



DB Avalon

North America's First Hybrid Dredge

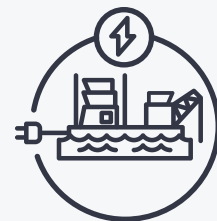
Largest Clamshell Dredge in North America • Lowest Carbon Footprint



Highest capacity, with the lowest carbon footprint vessel of its class.



Hybrid



Capable of an all-electric operation, with shore-power connection making it a true zero-emissions dredge.



DB Avalon

DB Avalon is a market-first, hybrid-powered dredge vessel designed and built by Curtin Maritime to be the highest capacity, with the lowest carbon footprint clamshell dredge of its class. Designed with a fully automated dredging system. Capable of an all-electric operation, with shore-power connection making it a true zero-emissions dredge.

Its system boasts a state-of-the-art hybrid power supply system utilizing a set of massive lithium-ion battery banks, allowing for usage of generators 30% smaller than those found in conventional dredges. The system is configured to optimize charge/discharge balance by harnessing regenerative power while lowering or decelerating the bucket, then uses power from the batteries and generators to hoist. It also possesses the ability to connect to shore-power, where available, enabling a fully electric, zero-emissions operation.

Its combination of the largest clamshell buckets ever built in the U.S. not only allows for faster dredging, but also the ability to dredge materials not possible by clamshell rigs without pre-treating (e.g. cutterhead rig, blasting). Fully automatic operation of these purpose-built buckets result in the most accurate dredging

available in the world. This level of precise digging greatly minimizes turbidity pollution and the necessity to clean-up dig, completing depth targets faster and further reducing carbon footprint of any project.

Though a first of its kind in the North American market, this groundbreaking system is tried and true around the world winning awards in its innovation to leverage technology to not only outperform virtually all clamshell dredge vessels, but a fraction of fuel consumption and carbon footprint.

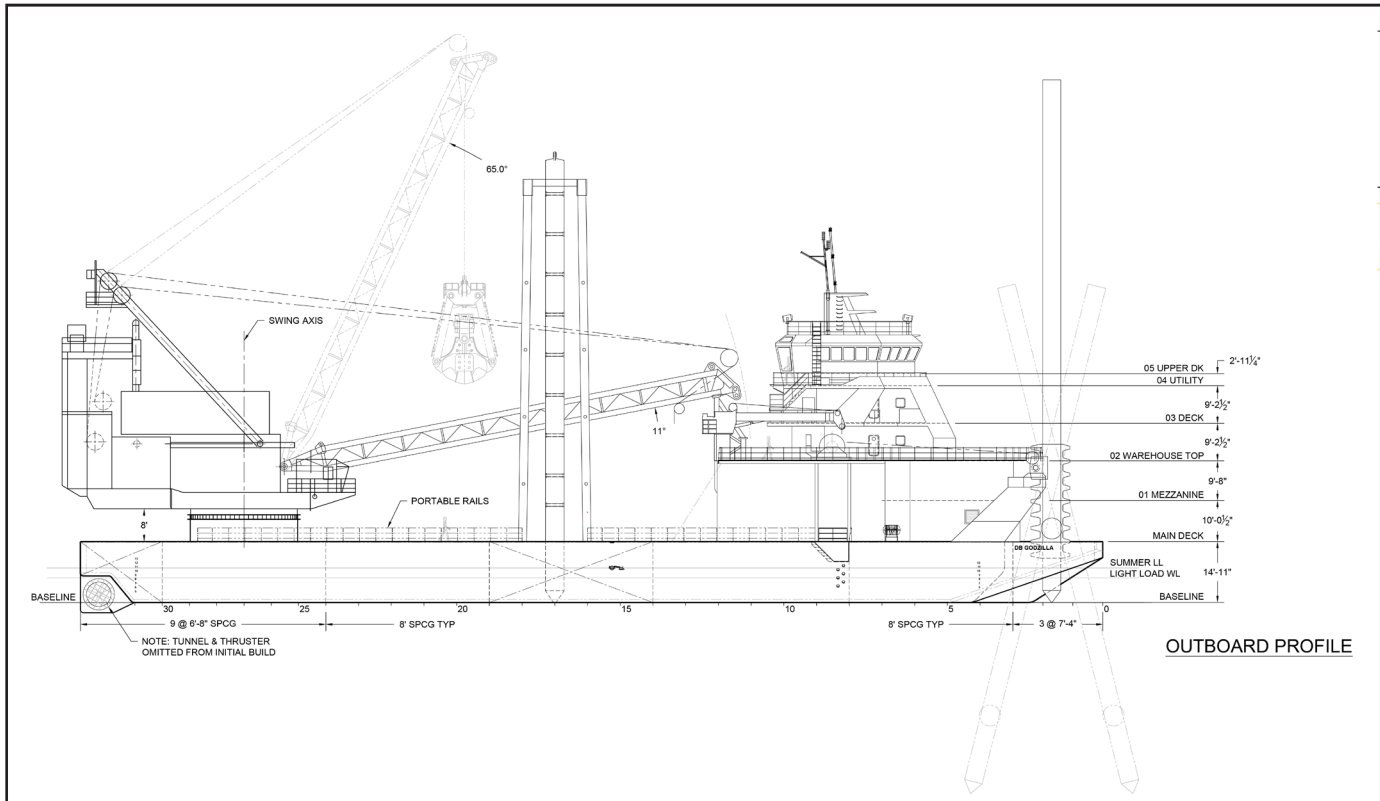
Ultimately, all these features make the DB Avalon the most cost-effective, most accurate, and highest capacity dredge vessel with the lowest carbon footprint in all of the Americas.



