

Pipelines 2015

Recent Advances in Underground Pipeline Engineering and Construction



Edited by V. Firat Sever, Ph.D., P.E. Lynn Osbor<u>n, P.E.</u>



PIPELINES 2015

RECENT ADVANCES IN UNDERGROUND PIPELINE ENGINEERING AND CONSTRUCTION

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> EDITED BY V. Firat Sever, Ph.D., P.E Lynn Osborn, P.E.



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Preface

It is an exciting time to be in the pipeline industry. The importance of pipeline infrastructure can never be over emphasized; from supplying drinking water to collecting wastewater, conveyance of petroleum products and other fluids (or for some cases solids as well), we depend greatly on pipelines. This year particularly marks a milestone for the pipeline industry as the ASCE Pipelines Division is becoming an institute. This will mean more opportunities for technical and personal growth, as well as more direct involvement of ASCE members in pipeline related activities.

In coordination with ASCE, the technical program and this publication was planned and implemented by the Technical Program Committee (TPC), which was led by the Technical Co-Chairs. We received a record high number of abstracts, and this turned the abstract selection process into a challenging task for the TPC. Nevertheless, the meticulous selection process based on a scoring system, followed by the TPC discussion on the abstracts with a critical score, resulted in a high quality technical program with seven tracks. These seven tracks, namely, Trenchless Installation, Design and Construction (2), Assessment and Rehabilitation (2), Operations, Maintenance, Risk and Safety, and Planning and Analysis, include 59 sessions of technical paper presentations, two panel discussions (one on fiber optics and one on energy generation in pipelines), and one session comprised of a presentation on engineering ethics by the ASCE. The overall technical program was further boosted by six workshops on pressure pipe design, large diameter pipes, specifications for cured-in-place pipe and manhole rehabilitation, asbestos cement pipe bursting, corrugated HDPE pipe, and AWWA pipe manuals of practice.

Our intent was to prepare a balanced technical program with today's trends in mind for the pipeline industry, without sacrificing the overall quality of the content. We are also delighted to receive tens of abstracts from five continents; thereby, dubbing this event as an international conference.

On behalf of the Technical Program Committee, we are pleased to offer you the Proceedings of ASCE Pipelines 2015. We enjoyed reading these technical papers, and hope that you will find them useful and enjoyable too.

Warm regards,

Firat Sever, Ph.D., P.E., M.ASCE, and Lynn Osborn, P.E., M.ASCE Technical Co-Chairs

Acknowledgments

Technical Program Committee

<u>Technical Program Co-Chairs</u> V. Firat Sever, American Structurepoint, Inc. Lynn Osborn, LEO Consulting, LLC.

<u>Technical Program Committee Members</u> Dan Koo, Indiana University Purdue University (IUPU) Erin McGuire, CDM Smith Travis Wagner, Pure Technologies

Pre-Conference Workshop Leads

Large Diameter Pipeline Forum Nathan Faber, San Diego County Water Authority AWWA Pipe Manuals of Practice Liz Ralph, AWWA Paul Olson, AWWA Pressure Pipeline Design for Water and Wastewater Doug Biglen, HDR, Inc. and Sam Arnaout, Hansen Pressure Pipe Comprehensive Asbestos Cement Pipe Bursting Workshop Edward Alan Ambler, P.E., LEED AP, City of Casselberry, FL Design Practice for Corrugated High Density Polyethylene Drainage Pipe Dan Currence, Plastics Pipe Institute Writing Performance Specifications for Cured-In-Place-Pipe and Manhole Rehabilitation Technologies Projects. What must be included? Gerry Muenchmeyer, P.E., Muenchmeyer Associates

ASCE Staff

Lauren Miller Barbara Whitten Sean Scully Tenzing Barshee John Segna

The Technical Program Co-Chairs thank the peer reviewers, most of whom also served as Session Moderators at the conference, for their timely reviews under a tight schedule and their leadership during the conference.

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The Technical Program Co-Chairs also thank the authors for their dedication to the industry in preparing a paper for this conference. Without your contributions, the conference would not be possible.

And lastly, the Technical Program Co-Chairs express special thanks to Ahmad Habibian and Camille Rubeiz, Conference Co-Chairs, for their vision and leadership during the planning and execution of Pipelines 2015, and also for their continual support and confidence in the Technical Program Co-Chairs.

