

World DREDGING

Mining & Construction

Vol. 50, Nos. 9/10 - 11/16

Pilot Project: Thin Layer Sediment Augmentation restores habitat for endangered species in Seal Beach National Wildlife Refuge, Seal Beach, California performed by Curtin Maritime.
(See story on pg. 6) (Photo by Curtin Maritime)

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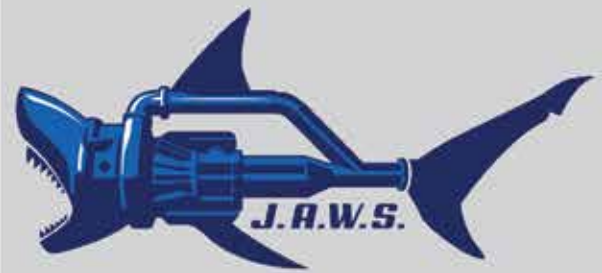
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COVER: Pilot Project: Thin Layer Sediment Augmentation restores habitat for endangered species in Seal Beach National Wildlife Refuge, Seal Beach, California performed by Curtin Maritime. (See story on pg. 6) (Photo by Curtin Maritime)

National Wildlife Refuge Island Building - as part of the Sunset / Huntington Harbour Maintenance Dredging and Waterline Installation Project



*Seal Beach National Wildlife Refuge (NWR) Sediment Augmentation.
Photo by Curtin Maritime*

Prime contractor Curtin Maritime of Long Beach, California (CA) began work January 19, 2016 on the Sunset/Huntington Harbour Maintenance Dredging and Waterline Installation project which included the Seal Beach National Wildlife Refuge (NWR) Sediment Augmentation Pilot Program. The \$7,991,011 County of Orange, OC Public Works' project was completed on September 7, 2016. Concrete work was subcontracted to L&S Construction.



Sediment dispersal on the Refuge. Photo by Curtin Maritime

The project was performed for Marina residents, citizens of Huntington and endangered wildlife species Ridgeway Rail was funded by the County of Orange, City of Huntington, Federal Fish & Wildlife, California Fish & Wildlife, California Coastal Conservancy, as well as participation from the US Geological Survey (USGS), University of California Los Angeles (UCLA), California State University Long Beach, Chapman University, and Huntington Beach Wetlands Conservancy,

The Seal Beach National Wildlife Refuge (NWR) Sediment Augmentation Pilot Program involved placing a thin-layer of sediment on a portion of the Seal Beach National Wildlife Refuge to restore nesting habitat of the endangered Ridgeway Rail.

Other work involved mechanical dredging of beach replenishment sands from the entrance of Sunset Harbor with disposal at Sunset Beach (47,000 yd³), maintenance dredging with offshore disposal of various waterways inside Huntington Harbor, including installation of a 16" high density polyethylene pipe (HDPS) sub-sea waterline to provide critical infrastructure for the City of Huntington.



*Crew member installing sediment barrier to contain 5 ft. deep water channel.
Photo by Curtin Maritime*



Maintaining placement pipeline. Photo by Curtin Maritime

Curtin Maritime employed the following dredges for the project : a 12" DSC Shark cutter suction (CS) dredge, 1,200 HP and derrick barge (DB) Ben Weston (150 ton Lima 2400C4L Tier III) excavating heavy hard sands, clays and silts.

Most of the dredged material, 130,000 yd³ was loaded onto scows, tug transported and dumped offshore at site LA-2, a five hour round trip; 47,000 yd³ of dredged material was deposited at sunset beach as beneficial reuse; and 18,500 yd³ of dredged material was hydraulically pumped to the Seal Beach National Wildlife Refuge (NWR) through



*Derrick barge (DB) Ben Weston (150 t Lima 2400C4L Tier III)
dredging main channel east next to Pacific Coast Highway (PCH). Photo by Curtin Maritime*

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National Wildlife Refuge Island Building

Continued



Main channel dredging depositing in the dump scow for transport.

6,500' of 12" pipeline.

Curtin Maritime designed and fabricated an in-house nozzle prototype for sediment dispersal at the Seal Beach National Wildlife Refuge which took two months to complete.

Curtin used 3,500 LF of haybales, 6,000 LF of geotextile fabrics, wood and rebar stakes, low ground pressure amphibious vehicles, a cutterhead dredge, and a big effort by the crew to hand-handle all materials on the island conforming to extremely restrictive environmental standards.

Dredged material was specifically cored and laboratory tested to match existing sediments on the refuge, a critical element in project such as foreign soils would fundamentally alter the environment which Curtin sought to enhance.

Curtin's proprietary thin-layer sediment dispersal nozzles were mounted on a low ground pressure skid barge which was relocated around the site. Grade stakes were also installed in a 10 m grid across the entirety of the island cut to 22" above pre-placement grade. The top 12" was painted orange to guide crews in placing an average layer of 10" over 430,000 ft². Naturally existing rivers created from tidal decanting of the island were dammed using geotextile barriers to promote sediment retention in specific placement areas.

Curtin Maritime employed a crew working six 12 hour days including a project manager, engineer, leverman, and a four man crew of deckhands manning pipeline in the water and on the refuge resetting sediment dispersal nozzle location, and grade checking. www.curtinmaritime.com, Facebook: www.facebook.com/curtinmaritime, LinkedIn: www.linkedin.com/company/curtin-maritime-corp ○



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Army Corps Restores and Builds Marsh Islands in Jamaica Bay, New York

Vince Elias
U.S. Army Corps of Engineers, New York District

With the Manhattan skyline less than 10 miles to the north, the marsh islands complex is an integral part of Jamaica Bay New York, which were restored by the U.S. Army Corps of Engineers, with the support by the National Park Service, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, The Port Authority of New York and New Jersey, the National Resources Conservation Service and the New York/New Jersey Harbor Estuary Program. (Photo USACE NY District)

With Manhattan less than 10 miles to the north, Jamaica Bay is situated within the Boroughs of Brooklyn and Queens, New York City. Approximately 8 miles long by 4 miles wide, it covers 26 mi², and opens into the Atlantic Ocean via the Rockaway Inlet. Jamaica Bay is recognized by the U.S. Fish and Wildlife Service as a coastal habitat deserving preservation and restoration of habitats which contribute to sustaining and expanding the region's native living resources.

Dominant land uses in the surrounding area are fringing salt marsh, and residential, commercial and industrial uses. The project enhanced formerly eroded marsh on multiple islands within the Bay. Former marsh has been eroded and replaced with un-vegetated mud flats. The bay contains salt marsh islands, mudflats, tidal creeks, navigational channels, and open water.

Jamaica Bay is a highly productive habitat for a variety of fish and wildlife species. These species breed and use the area as a nursery for juvenile birds that reside in the area during winter and migratory birds that stop-over during fall and spring. The Jamaica Bay Marsh Islands are at the heart of the complex urban ecosystem of the Bay which is a part of the National Park Service, U.S. Department of the Interior - Gateway National Recreation Area, the country's first urban National Park, established in 1972.

Approximately 1,400 acres of tidal salt marsh have been lost from the marsh islands since 1924, with the system-wide rate of loss rapidly increasing in recent years.

From 1994 and 1999, an estimated 220 acres of salt marsh were lost at a rate of 44 acres per year. Left alone, the marshes could vanish by 2025, destroying wildlife habitat and threatening the bay's shorelines. In response to these losses, the Army



There was a considerable amount of engineering construction that went into the marsh islands construction at Jamaica Bay, N.Y. (Photo Stefan Turner - Courtesy Great Lakes Dredge & Dock Company)

Committed to the Coast



On the Louisiana Coast - Many Weeks Marine employees call Louisiana home. For some of us living at the water's edge for weeks at a time, the Louisiana coast is a second home.

Weeks has worked to **re-establish land lost to coastal erosion** for over twenty-five years, and has completed many of the state's large scale restoration projects. Recently, Weeks' Dredging Division put the finishing touches on two major, high profile contracts at **Bayou Dupont** and the **Caminada Headland**. Both challenging projects involved the transport of sediment over exceptionally long distances.

For many advocates seeking a beneficial use of **Mississippi River** sediments, pumping sand across parish lines up to 13 miles away and creating hundreds of acres of restored marsh in the Bayou Dupont footprint represent significant accomplishments.

