Structures Congress 2018

Bridges, Transportation Structures, and Nonbuilding Structures

Selected Papers from the Structures Congress 2018

Forth Worth, Texas, USA 19 - 21 April 2018

Editor:

James Gregory Soules

ISBN: 978-1-5108-6233-3

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© (2018) by American Society of Civil Engineers All rights reserved.

Printed by Curran Associates, Inc. (2018)

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

Construction Overview1
David B. Spires, Yingqin (Elaine) Jin, Bryce Binney, Victor Ryzhikov, and Patrick Hays
Optimized Fatigue Analysis of Steel Bridges Using Finite Element Method
Impact Treatment of Highway Bridge Welds to Enhance Durability of Steel Bridges: Mechanism, Limitations, and Design
A Soil-Structure Interaction Procedure for the Design of Bridges on Drilled Shafts
Andrew R. Kimmle and Carlos G. Matos
Recommendations for Improving Fire Performance of Steel Bridge Girders48 Reeves Whitney, Nicole Leo Braxtan, and Halima Alsayed
Investigation of Eliminating Prestress in Bridge Girders with the Use of Non-Prestressed Ultra-High-Performance Fiber-Reinforced Concrete Girders
Venkatesh Babu Kaka and Shih-Ho Chao
A Hybrid Composite System for Strengthening Concrete Columns
Multi-Scale Finite Element Model Development for Long-Term Condition Assessment of Vertical Lift Bridge90
Maryam Mashayekhizadeh, Milad Mehrkash, Vahid Shahsavari, and Erin Santini-Bell
Effect of Soil Conditions on the Seismic Response of Three-Span Integral Abutment Bridges100
D. L. Kozak, L. A. Fahnestock, and J. M. LaFave
Corrosion in the Substructure of a Pedestrian Bridge at YSU: A Case Study111 A. K. M. Anwarul Islam and Bhishan Poudel
Mitigation of Shrinkage Cracking in Bridge Decks Using Type-K Cement

Minimizing Ends' Cracks of Skewed Pre-Tensioned Box Beam Concrete Girders	12
Girders	,,
Precast Prestressed Concrete Through-Girder System for Shallow Bridge Structures	15
Diaphragms to Girders Connection Effect on the Rotation of Exterior Girders during Construction	54
Analysis of Cracking Caused by Hydration Heat in Bridge Seals Utilizing Innovative Massive Concrete Mixtures	5 7
Preservation of a Historical Timber Bridge in California	'6
Timber Bridge Inspection Using UAV	36
Expanding the Case for Structural Health Monitoring: A Focus on Its Role in Maintenance and Operations and Asset Management Systems	7
Small Unmanned Aerial Vehicle (sUAV) Inspections in GPS Denied Area beneath Bridges)5
Bridge Inspection and Condition Assessment Using Image-Based Technologies with UAVs	17
Friction's Contribution to Maximizing the Life-Cycle of Structures	29
Maintenance Optimization for Deteriorating Bridges under Uncertainty24 O. Khandel and M. Soliman	12
Extending the Life-Cycle of Reinforced Concrete Columns by FRP Strengthening	52
Automating Refined Load Ratings for Girder Bridges	51

Application of a Sequence-Free Iterative Structural Identification Framework for Reserve Capacity Estimation of a Steel-Concrete Composite Bridge27 Sai Ganesh S. Pai and Ian F. C. Smith	75
Design Phase of Life in Coastal Bridges to Minimize Environmental Impacts and Improve Resiliency	87
Analytical Models for Seismic Repair of Bridge Columns Using Plastic Hinge Relocation	96
Fragility Curve Development for the Seismic Vulnerability Assessment of Retrofitted RC Bridges under Mainshock-Aftershock Seismic Sequences	08
Numerical Analysis of AFRP Reinforced Concrete Columns with Replaceable Structural Fuses as Energy Dissipaters under Cyclic Loading	17
Moment-Curvature Analysis of Hybrid Concrete-Filled Fiber Reinforced Polymer Tube Columns Alexandra Hain, Arash Esmaili Zaghi, and Angela Lanning	38
The Dynamics of Precast Post-Tensioned Rocking Columns	49
Enhancing Fatigue Performance of Rib-to-Deck Joints in Orthotropic Steel Decks Using Thickened Edge U-Ribs	59
Repairing the Yullajung Pedestrian Suspension Bridge: Service Learning in the Nepal Himalaya	70
Analysis and Design of Flame Ducts	80
Dynamic Evaluation of ID Fan Foundation System	92
Selection of Concrete Mix Design Types for Petrochemical Structures40 Eric Wey and Nam Do	00
Sustainability Methods in the Design of Industrial Structures40 Eric Wey and Emily Horton	08

Turbine Generator Foundations—State-of-Practice Review
A Case Study on the Dynamic Analysis of a Combustion Turbine Generator Foundation Using Different Soil Modeling Approaches
Seismic Design and Analysis of Concrete Liquid-Containing Tanks
Deflection Analysis of High Performance, Exterior Wall Systems
Design of Industrial Equipment Support Structures—Considering Interactions between Equipment and Structures
Arctic Engineering: Structural Evaluation on the North Slope of Alaska
Industrial Structure Repair Case Study: Structural Assessment and Repair Prioritization
Restoration of Coker Structures
Extending Building Façade Performance Requirements for Blast: Hazard and Injury Assessment Investigations
Dynamic Response of a Four-Cylinder Compressor Foundation Considering the Effect of Soil-Foundation Interaction—A Case Study
Dynamic Buckling of Aboveground Storage Tanks Subjected to Hurricane-Induced Waves
Integrated Vibration Control and Energy Harvesting of Offshore Wind Turbines Subjected to Misaligned Wind and Wave Loading