

# PORTS 2013

## *Success through Diversification*

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PROCEEDINGS OF THE THIRTEENTH TRIENNIAL  
INTERNATIONAL CONFERENCE

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Seattle, Washington

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PIANC

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# Preface

Continuing a long tradition of excellence, **PORTS '13**: “Ports: Success through Diversification” will be the 13th in a series of international port and harbor development specialty conferences held on a tri-annual basis since 1977. This conference’s theme was selected in recognition of the broad spectrum of factors that make ports so important to their local, regional, and national communities, including the wide range of missions they support, e.g., moving cargo, providing recreational opportunities, serving as engines of economic development, and providing for stewardship of environmental resources.

**PORTS '13** is sponsored and organized by the Ports and Harbors Committee of the Coasts, Oceans, Ports, and Harbors Institute of the American Society of Civil Engineers and co-sponsored by PIANC. The Ports and Harbors Committee focuses its activities on improvement of port, waterway, and facility engineering, development, and operating techniques, practices, and standards. Many of the Committee membership were actively involved in the development of the **Ports '13** program and organization of the conference. The Conference efforts were led by:

Tom McCollough, P.E., Conference Chairman  
Bruce Ostbo, P.E., S.E., Technical Committee Chairman  
Don Oates, P.E., S.E., Technical Committee Vice Chair

Nearly 300 abstracts were submitted for consideration by the Conference Technical Committee, consisting of 51 individuals drawn from the port design and development community. The Technical Committee chose 196 for publication in these Proceedings and presentation at the Conference. These papers reflected our industry’s full diversity, and were organized into 51 technical sessions covering:

**Environmental Issues:** Air and Water Quality; Transportation and Traffic;  
Climate Change Impacts; Environmental Compliance and Liabilities;  
Green Infrastructure; Regulatory and Permitting; Habitat and Wildlife:  
Creation, Protection, Mitigation, and Restoration; Redevelopment;  
Regulatory and Permitting; Site Remediation: Innovative Port Programs  
**Equipment and Systems:** Automation and New Technology  
**Navigation and Waterways:** Widening and Deepening; Navigation  
Technology; Modeling and Simulation  
**Port Engineering and Infrastructure,** Coastal; Extreme Events (seismic,  
tsunami, storm surge and waves, wind); Facilities and Operations;  
Geotechnical: Foundations and Reclamation; Inspection, Repair, and  
Maintenance; Structural

***Port Planning and Operations:*** Development Management and Master Planning; Facility Management; Urban and Community Interfaces  
***Project Development:*** Construction Management; Design, Build, Finance, and Operate  
***Terminal Planning and Design:*** Container; Container, Liquid and Dry Bulk; Cruise, Ferry, Small Craft and Recreation; Liquid and Dry Bulk; Miscellaneous Terminals  
***The M 9.0 Tohoku Earthquake and Tsunamis of March 11, 2011: Port Performance and Implications for Design in Regions of High Seismicity.***

The success of this Conference, as with all ***Ports*** Conferences, has relied on the contributions of the authors who submitted their work for our consideration. The preparation of ***Ports*** conference abstracts, papers, and presentations is a demanding process, and our sincere thanks go out to all of those who have participated.

The Technical Committee was responsible for reviewing and selecting Abstracts, reviewing and vetting submitted Papers, ensuring compliance with the Conference's publication rules, reviewing Presentations, and acting as Session Chairs at the Conference. Their contributions and the support of their organizations are deeply appreciated:

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