At Caminada Headland, the 800+ acre **beach and dune restoration** projects are protecting bustling **Port Fourchon**, Highway 1, and "sensitive landward marshes and maritime forests from erosion and saltwater influences," according to the Oil Spill-underwritten Gulf Environmental Benefit Fund.

With more reliable funding now available, the successful completion of Bayou Dupont and Caminada is a testament to the return on investment realized through **Long Distance Sediment Transport** in coastal Louisiana.



Army Corps Restores and Builds Marsh Islands in Jamaica Bay, N.Y.

Continued

Corps New York District, The Port Authority of New York and New Jersey, New York State Department of Environmental Conservation, New York City Department of Environmental Protection and National Park Service implemented five marsh island restoration projects under multiple authorities discussed below.

The Army Corps New York District and The Port Authority of New York and New Jersey recently celebrated in September 2016 the completion of the New York/New Jersey Harbor Deepening Program where the 37 miles of the Port District were deepened to 50 feet to accommodate the large container ships that dominate worldwide shipping today.

“Maximizing the beneficial use of dredged material has been the policy at the Army Corps New York District, since the inception of the Harbor Deepening Program,” said Peter Wepler, Chief of Army Corps’ New York Environmental Branch, Planning Division. “The more than 52 million yd³ of material dredged during project



Sand used from the Harbor Deepening Program was used to remediate, restore and protect the marsh islands in Jamaica Bay, N.Y. (Photo USACE NY District)



To quell further erosion of the islands, and adding to an already impressive list of habitat restoration projects in Jamaica Bay, the Army Corps placed millions of cubic yards of sand from the Harbor Deepening Program to restore marsh islands in Jamaica Bay. (Photo USACE NY District)

207 of the Water Resources Development Act 1996 of the Continuing Authorities Program, the Army Corps New York District in partnership with The Port Authority of New York and New Jersey, New York State Department of Environmental Conservation, New York City Department of Environmental Protection and National Park Service restored approximately 43 additional acres at Elders Point West marsh island as a result of the beneficial use of dredged material from the Harbor Deepening Program.

The restoration of Elders East and West marsh islands included restoring the existing vegetated areas and the sheltered and exposed mudflats by placing dredged sand up to an elevation suitable for low marsh growth.

Following sand placement, more than 700,000 plants grown from local seed stock by the National Resources Conservation Service were hand planted on the East island and replanting more than 200,000 plants on the West island. On Elders East Island, *Spartina alterniflora*, a salt marsh cord-grass, was planted throughout the low marsh zone.

“A mixture of *spartina alterniflora*, *spartina patens* which is salt hay, and *distichis spicata* which is spike grass were planted in the zones between low marsh and upland,” said Wepler.

During February and March 2012, 375,000 yd³ of sand was

construction was beneficially used throughout the Harbor.”

Rock was used to create offshore reefs, siltier sediment was used to capping landfills and Brownfields, the Dredged Material Historic Area Remediation Site off the coast of Sandy Hook, New Jersey and sand was used to restore Atlantic Coast shorelines and restore more than 160 acres of habitat in Jamaica Bay NY at Elders Point East and West, Yellow Bar Hassock, Black Wall, and Rulers Bar Marsh islands.

Elders East and West Islands were originally one island comprised of 132 acres. Restoration was accomplished under the following authorities:

In 2006-2007, to offset environmental impacts of the New York/New Jersey Harbor Deepening program, the Army Corps New York District and The Port Authority of New York and New Jersey restored approximately 40 acres at Elders East Island; and In 2010, under Section 204 of the Water Resources Development Act 1992, as amended, and Section



The Gateway National Recreation Area is at the heart of Jamaica Bay and is a highly productive habitat that supports more than 300 species of birds, and over 100 species of fish, marine animals and reptiles. These species breed and use the area as a nursery for juveniles, and hundreds of migratory birds. (Photo V. Elias USACE NY District)

placed at Yellow Bar Hassock resulting in 67 acres of new marsh island and approximately 47 acres of wetlands. Approximately 13 acres of *Spartina Alterniflora* hummocks were relocated, 28 acres of low marsh was seeded and 38,000 plants were planted.

In 2012, Black Wall and Rulers Bar Marsh Islands were constructed as part of the Army Corps' Beneficial Use Program. The New York State Department of Environmental Conservation and the New York City Department of Environmental Protection provided all the required funds to place 150,000 yd³ of sand from the

Ambrose Channel contract portion of the Harbor Deepening Project onto the two islands. After the placement activities, a community-based planting effort was undertaken by non-governmental organizations, including the American Littoral Society, Eco-watchers and Jamaica Bay Guardian completed the restoration of approximately 30 additional acres.

The marsh island restoration efforts are being monitored by a project team that is providing valuable data on the cause of problems and assisting to identify optimum effective future restoration options. This program also has significant implications for the future success of restoration activities from beneficially using sand from the New York District's Navigation Operations and Maintenance Program.

Immediately following construction of Yellow Bar, Black Wall and Rulers Bar, Hurricane Sandy hit the region and caused extensive damages in Jamaica Bay. Storm surge induced inundation of up to 5 feet (2 meters) over the entire inland area. Within the interior of Jamaica Bay, coastal wetlands were littered with debris following the storm and wrack deposits were visible in many marsh areas. Stakeholders within Jamaica Bay have suggested that the restored marshes dispersed wave energy within the bay.

With the focus of future coastal storm risk management efforts to include the incorporation of natural and nature-based features as part any recommended action, the restoration of marsh islands is now even more critical.

"The success of continuing restoration efforts in the Harbor region is due to strong partnerships and regional consensus



There was a considerable amount of engineering construction that went into the marsh islands construction at Jamaica Bay, N.Y.

(Photo Stefan Turner - Courtesy Great Lakes Dredge & Dock Company)



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Sand used from the Harbor Deepening Program was used to remediate, restore Elders marsh island in Jamaica Bay, N.Y. (Photo USACE NY District)

wetland restoration is still needed to recover what has been lost and also provide the necessary nature-based features to restore coastal resilience and sustainability and contend with the impacts associated with climate change.”

The construction of the five marsh islands provided valuable data on how to restore the marsh islands in the most effective and efficient manner.

As part of the Study, lessons learned and cost effectiveness evaluations were used to develop and recommend additional marsh island designs for Pumpkin Patch, Duck Point, Elders Center, and Stoney Point. In addition, six remaining locations along the periphery of Jamaica Bay, including Bayswater Point State Park, Fresh Creek, Brant Point, Dubos Point, Dead Horse Bay, and Hawtree Point, are

Army Corps Restores and Builds Marsh Islands in Jamaica Bay, N.Y.

Continued

goals that are illustrated in the Hudson-Raritan Estuary Comprehensive Restoration Plan and being further investigated as part of the Army Corps New York District’s Hudson Raritan Estuary Ecosystem Restoration Feasibility Study, a draft report expected to be released in December 2016,” said Lisa Baron, Project Manager, Army Corps’ New York District.

“The Study notes that despite approximately 160 acres of restored wetlands within Jamaica Bay, additional coastal




A mixture of spartina alterniflora, spartina patens, and distichis spicata were planted on the marsh islands in Jamaica Bay, N.Y. (Photo V. Elias USACE NY District)




Sand being pumped at Jamaica Bay, N.Y. from the Harbor Deepening Program to restore marsh islands in Jamaica Bay, N.Y. (Photo USACE NY District)

also priority sites to be recommended for construction authorization in the HRE Feasibility Study.

Continued on pg. 23



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The **2017 Battelle Sediments Conference** will be held January 9-12, 2017, in New Orleans, Louisiana, at the Sheraton New Orleans Hotel. The Conference will be designed for and presented by scientists, engineers, regulators, remediation site owners, constructors and other environmental professionals. Participants will represent universities, government agencies, and consulting, R&D and service firms from around the world. **Battelle** has presented this premier international technical conference since 2001.

Abstracts are now being accepted for review and are due June 30, 2016. The program will be developed on the basis of the abstract review conducted by the Program Committee and the session chairs beginning in July 2016. The platform and poster sessions will be organized around the following major themes:

- Environmental Processes and Modeling
- Characterization, Assessment, and Monitoring
- Remediation and Restoration Alternatives
- Remedy and Restoration Implementation
- Management Approaches and Policy

Battelle gratefully acknowledges the financial contributions made by the following Sponsor organizations toward the general costs of planning and conducting the Conference.



