

WODA



World Organization of Dredging Associations

PROCEEDINGS OF THE EIGHTEENTH WORLD DREDGING CONGRESS (WODCON XVIII)

May 27 – June 1, 2007

Lake Buena Vista, Florida USA

PROCEEDINGS
OF THE
EIGHTEENTH WORLD DREDGING
CONGRESS (WODCON XVIII)

GLOBAL DREDGING

May 27 – June 1, 2007
Lake Buena Vista, Florida USA

Edited by

Robert E. Randall, Ph.D., P.E.
Professor of Ocean and Civil Engineering
Director, Center for Dredging Studies
Ocean Engineering Program, Zachry Department of Civil Engineering
Texas A&M University, College Station, Texas 77843-3136

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WELCOME

Welcome to the Eighteenth World Dredging Congress (WODCON XVIII), Disney World, and Orlando, Florida. On behalf of your host, the officer, directors, and members of the Western Dredging Association, we sincerely hope that you will find the technical programs, the exhibits and networking time with others in the international dredging community to be outstanding. The Goal of the World Organization of Dredging Association's (WODA) Tri-annual Congress is to promote professional development in the various operational and technical fields related to dredging, navigation, marine engineering and construction, as well as the enhancement of the marine environment. We are confident that you will, at the end of this congress, come away with a better understanding of the solutions available to solve the challenges facing our industry.

The site of this congress, Disney World in Lake Buena Vista, Florida, will surely add enjoyment to your visit because the entertainment opportunities in the surrounding area are fantastic.

If there is anything we can do anything to help your attendance at this congress more enjoyable, or you have any questions, please stop by the Registration Desk so our staff of Congress Organizers and local experts may assist you.

I wish each one of you a safe, educational, and joyful experience during the Eighteenth World Dredging Congress.

Sincerely,

John F. Adams
President
Western Dredging Association

PAST WODA/WODCON MEETINGS

Past WODCON meetings have been held in the following locations: New York, NY (1967), Rotterdam, The Netherlands (1968) Singapore (1970), New Orleans, LA (1971), Hamburg, Germany (1973), Taipei, Taiwan (1974), San Francisco, CA (1976), Amsterdam, The Netherlands (1978), Vancouver, BC (1980), Singapore (1983), Brighton, England (1986), Orlando, Florida (1989), Bombay, India (1992), Amsterdam, The Netherlands (1995), Las Vegas, Nevada (1998), Kuala Lumpur, Malaysia (2001), Hamburg, Germany (2004), and now, Lake Buena Vista, Florida, USA (2007).

WORLD ORGANIZATION OF DREDGING ASSOCIATIONS

The World Organization of Dredging Associations (WODA) is divided into three separate organizations. The Western Dredging Association (WEDA) region covers North, Central, and South America; the Central Dredging Association (CEDA) covers most of Europe, Africa, the Mid and Near East; the Eastern Dredging Association (EADA) covers the Far East and Pacific region. The three organizations that constitute the World Organization of Dredging Associations (WODA) have equal representation on the Board of Directors of WODA. The goals and objectives are common for each of the three organizations; however, operations to attain these are independently carried out.

