

THE BIG STORY

DREDGING THE PAST TO CREATE A BETTER SHIPPING FUTURE



BY MELANIE D.G. KAPLAN

POSTING IN **CITIES**

THE CENTURIES-OLD TECHNIQUE OF DREDGING SEDIMENT TO CREATE DEEPER WATERWAYS IS HAVING A RESURGENCE. WILL IT

SPARK AN ECONOMIC BOOM?

Special Feature: The Space Issue



In October, Jo-Ellen Darcy, the Assistant Secretary of the Army for Civil Works, stood before her audience at the Sheraton San Diego Hotel and Marina and tried to lighten the mood. This was, after all, a four-day conference on dredging.

“I predict lots of dredging puns this week,” she said, beginning her remarks. “Maybe there should be a competition for worst and best to shake things up a bit, although I fear the worst could be the best.”

Dredging has certainly taken its share of abuse in the joke department. It’s not easy to love an industry with a rather repulsive name. In fact, until it was recognized as a commercial commodity, the material

dredged up to create shipping channels used to be called “spoils.”

But look at it now! Today, dredging warrants an entire international conference. “Any silt happens T-shirts in the crowd?” quipped Darcy. “If so, I dare you to wear them outside of the hotel.” And then she got down to business.

Dredging involves excavating sediment and muck from the bottom of our oceans, rivers, bays and harbors to create navigable waterways for shipping traffic. The Chesapeake Bay, for example, is an average of just 21 feet deep, but the waterways are deepened to 50 feet. To put the importance of dredging in perspective, consider this: If dredging stopped today, these underground highways would quickly become impassable to large ships, putting a halt to the commerce that brings us our pick-ups, personal computers and parkas.

Heyday of dredging

According to Darcy, the country’s marine transportation system consists of about 25,000 miles of navigable coastal, inland and intra-coastal channels. And it is an increasing challenge to find a place for the hundreds of millions of cubic yards of material dredged every year from these routes. Sometimes it is dumped offshore (typically the least expensive option), but more and more, it is used in construction materials or as an antidote for erosion--rebuilding islands, replenishing sand beaches.

The U.S. Army Corps of Engineers has been dredging since 1824. With the first River and Harbors Act, Congress also appropriated \$75,000

“to improve navigation on the Ohio and Mississippi rivers by removing sandbars, snags and other obstacles.” Today, a single dredging project can easily cost hundreds of millions of dollars. But despite the cost, it is somewhat of a heyday for this oft-forgotten industry of moving earth and creating space.

The shipping industry’s effect on state and local economies is, well, titanic. According to the Army Corps of Engineers, more than 95 percent of overseas trade goes in and out of the United States by ship. Our marine transportation industry supports nearly \$2 trillion annually in commerce and creates jobs for more than 13 million people. And because transporting goods by water is vastly more cost-efficient than doing so by air, rail or road, companies have a strong motivation to transport their products as far as possible by ship.

But more than anything, the recent glory days of dredging are being driven by the expansion of the Panama Canal. The Canal, the major shipping route that connects the Atlantic and Pacific oceans, will double its capacity in the next two years. Currently, container ships as wide as 106 feet can pass through the Canal. With the expansion, it will be able to accommodate ships as wide as 160 feet, giving these giant vessels access to the East Coast. Called Post-Panamax and Super-Post-Panamax, these larger ships can carry significantly more cargo, making each trip across oceans considerably more efficient.

In order to prepare for these ships, ports must create deep enough waterways and make multi-million dollar investments on land-side improvements. These include upgrades to cranes, piers and

transportation connections such as truck lanes, rail lines and terminals.

The Canal's expansion has left a flurry of port expansion projects in its wake. Even the ports that are not big enough to welcome the biggest vessels will be affected by what experts call the cascade effect, whereby ships that are nudged out of our largest ports to make room for bigger vessels will ultimately find homes at smaller ports. Each port is angling to increase its share of the shipping industry pie, or at least hold on to the business it has. And in this whole swirl of activity, dredging is playing a star role.

Technology aids expansion

In the early days of dredging, it was simply a matter of digging deep and hoping you were within a few feet of your target. Today, using GPS devices, the machines get within a few inches, and tracking systems also help conduct surveys before and after the operation. According to Dave Sanford, the navigation policy director for the American Association of Port Authorities, not only is the dredging industry replacing some of its aging fleet, but today's dredges are being designed with cleaner engines so there is less impact on the environment.

“The process has become much more precise,” he said. The new machines have sensors that can track and monitor all the movement of the vessel to show how much material is loaded and where it was released. Sanford said accountability has improved tremendously over the last couple decades.

In Darcy's speech, she gave examples of the work the Corps is doing along the Eastern Seaboard. These ports have undertaken multimillion-dollar expansion and improvement projects to prepare for the Panama Canal widening.