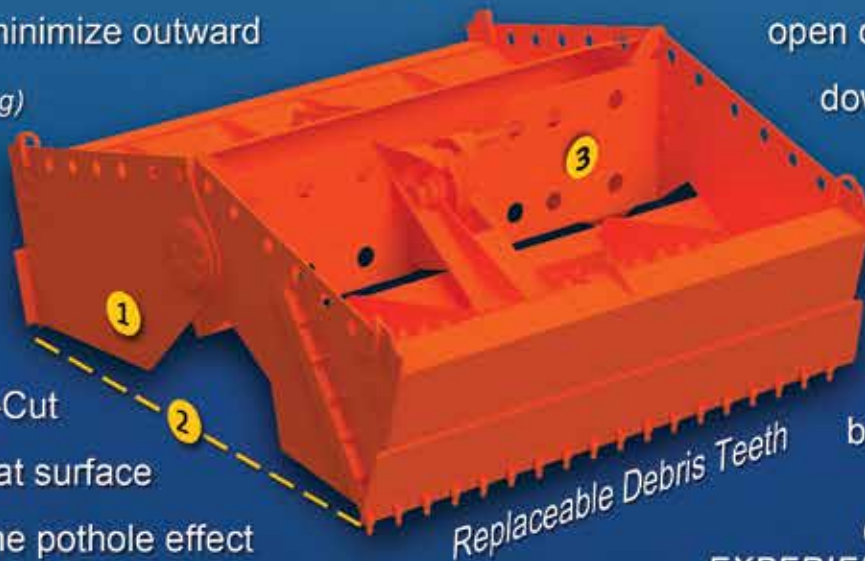
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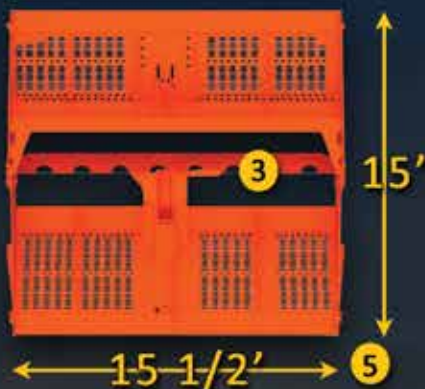
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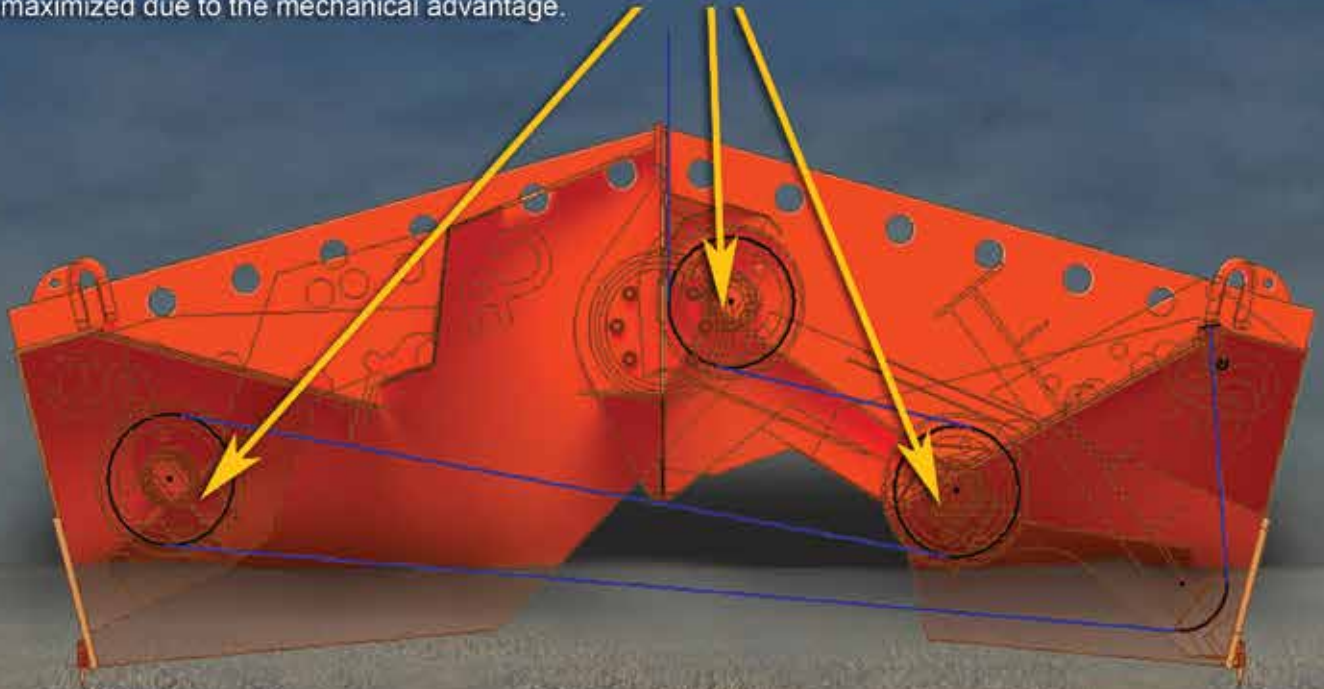
Resuspension

When dredging, sediments are loosened, stirred, and dispersed into the water column. These sediments then resettle overtop the freshly dredged area and downstream when a current is present. The Cable Arm Environmental clamshell features an open center and venting system to allow the bucket to descend without water pressure buildup beneath it. The bucket is designed with overlapping side plates to prevent sediment from pushing out the sides, and to seal in the material. Rubber flaps and the material's low center of mass also help seal and enclose the sediment to prevent washout during ascension.

Release

Pollutants are absorbed into and adsorbed onto pore water and sediment material. Once disturbed and re-suspended, those trapped pollutants can be released. It is, therefore, imperative that dredging operations minimize the resuspension of contaminated sediment. Another unique feature of the Cable Arm Environmental clamshell is the angle of its cutting edge. The 150° cutting angle allows the bucket to scoop the material with minimal disturbance. Optional debris teeth combined with maximum cutting edge forces ensure each bite makes it to grade, without material spillage, and leaves a near flat surface.

The unique design of the Cable Arm Environmental clamshell provides the bucket with key environmental features designed to minimize the 4 Rs. The clamshell's closing line is guided by either 2 or 3 sheaves to apply its closing forces. When adding the 3rd sheave (see image below), the force along the cutting edge is maximized due to the mechanical advantage.



WATCH VIDEO:
<http://www.cablearm.com/Buckets/Enviro.html>

A LOOK INSIDE THE BUCKET

n, Release, Residual, and Risk) and specializing in shallow cut sediment removal.

Residual

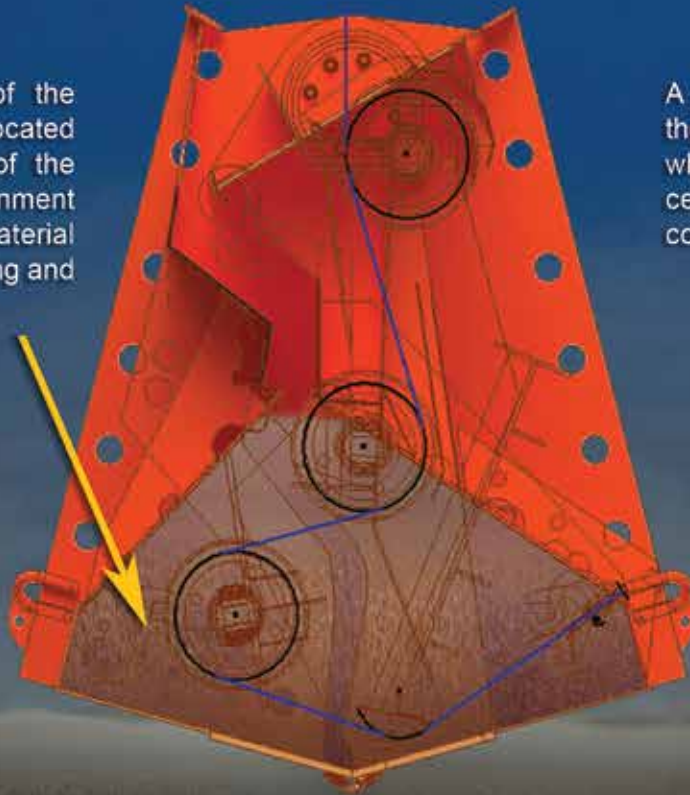
Ideally, all contaminated material will have been removed during the dredging operation. Of course, nature hardly ever provides ideal dredging conditions. That is why it is important to have a versatile, yet job specific, customized bucket. With over 25 years of experience, Cable Arm continues to be the leader in environmental clamshell innovations.