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WODCON XVIII

LIST OF EXHIBITORS

LAKE BUENA VISTA, FLORIDA
MAY 27 – JUNE 1, 2007

WODCON XVIII Exhibitor List

EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Ray Bergeron President Cable Arm 3452 W. Jefferson Avenue Trenton, MI 48183 USA	105 – 107	Tel: 734 676 6108 Fax: 734 676 1345 Email: info@cablearm.com
Albert J. Savage III Assistant Manager-Dredge Pumps Metso Minerals 900 N. 38 th Street Birmingham, AL 35222 USA	110	Tel: 205 599 6600 Fax: 205 599 6610 Email: bubba.savage@metso.com
Al Rougeau Reson, Inc 1011 Rue Bouis de Chene Breaux Bridge, LA 79571 USA	111	Tel: 805 964 6260 Fax: 805 964 7537 Email: arougeau@reson.com
Michael Gerhardt Deputy Director, Internal Operations Dredging Contractors of America 503 D Street West Washington, DC 20001 USA	113	Tel: 202 737 2674 Fax: 202 737 2677 Email: michaelgerhardt@dredgingcontractors.com
James Griffin Sales Executive Tri-Flo International 1000 FM 830 Willis, TX 77318 USA	115	Tel: 936 856 8551 Fax: 936 856 5668 Email: jgriffin@triflo.com
LI YI Director General Chang Jiang Waterway Bureau 20 Jiefang Park Road Wuhan, Hubel, China Wuhan, 430010 China	116 &118	Tel: 008627 82765127 Fax: 008627 82725913 Email: hdjcive@public.wh.hb.cn
John Boc National Sales Manager Julian A. McDermott Corporation 1639 Stephen Street Ridgewood, NY 11385 USA	117	Tel: 718 456 3606 Fax: 718 381 0229 Email: jboc@mcdermottlight.com
Bill R. Pearson Client Services Manager Weston Solutions, Inc 14160 Dallas Parkway, Suite 850 Dallas, TX 75254 USA	119	Tel: 469 374 7706 Fax: 469 374 7740 Email: William.pearson@westonsolutions.com

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EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Duke Long Del Tank & Filtration Systems P.O. Box 61460 Lafayette, LA 70596 USA	120	Tel: 337 237 8400 Fax: 337 266 7800 Email: Duke@deltank.com
Arthur Burgoyne Engineering Estimator Bean Stuyvesant, LLC P.O. Box 51118 New Orleans, LA 70151 USA	122	Tel: 504 587 8600 Fax: 504 587 8657 Email: aburoyne@cfbean.com
Tony Slinn Editor Dredging & Port Construction Lloyd Register-Fairplay 3 Princess Way Redhill Surrey RH1 1UP United Kingdom	127	Tel: 44 1737 37 9159 Fax: 44 1377 379001 Email: tony.slinn@lrfairplay.com
Ruud Ouwerkerk President Dredging Technology Corporation P.O. Box 1520 Wayne, NJ 07474 USA	205 – 207	Tel: 973 696 1559 Fax: 973 696 3572 Email: dredge@dtc.ihcholland.com
Lourdes R. Evans HYPACK, Inc 56 Bradley Street Middlefield, CT 06457 USA	208	Tel: 860 635 1500 Fax: 860 635 1522 Email: Lourdes@hypack.com
Mellisa Smith EA Engineering, Science & Technology 15 Loventon Circle Sparks, MD 21152 USA	209	Tel: 410 771 4950 Fax: 410 771 4204 Email:
Yue Wei Manager Global Construction Supply Co. Ltd A-1 Xi Hai Dong Yan De Sheng Men Nei Street Beijing, 100035 China	210 & 212	Tel: 008610 64031023 Fax: 008610 64031069 Email: yuew@bj-GIS.com
Ed Trainer Product Manager TenCate Geotubes 3680 Mount Olive Drive Commerce, GA 30529 USA	211	Tel: 706 693 1897 Fax: 706 693 1896 Email: t.meeks@tencate.com
Bradley J. Husack Technical Sales, GPS Harvey – Lynch, Inc 12718 Century Drive Stafford, TX 77477 USA	213	Tel: 281 240 5411 Fax: 281 240 0932 Email: bradh@harvey-lynch.com

WODCON XVIII Exhibitor List (continued)

EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Douglas Clarke, PhD Environmental Laboratory (EE-W) USACE ERDC 3909 Halls Ferry Road Vicksburg, MS 39180 USA	215	Tel: 601 634 3770 Fax: 601 634 3205 Email: Douglas.G.Clarke@erdc.usace.army.mil
Glenn Green Director of Business Development J.F. Brennan Company P.O. Box 2557 La Crosse, WI 54602 USA	217	Tel: 608 784 7173 Fax: 608 785 2090 Email: ggreen@jfbrennan.com
Keith Gosselin Manager Dredging & Mining EMCO Flow Systems 1755 Olive Street Lakeland, FL 33815 USA	218	Tel: 8636860920 Fax: 63 686 5321 Email: kgosselin@spiraz.com
Mark Wilkie Division Manager Elastec/American Marine, Inc 401 Shearer Blvd Cocoa, FL 32922	219	Tel: 618 382 2525 Fax: 618 382 3610 Email: elastec@elastec.com
Robert Hagler President Hagler Systems P.O. Box 7007 North Augusta, SC 29861 USA	220 & 222	Tel: 803 278 2728 Fax: 803 278 2729 Email: bobhagler@haglersystems.com
Lyle Geck Business Development Manager 4110 9 th Street, S.E. Calgary, Alberta, T2G 3C4 Canada	221	Tel: 403 259 3311 Fax: 403 259 8866 Email: tsehult@csi-wireless.com
David Tenwolde General Manager Damen Dredging Equipment, B.V. Edisonstraat 32 Nijerk 386 NE The Netherlands	223	Tel: 33 247 4040 Fax: 33 247 4065 Email: mh@damendredging.com
Sandy Bergkamp Marketing/Communications Officer Vosta LMG P.O. Box 37194 Amsterdam 1030AD The Netherlands	300 -- 301	Tel: 31 20 493 6669 Fax: 31 20 493 6670 Email: bergkamps@vostalmg.com
Robert Wilson Wilco Marsh Buggies 1304 Mac Arthur Avenue Harvey, LA 70058 USA	302	Tel: 504 341 3409 Fax: 504 341 8487 Email: rwilson@wilcomarshbuggies.com

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EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Kim Dailey Odom Hydrographic Systems, Inc 1450 Seaboard Avenue Baton Rouge, LA 70810 USA	304	Tel: 225 769 3051 Fax: 225 766 5122 Email: email@odomhydrographic.com
Minna Valtanen Sales Service Aquamee, LTD P.O. Box 260 27801 Sakyla Finland	305	Tel: 358 10 402 6400 Fax: 358 10 402 6422 Email: wastermaster@aquamec.fi
Robert Wetta Chief Operation Officer Dredging Supply Co. 156 Airport Road Reserve, LA 70084 USA	306	Tel: 985 479 1355 Fax: 985 479 1367 Email: rbwetta@dscdredge.com
John Vannoy Applied Technology & Management 2770 NW 43 rd Street, Suite B Gainesville, FL 32606 USA	307	Tel: 352 224 2974 Fax: 352 375 0995 Email: lrodgers@appliedtm.com
David La Fleur Sales Manager Anvil Attachment 17429 El Camino Real #410 Houston, TX 77058 USA	309	Tel: 281 480 2300 Fax: 281 480 8844 Email: Dlafleur@hawcomfg.com
Scott Nesbitt General Manager ICAN-OPS 5646 Milton Street, Suite 535 Dallas, TX 75206 USA	311	Tel: 214 691 9832 Fax: 214 890 0818 Email: snesbitt@icaninc.com
John F. Adams Senior Engineer Taylor Engineering, Inc 9000 Cypress Green Drive Jacksonville, FL 32256 USA	312	Tel: 904 731 7040 Fax: 904 731 9847 Email: jonedeadams@comcast.net
Chris Giordano Subaqueous Services, Inc 390 North Orange Avenue, Suite 2600 Orlando, FL 32891 USA	313 & 315	Tel: 407 926 7796 Fax: 407 926 7797 Email: ssi@ssidredging.com
David Tenwolde General Manager Damen Dredging Equipment, B.V. Edisonstraat 32 Nijkerk 386 NE The Netherlands	314	Tel: 31 33 247 40 40 Fax: 31 33 247 40 65 Email: mh@damendredging.com