Equipment Data

DB Avalon: 250'x77'

EPA Tier 4



Construction/Key Data:

Owner: Curtin Maritime, Corp.
Design & Construction: Curtin Maritime
Crane & Hybrid System: IHI AMTEC, Sumitomo Heavy Industries
Barge: Conrad DeepWater South

Year Built: 2022

Certificates:

- ABS Load Lines, Manned, Oceans

Particulars: 250' x 77' x 15'

Fuel: 58,145 gl. (98%)

Water: 35,770 gl. (100%)

Gross Tonnage: 2412

Holding Tank: 35,060 gl. (98%)

DEF Capacity: 4,925 gl. (98%)

Max. Hoisting Load: 242,000 lbs. (110 MT)

Radius: 66.9 ft. (@ 55 ° boom angle)

Boom Length: 93.5 ft.

Fixed Spuds: (2)x 109 ft./85k lbs./φ4.6'

Walking Spuds: (2)x 130 ft./130k lbs/4.6'x4.6'

Generators:

(2) x Cummins QSK60 (EPA Tier 4)

Hybrid System:

Designed by Sumitomo Heavy Industries

Powered by Lithium-Ion Batteries

Energy Regeneration System

Features

EPA Tier 4

Fully electric plug-in, zero-emissions capability

Fully automated dredging software by Sumitomo

18 Berths / 10 Heads

Air-conditioned accommodations

Full galley



Award-Winning Technology

Infrastructure Technology

Development Award

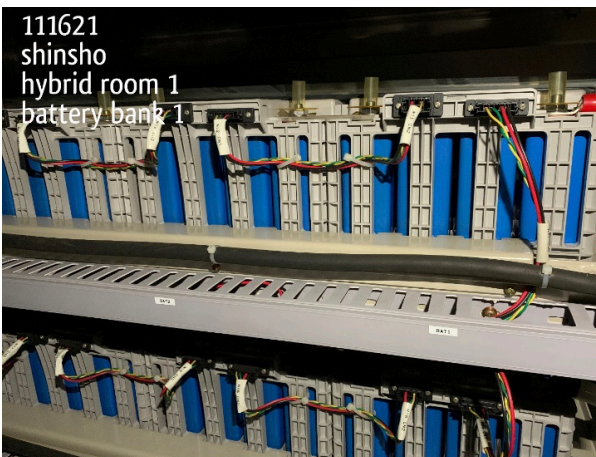
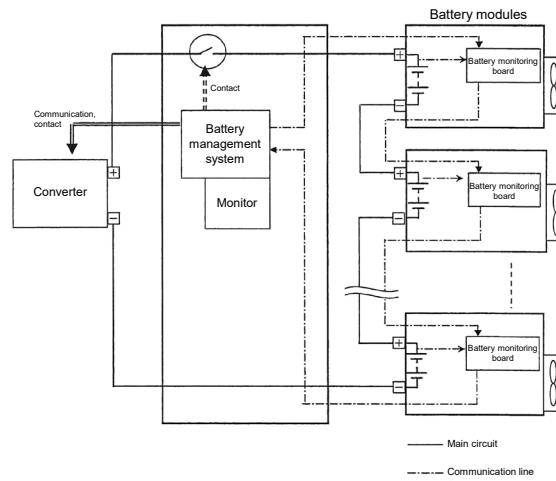
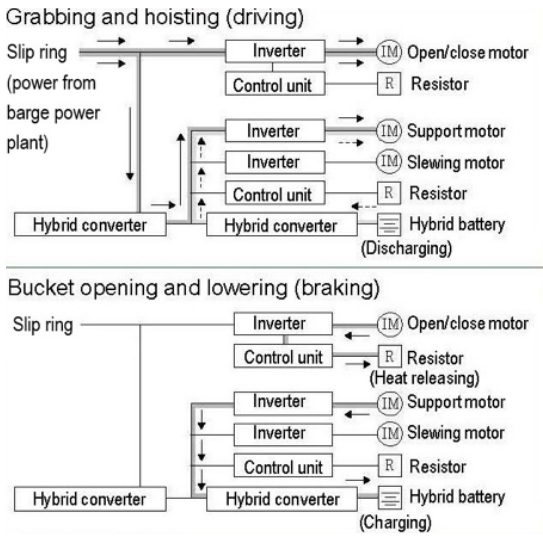
Japan Institute of Engineering