Risk

All change comes with risks. When those risks include our water, food, and health, it is vital that not only the best plan is implemented, but that the best equipment is utilized. The bucket should be part of the solution, not the problem. When equipping a dredge with a Cable Arm Environmental clamshell, the reward outweighs the risk.

Approximately $\frac{2}{3}$ of the material's mass is located below the center of the bucket's containment area to minimize material washout while closing and ascending.

A 150° cutting edge allows the bucket to "scoop" material which lowers the materials center of mass within the containment area.



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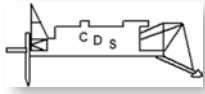
ClamVision® by Cable Arm, Inc. offers a wireless dredge positioning system designed to fulfill the need of most any dredging application. ClamVision® fits nearly every type of dredge and is easy to install and maintain. From clamshells to cutter heads, excavators to drill barges, ClamVision® gives operators and crew a real-time view of barge and machine position over project. ClamVision® tells the operator where to dig and how deep to go, eliminating all guesswork! It displays a 3-D, color-coded surface derived from existing hydrographic data and projected surface models. And, as always, ALL system information is recorded and stored to a file which can be viewed using any pc, with no need for extra "hard lock" keys. ClamVision® by Cable Arm, Inc. features the best service and support in the industry. Along with each installation, ClamVision® technicians provide solid training to familiarize the crew with the system. Technicians are available by phone and can be on site upon request. ClamVision® technicians also offer services like seafloor imaging and hydrographic surveying to help gather all important information for the jobsite.

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Texas A&M University's 2017 Center for Dredging Studies
46th DREDGING ENGINEERING SHORT COURSE



PRELIMINARY PROGRAM



Monday, January 9, 2017

Time	Topic	Speaker	Affiliation
8:00	Welcome & Introduction	R. Randall	TAMU
8:20	History of Dredging & Dredging Equipment	R. Randall	TAMU
9:20	Fluid Mechanics Review & Dredge Pump Cavitation	J. Figlus	TAMU
10:10	Coffee Break		
10:30	Sediment Transport in Pipes	R. Randall	TAMU
11:15	Pump Performance Curves & Dredge Instrumentation	R. Randall	TAMU
12:00	Lunch		
1:15	Mechanical Dredges & Sediment Resuspension	D. Hayes	UNLV
2:15	Geotechnical Mechanics: Physical & Engineering Properties	C. Aubeny	TAMU
3:00	Coffee Break		
3:20	Application of Geotechnical Engineering to Dike Design	C. Aubeny	TAMU
4:00	Environmental Clamshell Dredging	R. Bergeron & D. Nicholas	Cable Arm & Geosyntec
5:00	Adjourn		
6:45	Texas BBQ		

Tuesday, January 10, 2017

Time	Topic	Speaker	Affiliation
8:00	Beach Nourishment	B. Edge	TAMU / NCST
9:00	Break		
9:15	Basic Dredge Laws	R. Randall	TAMU
10:15	Coffee Break		
10:30	Basic Dredge Laws & Quiz	R. Randall	TAMU
11:45	Lunch		
1:00	Cutters & Cutter Suction Dredge Operations	P. deJong	DACS
1:45	Coffee Break		
2:00	Hopper Dredges & Dredge Control Systems	P. deJong	DACS
3:00	Coffee Break		
3:15	Small Hydraulic Dredges	W. Wetta	DSC
4:00	Travel to Laboratories		
4:15	Dredging Laboratory (Dredging demo, slurry flow loop & dredge simulator), (Haynes Laboratory), Group A Geotechnical Laboratory (CVLB 116), Group B	R. Randall, C. Aubeny	TAMU, TAMU
5:15	Adjourn		

Wednesday, January 11, 2017

Time	Topic	Speaker	Affiliation
8:00	Fate of Dredged Material in Open Water	J. Gailani	USACE-ERDC
9:00	Numerical Models for Predicting Fate of Dredged Material	J. Gailani	USACE-ERDC
10:00	Coffee Break		
10:20	Dredging Safety	R. Ramsdell	Great Lakes Dredge & Dock

TEXAS A&M SHORT COURSE

DREDGING ENGINEERING SHORT COURSE

Date: Jan. 9 -13, 2017
 Fee: \$1400
 Application Deadline : 12 / 1 / 16

Location: Texas A&M University,
 College Station, Texas 77843-3136
 Contact: R. Randall
 Phone: 979-845-4568, 979-845-4515
 Email: r-randall@tamu.edu
 Web: <https://engineering.tamu.edu/ocean/research/center-for-dredging-studies>



Texas A&M University's 2017 Center for Dredging Studies
46th DREDGING ENGINEERING SHORT COURSE

Continued

Time	Topic	Speaker	Affiliation
11:00	Technical Inputs to Dredging Estimates	R. Ramsdell	Great Lakes Dredge & Dock
12:00	Lunch		
1:30	Dredge Monitoring	B. Allen	USACE-Mobile District
2:15	Coffee Break		
2:30	Geotextile Container Systems, Design, & Case Histories	J. Fowler	Consultant
3:15	Coffee Break		
3:30	Advances in Hydrographic Surveying	C. Ransome	Ransome & Associates
4:15	Travel to Laboratories		
4:30	Dredging Laboratory (Dredging demo, slurry flow loop & dredge simulator), (Haynes Laboratory), Group B Geotechnical Laboratory (CVLB 116), Group C	R. Randall, C. Aubeny	TAMU, TAMU
5:30	Adjourn		
Thursday, January 12, 2017			
8:00	Subaqueous Capping	M. Palermo	M. Palermo Consulting
8:45	Confined Disposal of Dredged Material	M. Palermo	M. Palermo Consulting
9:30	Coffee Break		
9:45	Ecosystem Restoration Using Dredging and Dredged Material	R. Mohan	Anchor QEA
10:30	Coffee Break		
10:45	Canadian Experience in Managing Contaminated Sediment	R. Santiago	Environment Canada
11:30	Lunch		
1:00	Dredged Material Testing Manuals & Evaluation of Testing Results	B. Suedel	USACE ERDC
1:45	Environmental Dredging – Current Practice and Lessons Learned	R. Mohan	Anchor QEA
2:45	Coffee Break		
3:00	EPA and the Environmental Aspects of Dredging	C. Vogt	Craig Vogt Inc.
3:45	Question & Answer Panel R. Mohan, Anchor QEA M. Palermo, Consultant R. Randall, TAMU B. Suedel, USACE ERDC C. Vogt, Consultant		
4:20	Travel to Laboratories		
4:30	Dredging Laboratory (Dredging demo, slurry flow loop & dredge simulator), (Haynes Laboratory), Group D Geotechnical Laboratory (CVLB 116), Group A	R. Randall, C. Aubeny	TAMU, TAMU
5:30	Adjourn		
6:45	Banquet, Memorial Student Center, Buffet; Raffle & Presentation of Certificates		
Friday, January 13, 2017			
8:00	Engineering with Nature & Beneficial Use of Dredged Material	B. Suedel	USACE ERDC
8:45	Chemical Treatment of Dredged Solids	G. Tichenor	SNF Corp.
9:30	Coffee Break		
9:45	Case Study: Dewatering & Sediment Separation	T. Jamieson	Tri-flo Int'l Inc.
10:30	Project Management of Dredging Projects	R. Thomas	USACE-GALV
11:15	Estimating Dredging Costs	R. Randall	TAMU
12:00	Adjourn ○		



Sand being used from the Harbor Deepening Program to restore marsh islands in Jamaica Bay, N.Y. (Photo USACE NY District)



Sand being used from the Harbor Deepening Program to restore marsh islands in Jamaica Bay, N.Y. (Photo USACE NY District)



Sand being used from the Harbor Deepening Program to restore marsh islands in Jamaica Bay, N.Y. (Photo USACE NY District)



Sand being used from the Harbor Deepening Program to restore marsh islands in Jamaica Bay, N.Y. (Photo USACE NY District)



Jamaica Bay is a highly productive habitat for a variety of fish and wildlife species. These species breed and use the area as a nursery for juvenile birds that reside in the area during winter and migratory birds that stop-over during fall and spring. (Photo V. Elias USACE NY District)

“The New York District along with the regional partners, remain committed to counteract the loss of the signature Jamaica Bay salt marsh habitat and restore the benefits they provide to the bay’s wildlife, regional ecosystem, and to the surrounding communities,” said Baron.