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EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Zhu Yu Guang China Communication Construction Grp B88 Andingmenwai Street Beijing 100011 China	226, 227, 316, 318, 320, 322, 326, 327, 328, 426, 427	Tel: 008610 64287362 Fax: 008610 64287234 Email: zhuyg@ccgrp.com.cn
Scott Ramey Business Development Manager SNF Performance Chemicals One Chemical Plant Road Riceboro, GA 31323 USA	317	Tel: 912 880 8016 Fax: 912 880 8022
Tsuyoshi Nomura Executive Director The Japan Work Boat Association CHUO-KU Tokyo Japan 104-0028	400	Tel: 81 3 3271 5618 Fax: 81 3 3281 2975 Email: nomura@s-wa.or.jp
Claretta Jo Segura Rotonics Mfg , Inc Sales Engineer P.O. Box 1059 Brownwood TX 76804 USA	401	Tel: 915 646 1566 Fax: 915 643 4644 Email: Brownwood@rotonics.com
Robert M. Engler Senior Environmental Engineer Moffatt & Nichol 105 Pecan Blvd Vicksburg, MS 39183 USA	402	Tel: 601 415 9968 Fax: 601 368 8161 Email: Rengler@moffatt&nichol.com
Paul P. Quinn Director of Sales Ellicott Dredges, LLC 1425 Wicomico Street Baltimore, MD 21230 USA	404 & 406	Tel: 410 545 0240 Fax: 410 545 0293 Email: pquinn@dredge.com
Jim Willis Manager Sales & Training Salem-Republic Rubber Co. 475 W. California Avenue Sebring, OH 44672 USA	408	Tel: 330 938 9801 Fax: 330 938 9809 Email: jwillis@salem-republic.com
Jim McCullough Project Manager ANAMAR Environmental Consulting 2106 NW 67 th Place, Suite 5 Gainesville, FL 32653 USA	410	Tel: 352 377 5770 Fax: 352 377 7620 Email: jmcullough@anamarinc.com
Brian Howell Hagglunds Drives, Inc. Market Segment Manager 2275 International Drive Columbus, OH 43228 USA	411	Tel: 614 527 7412 Fax: 614 527 7401 Email: brian.howell@us.hagglunds.com

WODCON XVIII Exhibitor List (continued)

EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Mrs. M. Taal IADC Alexanderveld 84 The Hague 2585 DB The Netherlands	413 & 415	Tel: 31 70 352 3334 Fax: 31 70 351 2647 Email: info@iadc-dredging.com
Patrick Delaney DHI Water & Environment 319 SW Washington Street, Suite 614 Portland, OR 97204 USA	420	Tel: 519 650 4545 Fax: 215 504 8498 Email: pad@dhi.us
Neil Bradach Virotec 1328 Northridge Court Golden, CO 80401 USA	422	Tel: 303 525 5493 Fax: 303 526 2795 Email: nbradach@virotec
Lawrence M. Patella World Organization of Dredging Assoc. 2714 NE 42 nd Circle Vancouver, WA 98663 USA Anders Jensen Chief Engineer DHI Wa	500 & 501	Tel: 360 750 0209 Fax: 360 750 1445 Email: Weda@comcast.net

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EXHIBITOR	BOOTH NUMBER	TEL/FAX/EMAIL
Robert C. Pater Technical Solutions Team Dupont P.O. Box 753 Starke, FL 32091 USA	518	Tel: 904 964 1289 Fax: 352 473 9689 Email: Robert.C.Pater-1@USADupont.com
Tim Briggs Compass Environmental, Inc 954 West Washington Blvd, 5 th Floor Chicago, IL 60607 USA	520	Tel: 312 492 6590 Fax: 312 492 6597 Email: jparrott@compassenvironmental.com