Contents

Trenchless Installation

| Sugarloaf Pipeline, Kp41 Tunnel—Design and Construction1 Marcus Weeks |
|---|
| Challenges and Rewards of a Successful Compound Curve Microtunnel Drive |
| Dennis Shearer, John Fowler, and Jeff Anderson |
| Microtunneling Technology Implemented for the Replacement of an Aging One Mile PCCP 36-inch Force Main to Minimize Environmental Impacts |
| M. Notheis and B. Schillo |
| Kaw WTP Water Transmission Main: Serving NorthLawrence and BeyondJeff Heidrick, Philip Ciesielski, Michael O'Connell, and Shawn Wilson |
| Permitting Requirements Drive Trenchless Design and Project Risk: An HDD Pressure Pipeline Case History45 C. G. Price, M. P. Olson, and J. E. Staheli |
| HDD Utilized to Complete Key Crossings for Transmission Lines from New Woodbridge Energy Center |
| How to Manufacture an Endless Pipe Onsite |
| Hitting the Bulls-Eye: How to Cut-In a 108" Outlet to a 108" Vertical Shaft 230' Beneath a Lake |
| Alternative Pipe Material Choice Provides Trenchless Solution |
| Teamwork in Trenchless Projects: The Martha Lake GatewayExperienceSchey, Ben Nelson, Michael Kucker, Matthew Pease, and Paul Richart |

| Experimental Examination of the Mathematical Model for Predicting the Borehole Pressure during Horizontal Directional Drilling109 Xuanchen Yan, Sarkar Sayem, Erez Allouche, and Shaurav Alam |
|---|
| Victory Pipeline Duchesne County Utah Water Conservancy District |
| Big Pipe—Tight Quarters: Lessons Learned from Large Diameter Urban Pipelines |
| Arching Effects in Box Jacking Projects145 Babak Mamaqani and Mohammad Najafi |
| Pipe Haunching Study Using Non-Linear Finite Element Analysis Including the Use of Soilcrete |
| Trenchless Rehabilitation Saves Grottoes, VA, Culverts—and Money—Without Disrupting Traffic |
| Trenchless Technologies Decision Support System Using Integrated Hierarchical Artificial Neural Networks and Genetic Algorithms |
| Water Pipeline from Turkey to Cyprus—1,600 mm Diameter Polyethylene 100 Pipeline and Its Flange-Technology Solution191 Dragisa Dubocanin |
| Make Way for Progress—The Challenges of Relocating Large Diameter Water Mains for Light Rail System Expansion |
| Under the River and through the Woods: Design and Construction of Two Large Diameter Horizontal Directional Drills for the City of Corpus Christi |
| Lessons Learned from Horizontal Directional Drilling Installation of HDPE Sewer Forcemains in Anne Arundel County, Maryland221 James A. Howard |
| HDD River Crossing Improves Reliability of Water System and Meets Growing Demand |

| Thermal Contraction Lesson Results in Steel Tunnel Liner Damage238 B. Nash Williams |
|---|
| An Engineer's Guide to Nondestructive Weld Examination250 Terri Tovey |
| Streamlining the Submittal Process—Do's and Don'ts257 Roger Beieler and Amie Roshak |
| Liquefaction-Induced Differential Settlement and Resulting Loading and Structural Analysis of Buried Steel and Cast Iron Pipelines267 Yogesh Prashar, Annahita Fallah, Roberts McMullin, and Xavier Irias |
| Guidance from Tunnel Impact Analyses for DC Clean Rivers Project: Design Build Bidding to Protect Critical Pipelines |
| Design and Construction I |
| Seismic Fragility Functions for Sewerage Pipelines |
| Identifying Seismic Vulnerability Factors for Wastewater Pipelines after the Canterbury (NZ) Earthquake Sequence 2010–2011 |
| Shaking Table Test for Axial Behavior of Buried Inner Rehabilitated Pipes Affected by Aging Pipes in Liquefied Ground |
| Design and Fabrication Requirements of a High-Pressure Steel Pipeline |
| Analysis of a Steel Pipeline in a Seismically Active Region |
| Analysis and Behavior of Steel Pipe Welded Lap Joints in Geohazard Areas |
| Performance of Polypropylene Corrugated Pipe in North America365 John M. Kurdziel |