Contact : Vincent.F.Elias@usace.army.mil ○

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Boskalis' 2016 Year in Review

Royal Boskalis Westminster N.V. (Boskalis) closed the third quarter of 2016 in line with expectations. Both revenue and operating profit were higher than the average seen in the first two quarters of the year. The increase was wholly attributable to the contribution from the offshore activities acquired from VolkerWessels, which are consolidated with effect from the third quarter. Adjusted for these activities there was a slight decline in revenue and operating profit compared to the average seen in the first two quarters of the year.

Adjusted for acquisitions there was a substantial decline in revenue and operating profit compared to the third quarter of last year, in line with expectations. 2015 as a whole was an exceptionally good year with high fleet utilization and particularly good project margins.

Market conditions remain persistently difficult both at Dredging and for the capacity driven service related activities of Offshore Energy, putting pressure on volumes and prices. The order book increased to EUR 2.9B up 8% compared to end June, with the increase wholly attributable to the addition of the offshore activities of VolkerWessels.

The expectations for the remainder of the year remain unchanged. For 2016 as a whole Boskalis expects the operating net profit in the second half to approach the level achieved in the first half of the year.

Operational developments

Dredging & Inland Infra had a quiet third quarter in line with the first half of the year. Market weakness resulted in low but stable utilization levels for the hopper fleet and revenue comparable to the average seen in the first two quarters of the year. Results on dredging projects in progress were reasonable to good and there was also a positive contribution to the result from projects that were technically completed at an earlier stage. However, at the same time the result was adversely impacted by the considerably lower equipment utilization rates. In the third quarter projects were contracted in countries including the Netherlands, Finland, the United Kingdom and Uruguay. On balance the order book at Dredging & Inland Infra fell by around 5% compared to mid 2016.

Offshore Energy had a good third quarter on balance, supported by the contribution from the offshore activities acquired from VolkerWessels. Revenue and the result at the segment rose compared to the previous quarters. Excluding the contribution from the VolkerWessels activities revenue and the result were slightly lower compared to the average seen in the first two quarters of the year.

The sharply contracting market and increased competition is putting increasing pressure on utilization and margins at the capacity driven Marine Services activities. By contrast new opportunities are opening up in the offshore wind energy market, partly thanks to the offshore activities recently acquired from VolkerWessels. In the third quarter Boskalis secured the contract for the construction of the Aberdeen Offshore Wind Farm as well as numerous smaller contracts. The order book of Offshore Energy was higher as a result of the VolkerWessels acquisition; adjusted for this consolidation effect the order book declined compared to mid 2016 levels.

In the Towage & Salvage segment revenue at Salvage in the third quarter was comparable to the first two quarters. Contrary to last year, this year there were no large wreck removal projects in progress or in the order book. There was no material change in the picture at the Towage joint ventures and associated companies (Smit Lamnalco, Keppel Smit Towage, Saam Smit Towage and, from the second quarter, KOTUG SMIT Towage) in the third quarter compared to the first half of the year. The contribution to the result from Smit Lamnalco and Keppel Smit Towage was lower than expected due to pressure on end markets.

The Holding segment mainly comprises the usual non allocated head office costs as well as various non allocated (in many cases nonrecurring) income and expenses. The acquisition of the remaining shares in VBMS, in which Boskalis already held a 50% stake, resulted in a revaluation gain of EUR 40M in the third quarter.

Update on fleet rationalization

At the beginning of July Boskalis announced a fleet rationalization program to be implemented over the next two years. It involves 24 vessels being taken out of service and the loss of 650 jobs. After obtaining a positive opinion from the Dutch Works Council and approval of the social plan from both trade union CNV Waterbouw and the Works Council, Boskalis started with the implementation of the program. Of the announced reduction affecting 650 jobs, the workforce has already been reduced by more than 200 jobs. The timing of the remaining workforce reduction is partly dependent on factors including the current deployment of vessels and national legislation.

Market conditions remain persistently difficult both at Dredging and for the capacity driven service related activities of Offshore Energy, putting pressure on volumes and prices. The order book increased to EUR 2.9B, up 8% compared to end June, with the increase wholly attributable to the addition of the offshore activities of VolkerWessels.

Outlook

At the release of the half year results the company stated that, based on the fleet planning and work in the order book and barring unforeseen circumstances, operating net profit in the second half of 2016 was expected to approach the level achieved in the first half of the year. Based on the result and the market picture in the third quarter the Board of Management maintains this forecast.

Exceptional items such as book and revaluation gains, impairments and our share in the result of Fugro are excluded from the operating net profit forecast. At the close of the fourth quarter and based on the new three year corporate business plan, annual impairment tests required under IFRS will be conducted. Given the rapid and strong deterioration in market conditions impairment charges cannot be ruled out, in particular at the offshore services activities. A potential impairment of this type will have no impact on determining the dividend amount.

Capital expenditure in 2016 is expected to total EUR 180 - 200M, excluding acquisitions. The amount is well below the level of depreciation and will be financed from the company's own cash flow. Boskalis' financial position remains strong. The net debt position has declined since mid 2016 and Boskalis comfortably meets the covenants agreed with its debt providers.

2017 FINANCIAL CALENDAR

8 March - Publication of 2016 annual results

10 May - Trading update on first quarter of 2017

10 May - Annual General Meeting of Shareholders

17 August - Publication of 2017 half year results

10 November - Trading update on third quarter of 2017

Royal Boskalis Westminster N.V. is a leading global services provider operating in the dredging, maritime infrastructure and maritime services sectors. The company provides creative and innovative allround solutions to infrastructural challenges in the maritime, coastal and delta regions of the world with services including the construction and maintenance of ports and waterways, land reclamation, coastal defense and riverbank protection.

In addition, Boskalis offers a wide variety of marine services and contracting for the oil and gas sector and offshore wind industry as well as salvage solutions (SMITSalvage).

Additionally, Boskalis has a number of strategic partnerships in harbor towage and terminal services (KOTUG SMIT Towage, Keppel Smit Towage, Saam Smit Towage and Smit Lamalco). With a versatile fleet of 1,000 units Boskalis operates in around 75 countries across six continents. Boskalis has over 8,200 employees, excluding its share in partnerships. www.boskalis.com

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Hudson River's Troy Lock & Dam: 100 years and going ...

By JoAnne Castagna, Ed.D.

You're taking a boat ride on the entire length of the Hudson River. Your journey begins upstream in the Adirondack Mountains of Upstate New York, continues south through the Hudson Valley and will end at the Atlantic Ocean, between New York City's Battery Park and Jersey City.

As you travel downstream on the Hudson, you will reach and will have to pass through the Troy Lock and Dam in Troy, New York. The Lock holds the distinction of being one of the oldest in the country, celebrating its 100-year anniversary this year. The Lock continues to provide significant economic and recreational support to the region and serves as a gateway to the New York State Canal System.

100 years ago ...

The Hudson River and other navigation channels in the United States are kept at certain depths so that water vessels can safely transport their goods along the river. To maintain this specific depth, it was mandated in the early 20th century that a system of locks and dams be constructed on rivers.