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Assessment of Potential Impacts of Bucket Dredging Plumes on Walleye Spawning Habitat in Maumee Bay, Ohio Kevin Reine and Douglas Clarke, U.S. Army Corps of Engineers; Charles Dickerson, Bowhead Information Technology Services; Scott Prickard, U.S. Army Corps of Engineers, USA	3D-4	619
Building with Nature: Creating Sustainable Solutions for Marine and Inland Water Constructions–New Research Initiative Towards a Centre of Excellence Gerard van Raalte, Boskalis/Hydrodynamic; Wouter Dirks, Van Oord Dredging and Marine Contractors bv, T. Minns, WL/Delft Hydraulics; J. van Dalssen, IMARES; Paul Erftemeijer, WL/Delft Hydraulics; S.Aarninkhof, University of Twente; H. Otter, WL/Delft Hydraulics/University of Twente, The Netherlands	3D-5	637
The Cost of Environmental Protection in Maintenance Dredging T.T. Leeser, U.S. Army Corps of Engineers, USA	3D-6	649
SESSION 4A: DREDGING PROJECT CASE STUDIES III		
The Scheldt Estuary Development Project J. Claessens, Flemish Government, ProSes2010, The Netherlands	4A-1	657
Third Enlargement Program of the River Scheldt Kathleen De Wit, International Marine & Dredging Consultants; Youri Meersschaut, Flemish Government; Marc Sas, International Marine & Dredging Consultants, Belgium	4A-2	667
Removing Silt in a City Using a Dredge Pipeline–A New Way of Using Water Power Shi Yong Fu, Channel Administration of Nanjing, China	4A-3	683
SESSION 4B: DREDGING RESEARCH III		
Properties of Fluid Mud and Prevention of Sedimentation H. Nasner, R. Pieper, P. Torn, H. Kühlenkamp, Institute of Hydraulic Engineering, University of Applied Sciences Bremen, Germany	4B-1	689

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Hydraulic Transport of Coarse Gravel—A Laboratory Investigation into Flow Resistance Gu Ming and Liu Ruixiang, Tianjin Waterway Bureau, China Communications Construction Group; Ni Fusheng and Xu Liqun, Hohai University, China	4B-2	703
Beneficial Uses of Dead End Canal Dredging in Combination with Special Use Materials for Erosion Control Nicholas De Gennaro, Applied Technology & Management, Inc., USA	4B-3	711

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SESSION 6A: SURVEY AND POSITIONING EQUIPMENT		
Modern Positioning System Provides for an Inexpensive Mattress-Laying Vessel at the Venice Surge Barrier M.O. Winkelman, A.H. Mulder, and D. Tenwolde, Damen Dredging Equipment, The Netherlands	6A-1	721
Bathymetric Survey System, Beluga, with Real-Time Processing Capacity—Combined Use of GPS and Narrow Multibeam Sounder Tatsuya Mizukawa, Toa Corporation, Japan	6A-2	739
Monitoring and Dredging Technology in Muddy Layers		