Coastal Development Institute of Technology



Hybrid Power Plant

DB Avalon: 250'x77'
EPA Tier 4



Credit: Sumitomo Heavy Industries

DB Avalon

The DB Avalon employs the latest hybrid technology, combined with the most energy-efficient Tier 4 generators in the market.

Because of the hybrid power source, it allows the usage of generators two-thirds the size of a conventional dredge vessel, further reducing CO2 emissions by 30% less than the highest tier rated generator available.

The two QSK60 generators manufactured by Cummins uses a proven Selective Catalytic Reduction (SCT) technology with a flow-through exhaust after-treatment system, using diesel exhaust fluid (DEF), to deliver ultra-low emissions.

Credit: Sumitomo Heavy Industries

The four banks of 20 battery modules each, are controlled by state-of-the-art software. It optimizes charge and discharge cycles by harnessing regenerative power from normal digging operations and re-charging the batteries, further reducing fuel consumption and greenhouse gas emissions.

The hybrid system designed and built by Sumitomo Heavy Industries received the Infrastructure Technology Development Award for its breakthrough innovation in increasing performance, while drastically reducing carbon footprint in the Asian market.



Automated Dredging System

DB Avalon: 250'x77'
EPA Tier 4

Digging Position Control

The DB Avalon digs in a fan shape by repeating automatic slewing and stopping motions at multiple positions along the direction of slewing. The slewing operation is designed to avoid interferences

between the bucket placed on the water surface, or under a scow alongside.

Depth Control

Required lifting height is calculated for a set depth based on tide level, trim angle, heel angle and draft input from the barge, and automation controls bucket digging activity as directed. To reduce pollution around the digging area and the impact of the bucket

dropping into and coming out of the water and reaching and leaving the seabed, speed and distance are automatically controlled to slow the bucket's movement before/after each operation.

Lowering and Grabbing

The bucket blade tips go up or down, depending on the bucket opening. By automatically hoisting or lowering the bucket with the support winch the necessary amount, either up or down, the blade tips move horizontally at the same level. This supports more efficient grabbing of a greater amount of soil. This allows for a level

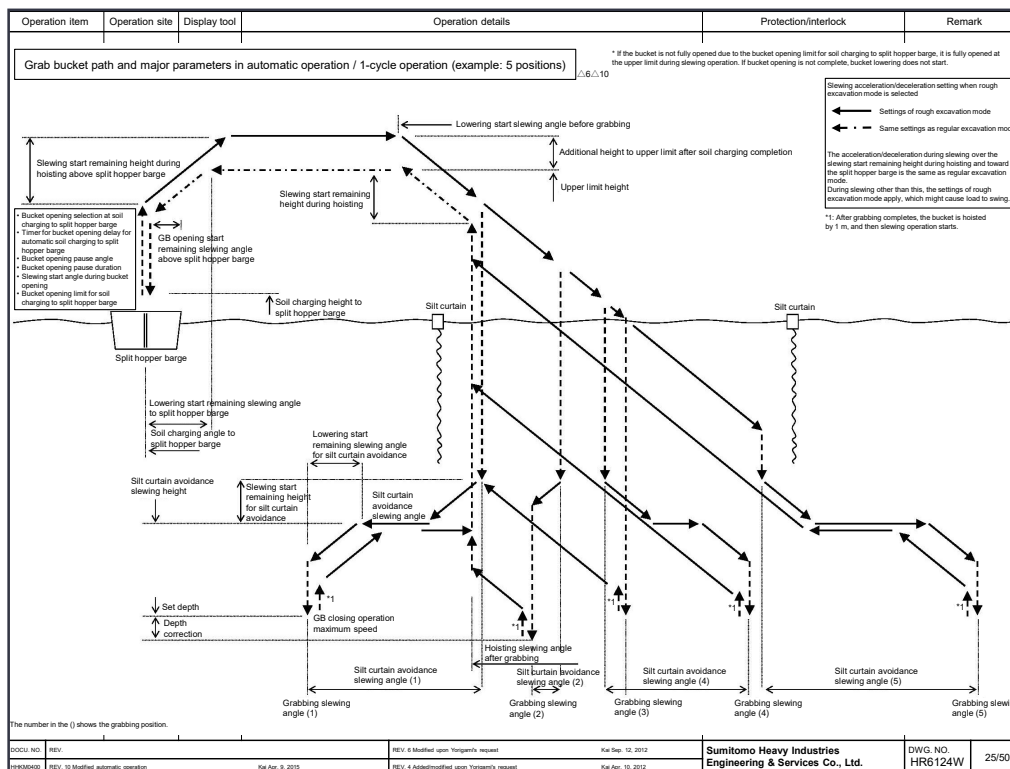
cut with round nose digging buckets. This is a great advantage for accurately dredging to design depths and tolerances. The level cut that is normally only realized with specially designed level cut buckets is now available with all buckets through this automation.

