

IDR

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IN THIS ISSUE:

WEDA chapter meetings. Page 18.

Dredging projects in stimulus. Page 9 and beyond.

Miami River project ends, Fox River project begins. Page 36.



A crew member operates the controls to attach the floating hose discharge line to the dredge *B.E. Lindholm* for pumpout to Dewey Beach, Delaware. Story on page 6.


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Reader Reply No. 35

Concern for the Environment Led Dolman To Dredged Material Processing

When Johan Dolman's aggregate dredging operation was faced with millions of cubic meters of contaminated sediment in the early 1980's, his solution to the problem was the beginning of a process that to date has processed more than 10 million tons of contaminated material.

His basic idea was to separate, wash and re-use the coarser materials, purify the water for return to the waterway, and have on hand only the contaminated fines to dispose of.

Dolman's career began in 1970, when he joined a marine and shipping company in Dordrecht, the Netherlands as manager of marine activities. Nine years later he started his own company – Dolman b.v. – and in the early 1980's he engineered and built the aggregate processing equipment himself, producing materials in specific sizes for construction. He dredged from aggregate pits, storing the fine materials in mined-out pits after separating the saleable products.

But in the mid-1980's the Dutch government began discovering the extent of contaminants in its lakes and waterways, which included the fines that Dolman had been depositing in the pits.

In addition, his permit to dredge sand from the IJsselmeer was curtailed when a layer of contaminated fines was discovered on top of the clean sand throughout the system. IJsselmeer and its adjacent Ketelmeer are fresh water lakes that were formed in 1932 when the Zuiderzee was closed by a dike, and land within it reclaimed. The IJsselmeer has an area of 1100 square meters (nearly 3000 square miles) and is five or six meters (20 feet) deep.

It was necessary to remove and store the contaminated overburden before he could continue his aggregate operation in the IJsselmeer, and he realized that the overburden contained sand that could be removed and sold. He also realized that if only contaminated fines were stored in a CDF (confined disposal facility), its capacity would be more wisely used.

Dolman devised a method to process the material using screens, cyclones and upstream classifiers to remove fines from the coarse material, chemical separation of the contaminated fines from the water, and filter presses to dry to fines for placement in the IJsselmeer, a dredged material island with a circular lined CDF in the center within a ring dyke. This is the containment facility for contaminated sediments dredged from the IJsselmeer and



Dolman views his processing equipment at the Miami River deepening project in 2008. Since the early 1980's his equipment has processed more than 10 million tons of contaminated material.

Ketelmeer. It was built by a consortium, of which Boskalis was part.

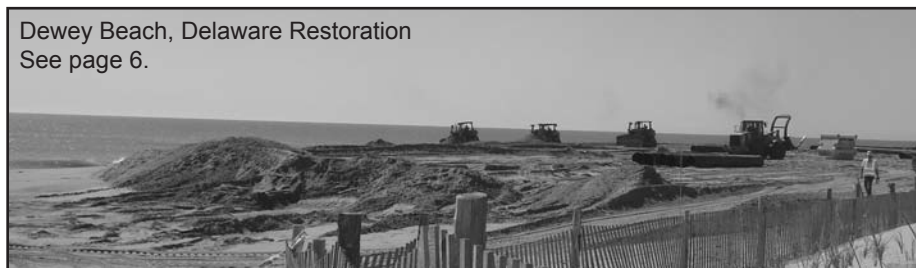
In 1987, Dolman received a contract to process all the contaminated materials from Amsterdam's canals – a job that would take 15 years. Meanwhile, he was expanding his company, exporting his processing equipment to Germany and other countries. For six years, starting in 1992, his facility in Hamburg processed all the maintenance material from the River Elbe – approximately one million cubic meters per year, contaminated with heavy metals. After being treated with the right polymer to get rid of the contaminated fines, the water was returned to the river and the contaminants stored in a safe location. A 50-meter-high grassy hill was created by the city of Hamburg to store the dewatered fine material.

That contract ended when the city built its own processing facility for dredged material.

Dolman's Integrated Approach is based on acquiring all possible information about a site and designing a processing facility based on that knowledge. The investigation includes physical and chemical testing of the sediments and a survey of historic activities in the area to give an idea of what to expect. Only then is a solution proposed to the client.

Part of his approach is a commitment to be as open as possible with government officials and local residents regarding the contaminants in the material and all processes. He attributes his success in large part to this commitment to honesty and openness, as well as a personal commitment to healing and protecting the envi-

Dewey Beach, Delaware Restoration
See page 6.



ronment. In aid of this commitment, he took a three-year environmental studies course at IJssel University when he was 39.