SESSION 6B: PASSAIC RIVER SEDIMENT REMEDIATION (CONTINUED)	Paper Number	Page Number
The Interplay of Dredging and Discharges: A Conceptual Model of Contamination in the Lower Passaic River Edward A. Garvey, AmyMarie Accardi-Dey, Juliana Atmadja, Solomon Gbondo-Tugbawa, Shane McDonald and Erika Zamek, Malcolm Pirnie, Inc., USA	6B-5	841
SESSION 6C: DREDGING RESEARCH IV		
Research on Diffusion Prevention Technology with Environmental Cutter in Dredging Fine-Grained Sediment Jing Ming Zhang and Qing Bo Zhang, Shanghai Waterway Engineer Design and Consulting Co., Ltd., China	6C-1	857
The Design of Anchor Elevation Platforms for Cutter Suction Dredge D'Artagnan–Last Men Standing G.A.P.L. Teheux and M. Lambalk, VOSTA LMG, The Netherlands	6C-2	865
Third Generation Rock Cutting System–From First Ideas to a Working Product K. Wijma, VOSTA LMG, The Netherlands	6C-3	871
The Application of a Production Optimization System for a Cutter Suction Dredger Tian Jun-feng, China Communications Construction Group Co., Ltd.; Ding Shu-you, Tianjin Dredging Company, China	6C-4	885
The Impact of a Decade of Intense Research on the Efficiency of a TSHD Ruud Ouwerkerk, Dredge Technology Corporation, USA; Arie de Jager and Caspar Kramers, IHC Holland Dredgers BV; Sergio Ooyens, MTI Holland BV; USA	6C-5	893
Initial Experiments and Data Acquisition for the Model Dredge Carriage J. Henriksen and R. Randall, Texas A&M University; P. deJong and S. Sonye, Digital Automation and Control System, Inc., USA	6C-6	913
SESSION 6D: ENVIRONMENTAL ASPECTS OF DREDGING II		
Environmentally-Friendly Dredging in the Bisan-Seto Shipping Route Seiki Takano, The Ministry of Land, Japan; Kazuhiro Someya, Hidetoshi Nishina, Ryoichi Takao, Shinji Yamato, and Yuji Inoue, Tomac Corporation, Japan	6D-1	925
Development of the Tidal Flat and Eelgrass (AMAMO) Field Creation System with the Effective Use of the Dredged Cohesive Material Tsutomu Inada, Kazuhiro Tsurugasaki, Tsuyoshi Kanazawa, and Shintaro Baba, Toyo Construction Co., Ltd., Japan	6D-2	935
Dredging and Material Relocation in Sensitive Coral Environments Adam Smith, Tom Forster, James Monkivitch, Great Barrier Reef Marine Park Authority, Townsville, Queensland, Australia	6D-3	945
Management of Environmental Issues Related to Capital Dredging Works at Port Klang, Malaysia Rajoo Addakann, Inai Kiara Sendirian Berhad, Malaysia	6D-4	957
Environmental Monitoring and Management of Reclamation Works Close to Sensitive Habitats S.M. Doorn-Groen and T.M. Foster, DHI Water & Environment (S) Pte. Ltd., Singapore	6D-5	979

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SESSION 7A: DREDGING EQUIPMENT I	Paper Number	Page Number
An Innovative Trailing Suction Hopper Dredger with Aft-Center Drag System and a Wide Span Drag-Head Shogo Miyajima, Chubu Regional Bureau of the Ministry of Land, Infrastructure and Transport; Kaoru Kamachi, MEC Engineering Service Co., Ltd.; Shuho Yano, Mitsubishi Heavy Industries, Ltd.; Tsuyoshi Nomura, Japan Work-Vessel Association, Japan	7A-1	999
Modular Approach in Cutter Suction Dredge Design J.M. van Helden, IHC Holland Engineering & Renovation BV, The Netherlands	7A-2	1019
New Pump Types Further Optimising a Dredger's Profitability P.M. Vercuijsse, MTI Holland BV; H. Bugdayci, IHC Holland Parts and Services BV, The Netherlands	7A-3	1035
Oil-Saving and Dredging--Pursuing Maximization of Benefits Shao Qunsheng and Yang Bo, Shandong Water Conservancy, China	7A-4	1045
Variable Speed Transmission Gearbox, The Solution for Your Dynamic Drive Problems C.H. van den Berg, MTI Holland BV; L.J.M. Claassen, IHC Holland Parts & Services BV; R.A. Kruijt, MTI Holland BV, The Netherlands	7A-5	1051
SESSION 7B: COMMENCEMENT BAY SEDIMENT REMEDIATION		
An Overview of Sediment Remediation Initiatives in Commencement Bay (Presentation Only) Jonathan Williams, U.S. Environmental Protection Agency, USA	7B-1	
Commencement Bay Case Studies of Environmental Dredging Residuals Clay Patmont and Tom Wang, Anchor Environmental, LLC, USA	7B-2	1069
Head of Hylebos--Adaptive Management During Sediment Remediation Paul Fuglevand and Robert Webb, Dalton, Olmsted & Fuglevand, Inc., USA	7B-3	1081
Incorporating Aquatic Habitat Restoration/Mitigation Into Dredging Projects G.B. Grette and M.E. Boyle, Grette Associates, USA	7B-4	1089
Rail Shipment and Landfill Disposal of Dredged Sediments for the Head of the Hylebos Project in Commencement Bay Elisa Webb, Webb Consulting, LLC; Pete Keller, Allied Waste, Inc., USA	7B-5	1105
Recontamination of Waterway Cap Thea Foss Waterway, Tacoma, Washington Matt Dalton, Dalton, Olmsted & Fuglevand, Inc., USA	7B-6	1119
SESSION 7C: DREDGING AND RESUSPENSION		
Suspended Sediment Plumes Associated with Navigation Dredging in the Arthur Kill Waterway, New Jersey D. Clarke and K. Reine, U.S. Army Corps of Engineers; C. Dickerson, Bowhead Information Technology Services; S. Zappala, HDR/LMS; R. Pinzon and J. Gallo, U.S. Army Corps of Engineers, USA	7C-1	1135