- The Savannah Harbor Expansion Project will modernize the Georgia Harbor to accommodate larger ships, which will allow more efficient transport of goods. The deepening is expected to yield annual benefits of \$174 million.
- Miami is working on a harbor-deepening project that should double the harbor's cargo business in the coming years, creating an additional 33,000 jobs.
- The Port of New York and New Jersey is deepening its navigation channels for larger ships, a \$1.6 billion effort. The New York and New Jersey Harbor is the largest container port on the East Coast, supporting more than 230,000 local jobs. An additional \$1 billion is being spent to raise the Bayonne Bridge by 64 feet so it can accommodate the new vessels.
- The Corps is also working with Jacksonville, Fla., and Charleston and Savannah, S.C., on projects to deepen their harbors.
- Baltimore had already created a 50-foot channel, but it recently added four super-sized cranes to its fleet, making it only the second port on the East Coast (after Norfolk, Va.) to be fully geared up for the gargantuan ships.

Sanford said although there are a lot of expansions underway, what he calls the "race to the bottom" is a misconception. He said it's just too expensive for ports to dredge without a clear long-term plan. "Frankly,

when you're looking at close to half a billion dollars for a major deepening project, you have to think twice about that," he said. "It's a complex process that requires a study to see whether the port would be competitive with a deeper channel. You hear a lot of people say, 'This port is going to 50 feet because the other port went to 50 feet.' It just doesn't work that way."

Dredge material inspires innovation

With each new dredging project (as well as periodic maintenance -- re-dredging after storms and natural movement of sediment), the Corps and its local partners must consider the final destination of the dredged material. Before the 1970s, it sometimes ended up being used in traditional construction projects, creating structures ranging from runways to the land that is now New York's Battery Park.

But today, once it has been tested for contamination, dredged material is being employed in a number of ways, including habitat development, shore protection, and agriculture and aquaculture and construction. Last summer, for example, I visited a few islands that have been built from material dredged from the Chesapeake Bay. Although most U.S. ports today are taking on innovative reuse projects, the Maryland Port Administration (MPA) is setting one of the best examples of how this material can be reused in positive ways.

On a brilliant and unusually warm day this fall, I drove from Washington to Baltimore, passing through two security checkpoints to reach Seagirt Marine Terminal. I met Frank Hamons, deputy director for Harbor Development, and we sat in the conference room

of a small building. The building sat on land built with material dredged years ago to create the I-95 tunnel in Baltimore.

Hamons, a biologist with an expertise in shellfish, was hired by the state in 1980 to start a dredge management placement program. He approaches dredging with the sensitivity of a scientist, the practicality of an engineer and the competitiveness of a businessman. He understands trends in the industry, economies of scale and why it is vital for Baltimore to make space underwater for the next era of ships.

“It’s about trying to get as many containers from point A to point B as possible,” he said, referring to the individual boxes that carry cargo on the ships. “And you don’t want shipping lines to leave the port, because it’s difficult to get them back.”

Every year, more than 2,000 cargo vessels and crew ships call on the port of Baltimore, moving about 40 million tons of cargo and generating \$1.4 billion in revenue. Out of 360 ports in the United States, it is first in the nation in the number of automobile, farm machinery and truck imports and is linked to more than 108,000 jobs in Maryland. Over the last decades, the port’s approach to dredging has shifted from placing dredge material in the open waters of the Chesapeake to a strategy that now includes restoring wetlands, rebuilding islands and creating roadways.

Baltimore has been a port since 1706 -- when it imported tea and exported tobacco -- and dredging has probably been going on to some extent since then, Hamons said. But the need to dredge more increased as ship sizes grew. “Probably the most fantastic rate of growth has

happened in the last 15 years,” he said. “It’s grown by leaps and bounds.”

That growth means that the Port of Baltimore requires dredging an average of 4.7 million cubic yards of sediment every year. Dredging costs are highly variable, but transporting the material is consistently one of the most expensive factors, so nearby solutions are always preferable. Rather than looking at this material as waste, Hamons has helped pioneer some ways to treat it as a resource, through what is called innovative reuse or beneficial use. Through these efforts, Maryland has become a national model for use of sediment dredged from the depths of our waterways.

Innovative reuse means recycling the dredged material so it can be used as a substitute for other raw materials. Examples include capping a landfill or transforming the material into construction materials, as two Pennsylvania companies are doing. HarborRock uses the material to make a lightweight aggregate that can be used in masonry blocks, concrete and asphalt. Schnabel Engineering developed a blend of dredged materials and waste from a Baltimore steel mill to create a compound that can be used for highway construction and parking lots. Both companies are working with the MPA.

The material can also be blended to create a topsoil, which can be used for athletic fields, home landscaping, golf courses and parks. And it can be combined with recycled materials such as glass, plastic bottles and automobile interiors to manufacture decorative landscaping products like statues, garden benches, patio pavers, planters and

artificial rocks.