Superior Operational Reliability

Dredging requires constant, accurate, and high-speed motion. The fully automatic operation system is also applied to electrical inverter control, the horizontal digging function, and the anti-sway system to achieve a more accurate and more effective operation.

Precise constant control due to the automatic operation system also results in increased operational safety by stabilizing the equipment's motion.

Automated Dredging = Increased Accuracy = Timely Schedule



Credit: Sumitomo Heavy Industries



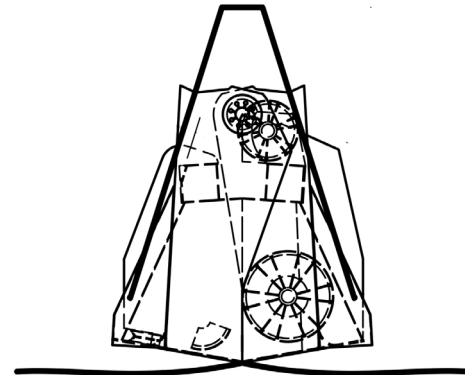
Dredging Gear

DB Avalon: 250'x77'
EPA Tier 4

Maintenance Bucket

Manufactured by Cable Arm
72 CY x 70,500 lbs.

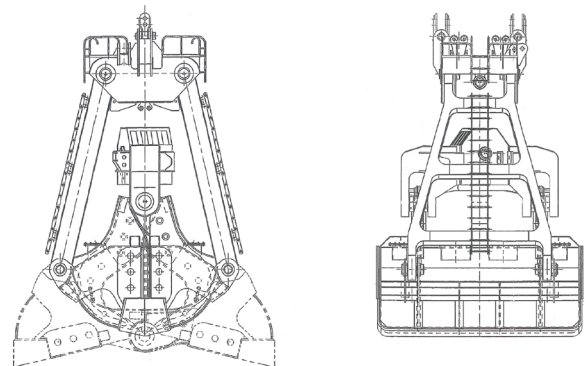
It is the largest class of buckets, and only 4-line bucket of this size Cable Arm has ever produced. CMC worked tirelessly with Cable Arm's founder Ray Bergeron to design this bucket to maximize on the extreme line pull in for line design of the Sumitomo machine. This is a fully contained environmental bucket that provides a level cut and low turbidity. It is a proven bucket design with proven results.



Middle Bucket

Manufactured by Koei Iron Works
39 CY x 132,200 lbs.

A closed bucket to reduce turbidity. It's the only one of its kind in the Americas. While the sheer weight and size of this bucket is unprecedented in the American markets, this is one of the most common buckets overseas where the crane originated.



Extra Extra Heavy Bucket

Manufactured by Atlas SSI
13 CY x 198,000 lbs

The "Extra Extra" bucket is the heaviest, most aggressive dredging bucket manufactured in the United States. It is the heaviest bucket ever produced by Atlas by almost twofold, weighing 198,000 pounds with a capacity of 13 yd.³. With over four-times the digging force of a typical large-scale clamshell bucket, it's capable of digging material previously impossible with existing buckets in the United States. The common practice of pretreating material with a cutterhead or by blasting is no longer always necessary. Its unparalleled design and construction results in the ideal bucket for digging through large amounts of solid rock in less time with more precision.

The economic value of digging once without pre-treatment, coupled with this bucket design based on buckets widely used overseas make the **DB Avalon the most efficient, versatile and cleanest clamshell dredge in the Western Hemisphere.**