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Preliminary Assessment of Sediment Resuspension by Ship Traffic in Newark Bay, New Jersey D. Clarke, U.S. Army Corps of Engineers; C. Dickerson, Bowhead Information Technology Services; K. Reine, U.S. Army Corps of Engineers; S. Zappala, HDR/LMS; R. Pinzon and J. Gallo, U.S. Army Corps of Engineers, USA	7C-2	1155
Measurement of Sediment Release from a Grab Dredge in the River Tees, UK, for the Calibration of Turbidity Prediction Software Neville Burt, HR Wallingford, Ltd., UK; John Land, Dredging Research, Ltd., UK; Hans Otten, Rijkswaterstaat, The Netherlands	7C-3	1173
Process-Based Estimation of Sediment Resuspension Losses During Bucket Dredging Donald F. Hayes, University of Louisiana at Lafayette; Thomas D. Borrowman and Paul R. Schroeder, U.S. Army Engineer Research and Development Center, USA	7C-4	1191
Acoustic Determination of Loss Terms for Mechanical Dredging Operations at Providence, RI, USA John Land, Dredging Research Ltd., UK; Douglas Clarke and Kevin Reine, U.S. Army Engineer Research and Development Center; Charles Dickerson, Bowhead Information Technology Services, USA	7C-5	1209
Modeling the Ultimate Transport and Fate of Dredge-Induced Suspended Sediment Transport and Deposition J.C. Swanson, T. Isaji, and C. Galagan, Applied Science Associates, Inc., USA	7C-6	1229
SESSION 8A: DREDGING EQUIPMENT II		
Modification of Dredgers, A Crazy Idea or Not? G. de Vries, Vuyk Engineering Rotterdam B.V., The Netherlands	8A-1	1247
Model Predictive Control for Optimizing the Overall Dredging Performance of a Trailing Suction Hopper Dredger J. Braaksma, R. Babuška, J.B. Klaassens, Delft University of Technology; C. de Keizer, IHC Systems, The Netherlands	8A-2	1263
Evaluation of Dredging Performance in a Trailing Suction Hopper Dredger D. Wangli, J. Braaksma, R. Babuška, and J.B. Klaassens, Delft University of Technology; C. de Keizer, IHC Systems, The Netherlands	8A-3	1275
Latest Developments in VOSTA LMG Suction Systems K. Johannsen and M. Rother, VOSTA LMG, Germany	8A-4	1285
Dredge William A. Thompson Replacement Project Marc F. Krumholz, U.S. Army Corps of Engineers, USA	8A-5	1299
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Hydrodynamic and Sediment Transport Modeling for a New Container Terminal Matt Goodrich and Jack Ellis, Applied Technology & Management, Inc., USA	8B-1	1313
Harbor-Entrainment Due to Complex Tidal Flow Patterns Andreas Wurpts, Darmstadt University of Technology, Germany	8B-2	1333

