derived Aggregate Concrete: A Case Study on Energy, Emissions, Economy, and ENVISION	399
Fariborz M. Tehrani, Maryam Nazari, Diem Truong, and Roshanak Farshidpour	

North Fork Matilija Creek: A Model for Environmentally Nuanced Restoration Projects	409
Ben Willardson, Tsou Jaw, and Peter Champion	

Seeing through a New Climate Lens: Canada's Policy Approach to Climate-Resilient Infrastructure	420
Charling Li, Sandra Banholzer, Christine Callihoo, and Guy Felio	

Challenges Facing Municipalities to Provide Wastewater Services: A Case Study of Gaza Strip	428
Bassam A. Tayeh, Wesam Salah Alaloul, and Abdallah Farid Alnairab	

Calling Engineers to Rise to the Challenges of Meeting the United Nations Sustainable Development Goals (UN SDGs)	441
Theresa E. Harrison and William E. Kelly	
Resilience and Sustainability in Underground Transportation Infrastructure: Literature Review and Assessment of Envision Rating System	447
Tonatiuh Rodriguez-Nikl and Mehran Mazari	
The City of Los Angeles Transforms an Industrialized Site to a Riverside Park.....	458
Bryan Powell, Christopher Johnson, Jason Fussel, and Elva Pangilinan	
Duel or Dual: Co-Benefits of LEED and Envision.....	466
Eric Dunford and Kaitlyn Gillis	
Protecting the Beach and Beneficial Use of Stormwater: Santa Monica CBI Project.....	474
Oliver Galang, Selim Eren, Merrill Taylor, and Jason Fussel	
Durable Concrete Design Guidelines for Bangladesh Using Chloride Mapping	482
G. M. Islam, F. H. Chowdhury, R. Rahman, and M. M. Raton	
Results Follow Process: Leveraging the Integrated Design Process (IDP) to Fundamentally Change and Improve How We Design Infrastructure	494
Quin MacKenzie	
Sustainability Assessment and ENVISION Rating of Lightweight Masonry Walls in Conventional Buildings	502
Fariborz M. Tehrani, Mohammad Pouramini, and Elnaz Mohammadiyaghini	
<i>Resiliency</i>	
Living with the Bay Resiliency Strategy and Program.....	508
Michael Bomar	
Comparison of Conventional Diesel and Mobile Solar Hybrid Power Generators in Long-Term Temporary Power Applications.....	522
A. Nadolishny and D. Canals	
Climate Change Mitigation for Coastal Communities	533
Teresa C. Vangeli, Gelyn Strileckis, and Justin Cesino	
Fire following Earthquake Risk Assessment: The City of Los Angeles' Efforts toward Water System Seismic Resilience and Sustainability	543
Craig Davis, Charles Scawthorn, Richard Coles, and Laureen Abustan	
Probabilistic Sustainability Assessment of Bridges Subjected to Multi-Occurrence Hazards.....	555
Nariman L. Dehghani and Abdollah Shafieezadeh	

Probabilistic Lifecycle Cost Analysis of Levees against Backward Erosion 566
Mehrzaad Rahimi, Nariman L. Dehghani, and Abdollah Shafieezadeh

A Granular Simulation of Bridge Closures Due to a Southern California Scenario Earthquake and Its Effects on the Disruption and Recovery of Freight Traffic to and from Ports of Los Angeles and Long Beach 575
Barbaros Cetiner, Eyuphan Koc, Lucio Soibelman, Ertugrul Taciroglu, Ellen Jisu Lee, and Anya Nutakki

Assessment of the Dynamics of Human System Networks in Water Infrastructure Adaptation to Sea-Level Rise Impacts..... 586
Tamarah Ridha and Ali Mostafavi

Preparation for a World of Resilience Investment 596
J. F. Williams II

Society and Urbanization

Sustainability in the Developing World: An Investigation on How Emerging Economies Are Performing..... 602
Camil Boulos

Investigating Barriers to Sustainable Urbanization 607
Mohammadsoroush Tafazzoli, Ashkan Nochian, and Ali Karji

Nelson Mandela Bay Metropolitan Municipality’s Bus Rapid Transit System: Case Study 618
Bradley Picard, Sadeqh Asgari, and Ebrahim Karan

Anti-Corruption, Ethics, Sustainable Infrastructure, and the UN Sustainable Development Goals..... 626
William E. Kelly and William P. Henry

The Relationship between Sustainability and Resilience of Food-Energy-Water Systems 634
Ebrahim P. Karan, Sadeqh Asgari, Atefeh Mohammadpour, and Somayeh Asadi

Transformational Change through Leadership: Lessons from the First Electric Metro Line in Lima 642
Judith Rodríguez

Advancing Resilient and Sustainable Buildings through a New Normative Workflow for Integrated Life-Cycle Assessments 652
Karen Angeles, Dimitrios Patsialis, Tracy Kijewski-Correa, Alexandros Taflanidis, Charles F. Vardeman II, and Aimee Buccellato

The Cities We Have, the Cities We Want..... 660
 Rocky Piro, N. Beegle, J. Ferguson, S. Fisher, M. Reiner, M. Stephens,
 M. Stevens, and C. Thompson

**Creating a Common Language: How Does the Sustainable Infrastructure
 Criteria Compare to the SDGs? 671**
 C. Contreras

**Quantitative Assessment of Sustainable Performance Criteria for Developing
 a Sustainable Building Assessment Tool (SBAT)..... 689**
 A. Suchith Reddy, P. Rathish Kumar, and Anand Raj

**Analyzing the Environmental and Economic Sustainability of Building
 Materials Flow under Geopolitical Uncertainty 703**
 Shaikha R. Al-Nuaimi, Yemane Weldemichael Weldu, and Sami G. Al-Ghamdi

**The Olympics Infrastructure: The Importance of Stakeholder Engagement
 and Sustainable, Intentional Urban Planning 715**
 Melissa M. Elder

Elevating Humanity to Optimize the Mobility Revolution 722
 Kaia Nesbitt and Beth Zacherle

Workforce Development

**How Multi-Disciplinary Teams Can Improve the Sustainable Design Process
 and Project 729**
 Theresa Harrison