"In 1915 the U.S. Army Corps of Engineers constructed the Troy Lock and Dam. It was constructed to improve navigation between the Hudson River and the New York State Canal System that includes the Erie and Champlain Canals," said William Petronis, chief, Albany Field Office, New York District., U.S. Army Corps of Engineers. Mr. Petronis has worked for the Army Corps for 38 years and has supervised the maintenance of the Troy Lock and Dam for more than 30 years.

In order to construct the lock and dam, a labor force was hired and supervised by the Army Corps. Many of these laborers were men returning from constructing the historic Panama Canal.

The Army Corps has operated the lock and dam since its construction. This involves making both major and minor repairs to the lock and dam structures, electrical, mechanical and hydraulic systems, as well as performing routine maintenance and maintaining the building and grounds.

An interesting piece of history is that following the construction of the Troy Lock and Dam, a hydropower facility built by Henry Ford was required to provide power free of cost to operate the Troy Lock.

After the lock and dam was constructed and the federal government decided to not pursue development of federal hydropower at the site, Henry Ford and his friends Thomas Edison and Harvey Firestone were camping near the dam. Ford saw the potential for hydropower and in 1918 he petitioned Congress for permission to construct a non-Federal hydropower facility.

In 1921, Ford and his sons were the first citizens in the United States to secure a license for development of private power at a federal facility. As a condition, Ford was required to supply power free of charge for operation and maintenance of the Troy Lock and Dam.

This was the first time that the federal government allowed for private development of hydropower at a civil works project and it took an Act of Congress to get it done. Today, many of the Army Corps' civil works projects across the country have private hydropower development and it all started with the Troy Lock and Dam project.

How lock and dams work

Navigation dams are built on rivers to hold back water and form deeper navigation pools. Dams make it necessary for river vessels to use a series of locks to "step" up or down the river from one water level to another and safely bypass the dam. The Troy Lock and Dam is in operation from May 1 to November 30 every year.

As your boat approaches the Troy Lock and Dam you will be greeted by a massive structure that is the size of more than



one and a half football fields and includes a lock chamber, a long main spillway, auxiliary spillway, a support pier, ice pass spillway and a headgate bulkhead.

“When carrying out a lockage many people think we pump the water but we don’t,” said Petronis “The lock is filled or emptied by gravity. When filling the lock, the water level will rise to the elevation of the upstream pool. When emptying, the water level will drain to the elevation of the downstream river’s tide at the time. On average the difference between the upstream and downstream water levels is about 17 feet.”

“Each lockage passes between 2.5 - 3.0 million gallons of water. It

takes
l e s s

than 10 minutes to raise or lower the lock; however a typical lockage takes approximately 20 - 30 minutes including vessel entry, securing and exit.”



Lock and dams & economic flow

Your boat ride on the Hudson River is contributing to the local economy.

According to Petronis, the Troy Lock and Dam serves as the eastern gateway to New York State’s extensive canal system and is integral to the viability of a system that consists of 524 miles of waterways and 56 locks. This ensures safe navigation of \$6B worth of commerce annually. Although there is no fee to specifically use the Troy Lock and Dam, vessels do have to pay to use the New York State Canal System to help defray some of the operation and maintenance costs.



Longer lifetime, less costs

During the past decades, Trelleborg Ede has built up a sound reputation as a specialist in slurry hoses for the international dredging industry. We design and construct dredging hoses that continue to perform optimally even under the most extreme circumstances. To that end, we use tested systems that we have developed ourselves, such as RockTrail® (incredibly strong hoses and flexible

connections, ideal for locations with a lot of sharp parts) and RockFloat® (floating hoses). Our dredging hoses guarantee a longer lifetime, which more than outweighs the extra costs involved. And the result is: less costs per cubic metre. All in all, it is not surprising that we can rank the world’s most significant dredging companies among our regular clients for years and years now.



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Hudson River's Troy Lock & Dam: 100 years and going ...

Continued

“The lock and dam allows for transport of construction equipment, bulk commodities, oversized loads such as large turbines, generators and steel - that cannot be transported over the highway,” said Petronis.

Shipping on the canal system is also economically beneficial for the shipper. According to the New York State Canal Corporation, the canal system is a considerably cheaper mode of transportation for shippers. For example, one gallon of fuel will move a ton of cargo 155 miles by truck, 413 miles by rail, and 576 miles by barge.

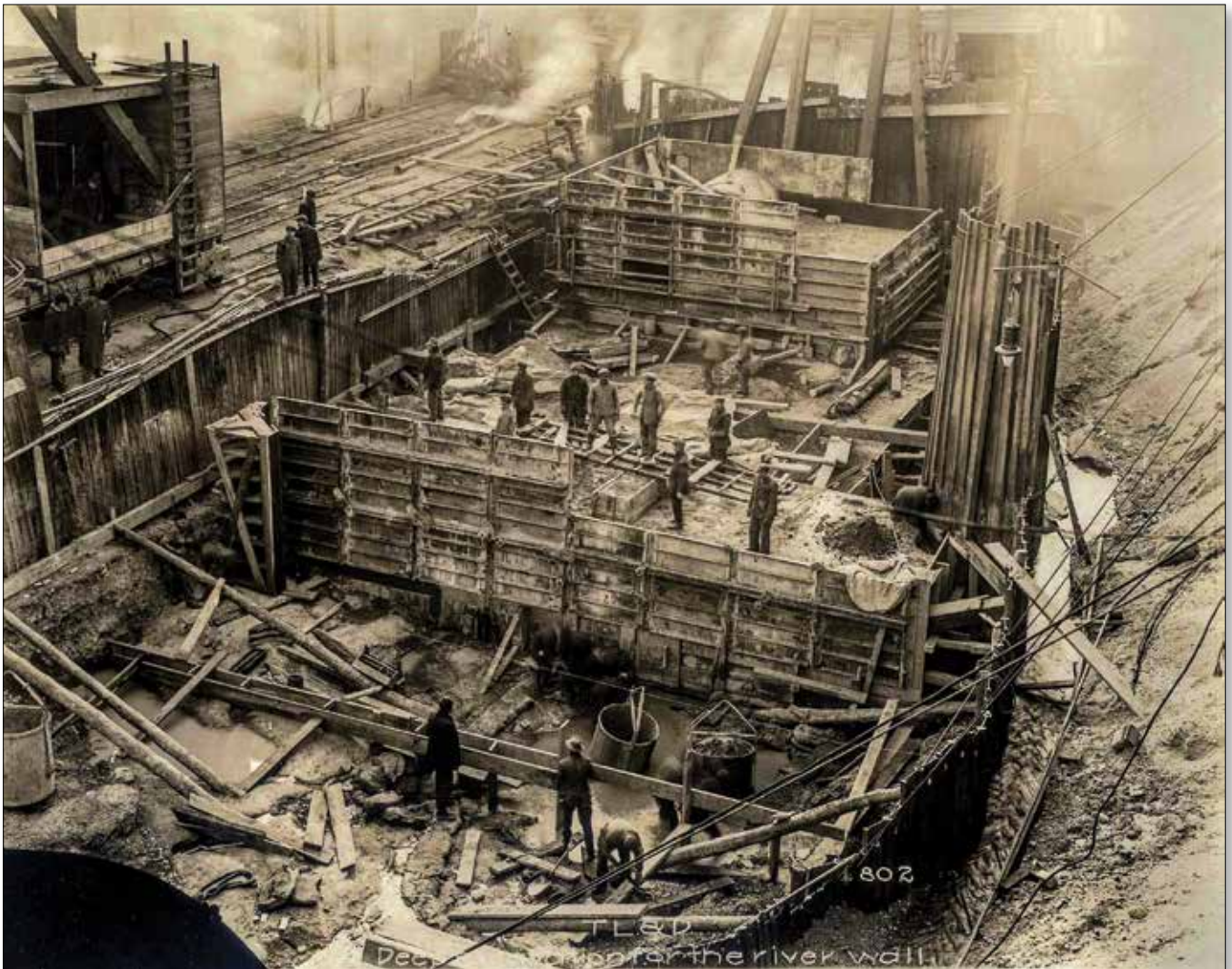
In addition to commercial shipping endeavors the lock also supports a great deal of tour boats, yachts, and local and long distance recreational vessels. The economic impact from activities associated with the New York State Canal System is estimated to be approximately \$380 million per year.