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Analysis of Fluorescent Sediment Tracer for Evaluating Nearshore Placement of Dredged Material S.J. Smith, U.S. Army Corps of Engineers; J. Marsh, Environmental Tracing Systems Ltd., UK; T. Puckette, Evans-Hamilton Inc., USA	8B-3	1345
Application of the Particle Tracking Model to Predict Far-Field Fate of Sediment Suspended by Nearshore Dredging and Placement at Brunswick, GA Joseph Z. Gailani, Tahirih C. Lackey, and S. Jarrell Smith, U.S. Army Engineer Research and Development Center, USA	8B-4	1359
A Model Calculation for Flow Resistance in the Hydraulic Transport of Sand Ni Fusheng, Zhao Lijuan, and Xu Liqun, Hohai University, China; W.J. Valsblom, Delft University of Technology, The Netherlands	8B-5	1377
SESSION 8C: DREDGING PROJECT CASE STUDIES V		
Rowing Line Dredging for Pan American Games 2007 Rio de Janeiro–Brazil M. Batalha, Dratec Engenharia; C. Mesquita, Autonomous Consultant; F. Batalha, Dratec Engenharia; F. Soares, FEEMA, Brazil	8C-1	1385
Development and Simulation of a Flywheel-Based Energy Storage System on a Clamshell Dredge H.J. de Jong and K.R. Williams, KRW Technologies, Inc., USA	8C-2	1401
Polyelectrolyte Use in the Dredging Industry: Safety Aspects and Environmental Benefits Dennis E. Marroni, SNF, France	8C-3	1415
Effects of Agitation Dredging in Savannah Harbor Francis Way, Christopher P. Ahern, Robert Semmes, and Matt Goodrich, Applied Technology & Management, USA	8C-4	1417
Permitting A Marine Container Terminal on the Former Charleston Naval Station Jack M. Ellis and K.F. Ziober, Applied Technology & Management, Inc., USA	8C-5	1433
Production Engineering Development of a Dredging Engineering Discipline Kyle D. Johnson and Robert C. Ramsdell, Great Lakes Dredge & Dock Company, USA	8C-6	1447
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A Description of Sediment Dewatering Methods Matthew Englis and Dewey H. Hunter, Ciba Specialty Chemicals Corporation, USA	9A-1	1451
Use of Geotube® Dewatering Containers in Environmental Dredging B.J. Mastin and G.E. Lebster, WaterSolve, LLC., USA	9A-2	1467
Processing Contaminated Sediment From the Miami River H.W. van Dam and R. Dielhof, Boskalis Dolman, The Netherlands	9A-3	1487
Metal Binding, Acid Neutralization and Minimization of Sulfide Oxidation in Dredge Spoil Material using ViroSoil™ Technology Jim V. Rouse, Virotec USA; David McConchie and Malcolm Clark, Southern Cross University; Simon Tillotson, ERM Ltd.; Daniel Blair, Virotech Global Solutions, USA	9A-4	1493

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The Role of Construction Quality Assurance (CQA) in Sediment Remediation E.P. Hedblom, G.M. Partch, M.J. Costello, SERVICE Engineering Group, USA	9B-1	1529
Environmental Applications for Sub-Surface Suction Dredging Johan Pennekamp, WL/Delft, Delft, The Netherlands; Michael Costello, Luca Sittoni, and Timothy Wagner, SERVICE Engineering Group, USA	9B-2	1539
St. Louis River/Interlake/Duluth Tar Site Remediation Sediment Operable Unit–2006 Sand Cap/Surcharge Project–Duluth, Minnesota Brian Bell and Tim Tracy, Envirocon, Inc., USA	9B-3	1547
Construction of a Contained Aquatic Disposal Facility End Dike Contractor's Perspective T. Smith, Marine Tech, LLC, USA	9B-4	1551
Dredged Material Placement Under Non-Segregating Conditions W.G.M. Van Kesteren, A.M. Talmon and Joh.G.S. Pennekamp, WL/Delft Hydraulics, The Netherlands; M.J. Costello and W.A. Flynn, Service Engineering Group, USA	9B-5	1559
Construction Management of the Saint Louis River/Interlake/Duluth Tar Remediation Project, Sediment OU, Duluth, Minnesota Stuart H. Russell, Hard Hat Services, USA	9B-6	1571