In the late 1980's, as the Dutch government was discovering the extent of polluted sediments in the country, Dolman was working on making capital investments to expand his company. Boskalis asked him to become part of their group at that time, and he saw it as an opportunity to concentrate on environmental cleanup instead of managing the company's growth.

Dolman was familiar with Boskalis, who had been his customer for years, purchasing sand in exact sizes to place under and over submerged tunnels. He accepted Boskalis' offer and the company became Boskalis Dolman.

"The fact that I and my staff are still with Boskalis (after 20 years) shows a good cultural environment in Boskalis," he said. "They respect my blueprint of environmental thinking, and they have respected me and my commitment to nature and the environment," he said.

With the completion of the Miami River project last October, and the beginning of the Fox River project this spring, he sees the possibility of a long-term commitment in the United States.

The Miami project (see related article in this issue) used a mobile plant that will be stored and can be transported to another location.



With his wife Jen in Miami, October 2008.

The company has set up an office within the project headquarters for the Fox River Wisconsin cleanup project, which will start this spring. Bastiaan Lammers, will do project development in the U.S. and Canada, while Claudia Sanders will manage the office. Martijn Luth is the Boskalis Dolman manager for the Fox River project.

Over the past eight months, more than 250 people from Boskalis Dolman and subcontractors have engineered and assembled the processing equipment at the Fox River, in Wisconsin – a fixed plant with four times the capacity of the Miami River plant.

The final results will be the same: separating and cleaning coarse materials, removing contaminated fines, and thus dramatically reducing the volume for disposal. The final result is clean water returning to the river, and sand re-used within accepted standards.

"I love the idea of being useful to the environment," said Dolman.

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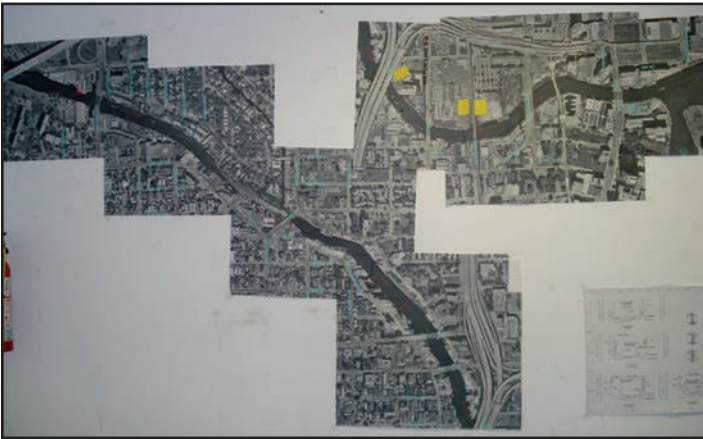
Dolman Symposium Marks Completion of Miami, Beginning of Fox River Cleanup



At the opening reception are, from left, Christopher Lutz, Lauren Putnam, Barbara Orchard and Joe Corrado, all of Arcadis, with Bastiaan Lammers of Boskalis Dolman.



This aerial photo of the processing site shows the covered stockpiling areas and a barge being unloaded. The ship moored on the opposite bank illustrates the confined working space of the project.



In the project office, job sheets contain satellite photos of the Miami River.



Bean's multi-purpose dredge *Barredor Del Rio* in backhoe mode in the Miami River. It will fill the barge in the right of the photo, which will be conveyed to the material processing site. The symbolic "last scoop" of the project was taken on October 15, 2008. The five year, 88 million dollar contract removed 750,000 cubic yards of contaminated sediments from a 5.5-mile stretch of river.



Ancil Taylor of Bean Environment describes the dredging portion of the project.

On October 15, 2008, Bean Dredging's excavator *Barredor Del Rio* took the symbolic "last scoop" of material from the 700,000-cubic-yard maintenance dredging/ environmental remediation of the Miami River.

Joint venture partners Weston Solutions and Bean Environmental designed the \$80 million project by integrating all elements, including dredging and materials handling and remediation. Besides restoring a 15-foot depth bank-to-

bank channel on the 5 1/2-mile-long waterway, the project included managing a spectrum of contaminants and debris.

Dutch company Boskalis Dolman bv was contracted to handle and process all the dredged material. Their treatment facility on the north bank of the river included a berthing area for sediment barges, a shore-mounted crane that unloaded the material. Flocculants were added to the material to separate the solids. The final products were a nearly-dry



Bastiaan Lammers, left, of Boskalis Dolman with Neil Geerers of Tetra Tech at the project site.