According to Canal officials, the historic waterway offers a high quality of life to communities and visitors alike that line its shoreline. People motorboat on it; fish on it; paddle with canoes, kayaks, and stand up paddleboards; bike on its parallel path; dine at its waterfront establishments; take dinner cruises; and just generally relax next to it - all while helping to support local businesses.

Spending the bulk of his career working at the Troy Lock and Dam facility has given Petronis a unique appreciation not only for the job but also for the people who keep the facility running 24 hours a day, 7 days a week.

“After 31 years at the Army Corps’ Albany Field Office, there are many things I find rewarding about working on the Troy Lock and Dam,” he said. “This includes the team members I have been fortunate to work with over the years, the various improvements we have made to the Troy Lock structure and equipment, the successful relationships we have developed with our partners and the public, and the development of successful maintenance dredging program on the Hudson River.”

Dr. JoAnne Castagna is a Public Affairs Specialist and Writer for the U.S. Army Corps of Engineers, New York District. She can be reached at joanne.castagna@usace.army.mil. Follow her on Twitter at [BlockedBlockedhttp://twitter.com/writer-4usaceny](https://twitter.com/writer-4usaceny). ○



Royal IHC to Build 4,200 m³ Hopper Dredge for Uruguay

Royal IHC (IHC) has signed a contract for the design, construction and delivery of a 4,200 m³ trailing suction hopper (TH) dredge (TSHD) with Administración Nacional de Puertos (ANP) in Montevideo, Uruguay. The contract was signed by Mr Alberto Diaz Acosta, President of the Board of Directors of ANP, Mrs Gladis Liliana Peirano Rivero, Interim General Secretary of ANP and Mr Hans Heszen, IHC Area Sales Director, in the presence of Mr Victor Rossi, Minister of Transport and Public Works of Uruguay and Mr Andre Mechi, Senior Project Manager IHC Latin America.

An important criterion for the award of this contract, as defined by the country's Ministry of Industry, Energy and Mining, was to comply with the local content regulations, ensuring close participation of the local marine industry.



IHC has therefore developed a tailor-made optimum solution for this project, in line with its strategic focus on internationalization. The overall project management will be executed by IHC's Latin American organization located in Rio de Janeiro, Brazil. The basic design and detailed engineering will be supplied by the head office in The Netherlands as well as the highly complex dredging parts and equipment. The construction and commissioning of the vessel will take place in Uruguay. To enable the customer to use the full potential of the vessel, an extensive training and maintenance program will also be provided by IHC. Furthermore, a complete package of spare parts will be delivered.

IHC's CEO Dave Vander Heyde stated, "IHC is honored to contribute to the Government of Uruguay's ambition to develop its shipbuilding industry, by sharing knowledge, providing training and upgrading a local construction facility." The sale of this new vessel will further strengthen

the relationship between IHC and ANP which dates back to the 1970s with the delivery of TH dredge DRAGA D-7, which remains part of ANP's fleet. www.royalihc.com, See ad on pg. 13

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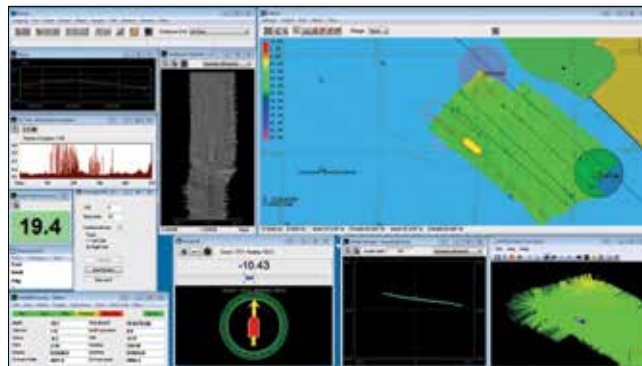
Since 1992, our engineers have lived on dredges while operating, developing and testing PLC code algorithms. We know power systems (electrical, diesel and hydraulic), motor control, PLC controls, wireless technology, information technology, instrumentation, GPS positioning technology and immediate full service support. **Don't settle for archaic skills and technology. Kruse will get you and keep you up to date. We live and breathe this stuff.**

HYPACK 2017 Hydrographic Training Event

The HYPACK 2017 Hydrographic Training Event will be held in New Orleans, Louisiana on January 9 - 12, 2017. The Hilton Riverside New Orleans will provide accommodations and host our annual event. Introducing HYPACK® 2017. During this event, we will reveal the newest version of our software, HYPACK® 2017. The following is a preview of some of the new features and enhancements that are included.

In Survey Planning

Exportable mission planning line files support work with autonomous surface vehicles. New device drivers include the Canon DSLR camera with remote triggering and post processed georeferencing capabilities, Reson T20 & T50 (and dual head), Klein 5000 bathy, PicoMBES, and Kongsberg Seapath INS and PuLSAR sidescan. Additionally, the Multibeam Coverage driver provides an on-the-fly line plan from newly collected multibeam data; and the NOAA Weather Station driver displays current weather information from the nearest NOAA station based on vessel position. The updated SonTek HydroSurveyor driver now supports DVL.



For Data Collection

Real-time sidescan mosaic for multibeam backscatter; simultaneous multibeam automatrix and sidescan mosaic coverage map, anchor sweep displays to monitor ship movement; and Real-time Cloud displays intensity data.

For Data Processing and Final Products

Our new, 64-bit Single Beam Editor (SBMAX64) emulates our MBMAX64 interface and adds the flexibility to simultaneously process all beams from multi-transducers, including the SonTek HydroSurveyor. MBMAX64 includes new routines: WOBBLER64, a wobble correction routine; and a vegetation filter to help distinguish the true bottom. You can apply your sound velocity profile based either on time *or* on time and position; and export selected areas from your Cloud, or Profile display to XYZ data files. HYSWEEP provides new Imagery tools to mark areas where the mosaicking process omits the scan data, which is useful for removing poor resolution turn data common in AUV sonar missions. HYSWEEP also now supports direct import of select 3rd party file formats.

HYPACK® Sub-Bottom

Our new HYPACK® Sub-Bottom license supports collection and processing of *only* sub-bottom sonar data. This is a lower-cost option if you use only a sub-bottom sensor in HYPACK®.

TRAINING SESSIONS

The HYPACK Hydrographic Training Event is an essential, low-cost method to receive comprehensive instruction in HYPACK®, DREDGEPACK® and HYSWEEP® software. This training is beneficial to all. We provide a general training session—for those who are just beginning to use HYPACK® or those who wish to have a refresher—and expert sessions for in-depth training on a particular subject. If you need help with an individual issue or question, one-on-one sessions with our technicians and programmers are also available throughout the event.

HYPACK CERTIFICATION

Attendees have the opportunity to become HYPACK®-certified in HYPACK® and HYSWEEP® after the HYPACK® 2017 Training Event. This is a difficult test that is given upon the completion of a three-day HYPACK® Training Seminar. You must demonstrate advanced knowledge in survey design, hardware configuration, survey, single-beam processing, sounding selection, multibeam calibration and processing, volume computations, and general hydrography in order to pass. You can find more information on our Web site (www.hypack.com). Just select HYPACK® Certified under the Training tab.

INDUSTRY PARTNERS EXHIBITING

There will also be an opportunity to visit exhibitors from the industry's leading hardware manufacturers, equipment resellers and service providers at HYPACK® 2017. The following list of exhibitors was updated as of press time :

AML Oceanographic
Applanix
Aqua Tech Services
CEE Hydrosystems USA, Inc.
EdgeTech
HYPACK-A Xylem Brand
Imagenex
Klein Marine Systems, Inc.
Knudsen
Kongsberg Underwater Technology Inc.
Marine Magnetics
Marine Science Fabrication

Measutronics
Mercator
Norbit
O.G.I. Inc.
OceanServer Technology, Inc.
Ping DSP
R2Sonic
Renishaw Inc.
SBG Systems
Seafloor Systems Inc.
SeaRobotics
SonTek-A Xylem Brand

Subsea Technologies, Inc.
Survey Equipment Services
Teledyne Marine
Valeport Ltd
Velodyne LiDAR, Inc.
WASSP LTD.

To find more information on this training event or to register, please visit our Web site at www.hypack2017.com.

