

- The dredge begins digging, placing dredged material into the moored barge.
- When all material is excavated, the dredge is moved forward by lifting the forward spuds and maneuvering with the bucket and stern spud.
- Loaded barges are towed to the disposal area and emptied.
- The offered procedures are repeated until project completion.

## ADVANTAGES AND LIMITATIONS

- Known for its ruggedness, this machine can remove bottom materials consisting of clay, hard packed sand, glacial till, stone, or blasted rock. The dredge requires less room to maneuver in than most other types of dredges.
- The violent action of this dredge may cause considerable sediment disturbance and resuspension during maintenance digging of fine-grained material.

## BUCKET DREDGES

A crane mounted on a flat-bottomed barge, on fixed-shore installations, or on a crawler mount, this dredge features clamshell, orange peel, or dragline buckets that can fulfill a variety of requirements and be quickly changed to suit operational needs.



JT Cleary dredging Nyack Marina in Nyack, NY, on the Hudson River. This was mechanical dredging, done for maintenance of depth in the marina, so boats would have sufficient draft at the docks. The company used a barge-mounted crane with environmental buckets to dredge 3,780 cubic yards and also replaced storm-damaged piles.

Used to excavate most materials – except for cohesive consolidated sediments and solid rock – these dredges are effective while working near bridges, docks, wharves, pipelines, piers, or breakwater structures because of their maneuverability and ease of control.

In most cases, anchors and spuds are used to position and move bucket dredges, with the material excavated placed in scows or hopper barges that are

then towed to disposal areas. Bucket dredges typically range in capacity from 1 to 12 cubic yards.

The effective working depth of this dredge type is roughly 100 feet, with 20 to 30 cycles per hour being typical.

A routine sequence of operation includes:

- A tug moves the bucket dredge, scows, or hopper barges to the work site.
- The dredge is positioned at the location where work is to start, and the anchors

and spuds lowered into place.

- A scow or hopper barge is brought alongside and secured to the bucket dredge hull.
- The dredge begins digging by dropping the bucket, in an open position, from a point above the sediment. The bucket falls through the water and penetrates the bottom material. The sides or jaws of the bucket are then closed by wire cables operated from the crane. As the sides of the

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bucket close, material is sheared from the bottom and contained in the bucket compartment.

- The bucket is raised above the water surface and swung to a point over the hopper barge. The material is then released into the hopper by opening the sides of the bucket.
- As material is removed from the waterway, the dredge is moved to the next nearby location through the use of anchors.
- The loaded barges are towed to the disposal area by a tug and emptied.

Advantages and limitations of bucket dredges are comparable to those of dipper dredges.

## SPECIAL-PURPOSE DREDGE

The U.S. Army Corps of Engineers' dredge, CURRITUCK, is one type of special-purpose dredge. Designed to work the same projects as sidecasting dredges, the CURRITUCK can completely remove material from an inlet complex and transport it to down drift eroded beaches.

A self-propelled, split-hull type of vessel, the CURRITUCK is equipped with a self-leveling deckhouse located at the stern. Here, all controls and machinery are housed. The vessel is hinged above the main deck so that the hull can open from bow to stern by means of hydraulic cylinders, which

are located in compartments forward and aft of the hopper section. The vessel has one hopper bin with a capacity of 315 cubic yards. The hopper section is clearly visible to the operators in the pilot house, which aids in production monitoring.

The vessel operates like a hopper dredge; however, the CURRITUCK is designed to transport and deposit dredged material close to the surf zone area.

## ADVANTAGES AND LIMITATIONS

- The CURRITUCK is an effective tool in shallow-draft inlets. The vessel can be used to supplement sidecasting dredges and to transport dredged materials from inlet channels to

the near-shore areas of eroded beaches.

- The production rate of the CURRITUCK is limited by its small hopper capacity and it is not effective in major navigation channels.

## COMPREHENSIVE KNOWLEDGE

While hopper and dustpan dredges are the two primary vessels used for dredging operations throughout the U.S., an in-depth knowledge of all dredge types remains useful for any marine contractor or agency that may encounter challenging and unexpected conditions when maintaining or expanding navigation channels. ■



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