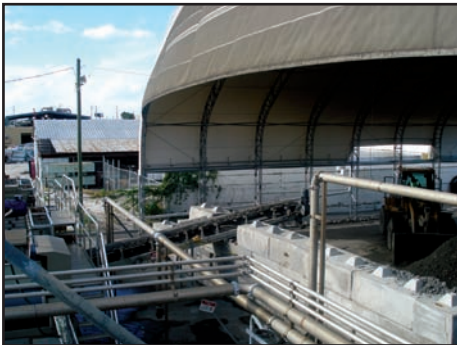
Haico Wevers, another guest, Ancil Taylor, Ken Hayes of Aqua Survey, and Johan Dolman in the control room during the tour.



Lauw Verschuren of Stuyvesant and Haico Wevers of Boskalis Dolman.



Dolman ladles material from the thickening tank to check on the progress of the clarification, while Steve McGee of TetraTech looks on. McGee is the project manager of the Fox River dredging and remediation project.



A conveyor belt transfers the final nearly-dry product to a stockpile. It will be hauled by truck to a landfill.



In this thickener, polymer is combined with the slurry prior to dewatering, stockpiling and removal of the dredged material.



The stockpiled material is covered until hauled to a safe disposal site by truck.

material and runoff water, which was clarified and re-used in the thickening tanks.

On October 17 and 18, CEO Johan Dolman held a symposium in Miami to describe his company's part in the dredging project.

An international group attended the opening reception on October 16, including Netherlands Miami Consul General Lucita Moenir Alam; Johan Dolman, general manager of Boskalis Dolman; and representatives from the dredging and engineering companies on the Miami River and Fox River, Wisconsin projects.

The next morning was devoted to talks about the two projects – Miami River and Fox River, Wisconsin (Dolman's next big



The entrance to the material treatment plant on the north shore of the Miami River. This is a portable plant and can be dismantled and moved to another project.

project) and the afternoon to a tour of the Miami River material processing site and equipment.

Dolman welcomed the guests, and introduced the keynote speaker, Eelco Dykstra, professor in International Emergency Management at the Institute for Crisis, Disaster and Risk Management at George Washington University. He talked about climate change and its effects on water management, with suggestions how the United States and the Netherlands could deal with these effects. He also described the results of a study on risk and water management in 136 port cities.

Stephan McGee, vice president of Tetra Tech IC Inc., and Glenn Green, director of Business Development at J.F. Brennan described the Fox River project in Operable Units 2 through 5, which is starting this spring. The project includes dredging and dewatering more than 3.5 million cubic yards of PCB-contaminated sediment in a project expected to take seven years. Dolman's membrane plate and frame presses will

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dewater the sediment after separation of sand for beneficial use. McGee is project manager for the Fox River Clean-Up.

Ancil Taylor, president of Bean Environmental Inc. and Bastiaan Lamers, project manager for Stuyvesant Dredging for the Miami River Project discussed the Miami River project. The *Barredor del Rio* removed more than 700,000 cubic yards of sediment. Boskalis Dolman's treatment included coarse fraction separation, sand separation and mechanical dewatering by belt filter presses.

Finishing up the talks, Ir. Haico H.A.G. Wevers, managing director of Boskalis Dolman described the company's soil washing centers (SWC); the integrated approach to dredging and material treatment, which includes planning, engineering and design; beneficial re-use examples and Brownfield development projects. He gave examples of a mobile sediment processing plant, dewatering by membrane filter presses (to be used on the Fox River), Sludge Mattress®, a lightweight construction of dredged sediments, and the sustainable confined disposal facility (DCF) management enhanced vacuum consolidation of fine-grained sludges.

Boskalis Dolman is committed to providing large-scale treatment of dredged sediment.

In the afternoon, the group boarded buses to the project site, where they viewed the sediment remediation equipment on the north bank



Johan Dolman, Lucita Moenir Alam (Netherlands Consulate General), Dr. Eelco Dykstra, and Marsha Cohen, editor of Terra et Aqua.



At the opening night reception are, from left, Glenn Green of J.F. Brennan, Terri Blackmar of TetraTech, Paul LaRosa of Anchor Environmental and Dewey Hunter of Ciba (now BASF).



Claudia Sanders with her father Harry Sanders, both of Boskalis International, and John Lally of Lally Consulting.



Clay Patmont of Anchor Environmental, Terri Blackmar of Tetra Tech and Tony Binsfeld, president of J.F. Brennan at the *al fresco* dinner the final evening.

of the Miami River. Visitors watched the gauges in the control room, and followed the course of the material from when it was unloaded from the barges through to the final discharge of material onto the stockpile, awaiting transport to a lined placement site.

Attendees were environmental engineers, consulting companies, survey companies, dredging companies and others interested in environmental cleanup and sediment treatment. The group gathered for a final dinner that evening and the golfers among them teed off at the adjacent golf course the next morning.