We look forward to seeing you in New Orleans! ○

Dutch Dredging wins 10 year maintenance contract in New Zealand

Dutch Dredging (Slidrecht, the Netherlands) has been awarded a 10 year maintenance contract for five New Zealand port authorities. The contract was signed in the presence of King Willem Alexander and Queen Maxima of the Netherlands, and the Dutch and New Zealand ministers of Economic Affairs, Henk Kamp and Steven Joyce. This longterm project covers the ports of Napier, Taranaki, Timaru, Lyttelton and Tauranga. It is significant that a tender for the maintenance contract was issued jointly by these competing ports, so that a dredge could be permanently stationed in New Zealand over this period. Dutch Dredging is to deploy one of its trailing suction hopper (TH) dredges Albatros for the task.



“We’re absolutely delighted about winning the order,” says Kees van de Graaf, managing director of Dutch Dredging. “As a family business we focus on the long term, so a 10 year contract fits in perfectly with our philosophy. This is a great example of how a longstanding partnership between parties can be brought about and illustrates once again that the Netherlands is more than capable of holding its own on the world scene. Of course, for us, the attendance of the King and Queen at the signing ceremony represents the proverbial icing on the cake.”

Dutch Dredging is a medium sized dredging company based in Slidrecht, the Netherlands. Activities center on dredging and performing surveying and other marine-related operations in the widest sense of the word. The family business has been in existence for over 50 years and has expanded in that time to become an organization with 150 employees and 30 vessels today. ○

Umbrella agreement signed between COSCO Shipping and DEME

DEME and COSCO Shipping are both market leaders in their sectors and have found one another in a joint venture active in offshore wind energy in China. The cooperation is in line with the Chinese climate vision and the development of renewable energy, which were recently incorporated in the 13th Five Year Plan (2016-2020) for social and economic development. The Chinese government wishes to significantly increase the installed capacity of offshore wind energy by 2020 and beyond.

As the largest shipping company in the world, COSCO Shipping wishes to enter this new market segment and has found a partner in DEME’s subsidiary GeoSea, with its extensive experience in developing, building and maintaining offshore wind farms.

DEME Chairman Luc Bertrand said, “As a pioneering company, DEME is a global leader in offshore wind energy, offering overall solutions via EPCIM contracts (Engineering, Procurement, Construction, Installation & Maintenance). Thanks to the accumulated know-how and experience with complex infrastructure projects at sea, DEME can support and carry out COSCO Shipping’s offshore wind vision. The cooperation is also in line with the Group’s partnering philosophy, in which DEME expands its international activities through sustainable cooperation with local partners. Such combinations have repeatedly proved successful in DEME’s dredging and environmental divisions. The joint venture with COSCO Shipping is a win-win for both parties and will contribute to realizing the ambitious Chinese climate objectives but creates also perspectives on further development and services in COSCO Shipping’s areas of expertise such as heavy lift transport, shipbuilding, etc”

COSCO Shipping Chairman Xu Lirong said, “The cooperation with DEME is in line with our strategy, and I believe it is going to help fortify our cooperation with customers, extend our business chain, moreover push forward the sustainable and healthy development of renewable energy industry in China. COSCO Shipping Corporation Limited is a world-leading integrated logistics and supply chain service provider, with shipping, integrated logistics and relevant financial services as core businesses, featuring coordinated development of multiple industrial clusters. Focusing on four strategic dimensions, which are “scale growth, profitability, anti-cyclical capability and building a global company”, the Group highlights the “6+1” industrial clusters layout. The “6” is shipping, logistics, finance, equipment manufacturing, shipping services, and social services industrial clusters. The “1” means “Internet Plus” business based on business model innovation. This layout will help facilitate the integration of shipping factors and build a world-class logistics service provider.”

The Belgian dredging, environmental and marine engineering group DEME is an international market leader for complex marine engineering works. Driven by several worldwide challenges (rising sea level - the scarcity of raw materials - the growing need for energy - reducing CO2 emissions - the contamination of our waterways and soils), DEME has transformed from solely a dredging and land reclamation company to a worldwide operating multidisciplinary and innovative marine engineering and environmental group. www.deme-group.com

COSCO Shipping Corporation Limited (hereinafter referred to as COSCO Shipping or the Company) is a multinational enterprise specializing in shipping, logistics and wharf services, ship building and repairing. The total fleet of COSCO Shipping comprises of 1114 vessels with a capacity of 85.32 million DWT, ranking No. 1 in the world. Its container fleet capacity is 1.58 million TEU, ranking the fourth in the world. Its self-owned dry bulk fleet (365 vessels/33.52 million DWT), tanker fleet (120 vessels/17.85 million DWT), general cargo and specialized cargo fleet (3 million DWT), are No. 1 in the world in terms of capacity. en.coscoshipping.com ○



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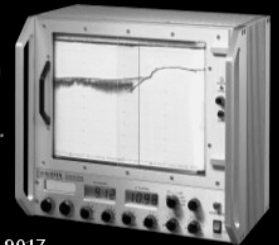
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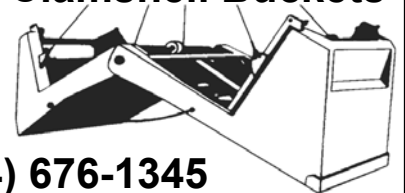
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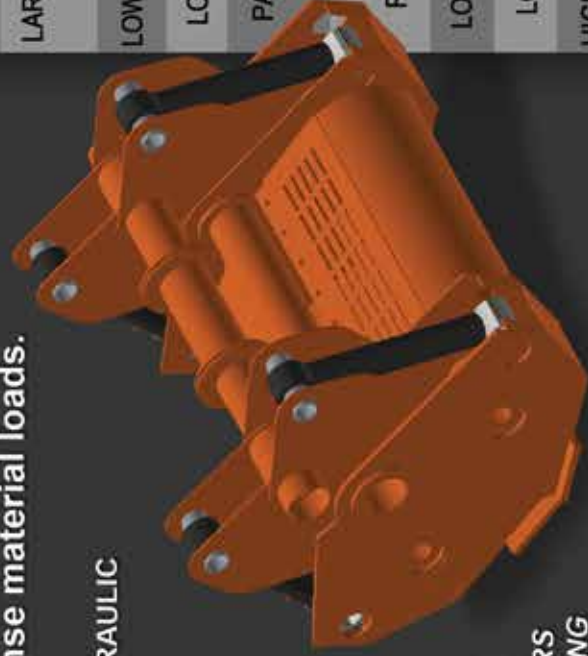
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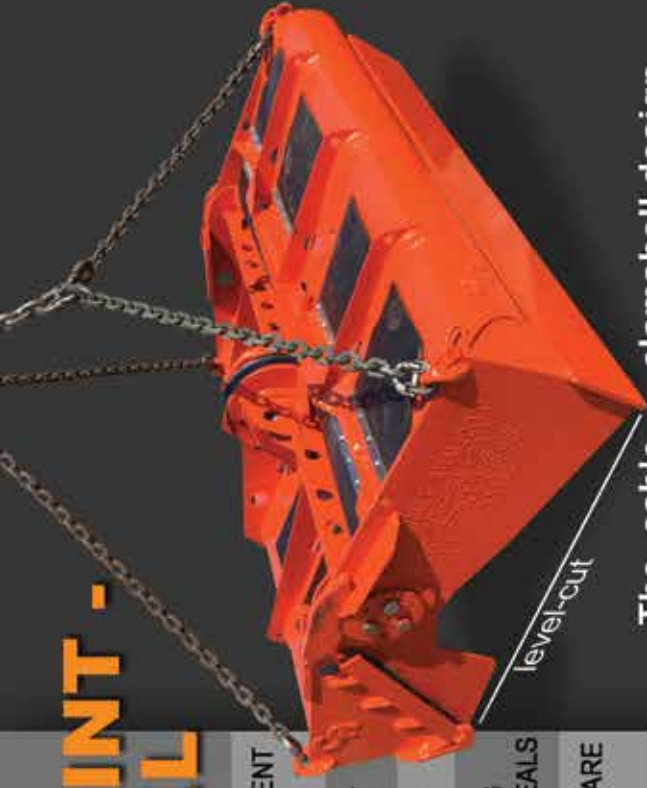
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