Beneficial use refers to using the dredged material for environmental benefits. There are a number of good examples of this across the country. In Washington state, the Port of Everett and the Corps used old dredged material to create Jetty Island. The island provides protection to the harbor and has created a safe environment for wildlife such as salmon and bald eagles.

In New Jersey, years of dredging more than 35 miles of shipping channels has created enough material to build 100 acres of tidal marsh, nourish beaches and cap the dredged material remediation site off the coast of Sandy Hook.

Steve Brown, chief of the Corps' Baltimore District Navigation Branch, said the restoration of Maryland's Poplar Island is one of the best examples of beneficial use (one of several islands Maryland has rebuilt or is currently rebuilding). Located 12 miles south of the Chesapeake Bay Bridge, It had eroded from 1,100 acres in the mid-1800s (when it was used by the Democratic Party for a men's-only hunting club) to barely five acres in the 1990s. The state and the Corps began restoring the island with dredged material in 1998. When it's completed, in 2039, it will include nearly 2,000 acres of tidal wetland, upland and open-water habitat.

“Material that would otherwise need to be disposed of,” Brown said, “helps restore an ecological habitat and improve the environmental condition of the Chesapeake Bay.”

Maryland: ready and waiting

After I talked to Hamons, a port representative took me on a quick tour of Seagirt Terminal. Riding around in his sedan, it felt like we were tiny toys, and giant Legos, Erector Set pieces and Tonka toys had taken over the universe. Enormous cranes swiveled around and picked up containers as though they were gargantuan cracker tins. The crane grabbed on to each box as easily as claws grab the tennis ball-sized stuffed animals from a glassed-in arcade machine.

As we sat and waited for some trucks to clear our path, I marveled at the scale. There was a flurry of large vehicles moving around, lifting, spinning, stretching, all playing a part in quickly getting each container toward its destination. Massive ships from faraway lands sat as their cargo was emptied. Trucks with empty flatbeds lined up like taxicabs, waiting for their containers.

Finally, we approached the latest pride and joy of the port: four skyline-changing, shiny white cranes that, if extended to their full height, stretch 400 feet into the sky. If dredging is the underworld of the shipping business, these \$40 million cranes are the visual representation of economic growth. Made in China, the cranes traveled for two months earlier this year to reach the terminal. They are the largest of their kind in the shipping industry and can reach 22 containers across on a ship (compared to 18 with the older cranes), lifting 187,300 pounds of cargo.

The cranes are a sign of the final step in a \$105 million expansion of the Port of Baltimore. (The critical infrastructure trio is a deep enough

channel, a deep enough berth and large enough cranes.) To make this happen, MPA partnered with Ports America Chesapeake, which has a long-term lease on the terminal. In exchange, the company invested \$105.5 million to develop the 50-foot berth and purchase the four cranes that sit on it. The partnership is creating 5,700 jobs.

Today, the cranes are fully installed, and the international longshoreman who will operate them have been trained. So now, they sit and wait for the largest container ships in the world. "It's inevitable that bigger ships will come to the East Coast," said Mark Montgomery, president and CEO of Ports America Chesapeake. "The reality and economics of bigger ships just makes sense. That's why we made the investments. I think that it's super-important for all of the ports along the East Coast to prepare themselves for that inevitability."

Mauro Dal Bo, who heads up the Baltimore office of Geneva-based MSC, one of the port's top container customers, was noncommittal about the larger ships and cranes. "If the economy is good, we will use the new cranes," he said. "It's difficult now with the economy." He said 2012 yielded positive numbers in both the export and import columns, so that builds some confidence. "It would be a pity not to be able to bring the [bigger] ships here," he added. "We want to avoid the cathedral in the desert -- beautiful construction, but no one goes there."

Montgomery said the market won't blossom on the East Coast until the Panama Canal project finishes, which is still two years away. The hope is that larger ships will travel to East Coast ports to reach their

customers faster -- and cheaper -- than their current routes to West Coast ports, sending products to cities by rail.

And of course West Coast ports are banking on their established infrastructure and efficiency to keep their current customers -- although at least some ports aren't too worried about competition from the East. There seems to be a consensus on the uncertainty in the near future, but those in the industry do agree that the point is to be ready once the economy picks up and the Canal expansion opens.

“We wanted to have all the checkmarks -- deep water, berth, cranes,” Montgomery said. “So as carriers start looking at what ports they can call on, at least Baltimore will be a positive check.”

Photo: Bill McAllen

DEC 3, 2012

SHARE THIS



MELANIE D.G. KAPLAN

Contributing Editor

Melanie D.G. Kaplan is a Washington, D.C.- based journalist. She is a regular contributor to The Washington Post and National Parks Magazine. Her website is www.melaniedgkaplan.com. Follow her on Twitter. **DISCLOSURE +**