

CAPABILITY SHEET

BACKHOE DREDGER

A HYDRAULIC EXCAVATOR INSTALLED ON A PONTOON

INTRODUCTION

A Backhoe Dredger (BHD) is basically a hydraulic excavator installed on a pontoon. Dredging is executed by the excavator which is mounted on a turntable at the front of the pontoon.

The BHD can be used for dredging in shallow or confined waters but also in open areas. A BHD is capable of dredging a wide range of materials, from soft material (such as soft silt) to hard material (such as blasted or weathered rock and stiff boulder clay).

MAIN PARTS BHD

The main components of a BHD are:

- pontoon
- hydraulic excavator, consisting of a hydraulic excavator body (crane), boom, stick and bucket
- spud poles and spud carrier or tilting spud. Spud poles provide a stable platform during dredging, as they lift the pontoon a few decimetres. The spud carrier or tilting spud enables the pontoon to move forwards and backwards when the front spuds are lifted.

WORK METHOD

Dredging with a BHD is not a continuous process, but consists of a cycle of operations.

These operations are:

- **Dredging:** The bucket is excavating soil by a combined back- and upward movement of boom, stick and bucket.

- **Lifting:** When the bucket is full, an upward movement of boom and stick lifts the bucket above the water to start swinging.
- **Swinging filled:** The bucket will be swung above the barge by rotating the excavator on the turntable.
- **Unloading:** Positioned above the transport barge the bucket is rotated and tips the material to unload into the barge. Alternatively the material can be cast to the side of the excavation.
- **Swinging empty:** Upon completion of discharge, the excavator will swing back empty to its last dredging location.
- **Lowering and positioning:** The boom will be lowered and the stick and bucket will be moved to the starting position. With aid of the survey and Crane monitoring system, the bucket excavates the material at the desired location and depth.

RELOCATING THE PONTOON

On each position of the pontoon an area as large as practically possible will be dredged (effective dredging area). Upon completion of dredging within this area, the pontoon will relocate towards a new position behind the previous one. Moving the pontoon requires the following steps:

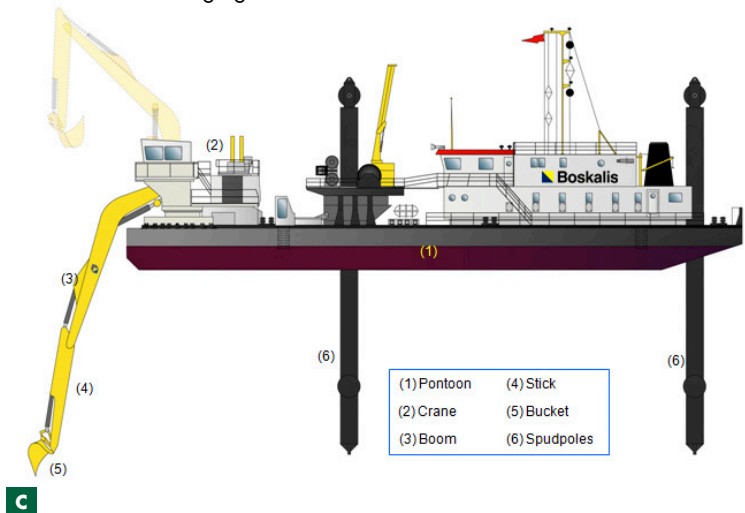
- Lower the pontoon by slacking the spud wires.
- Placing the bucket on the seabed.
- Lift main spuds.
- Move pontoon astern to the next working position (step), by pushing out the cylinder of the stepping or tilting spud, the excavator assists in this operation by guiding the movement with the bucket.
- Once the cylinder is pushed out completely the main spuds are lowered again.
- Lift stepping or tilting spud.
- Moving the stepping or tilting spud to it's starting position with a inwards movement of it cylinder.
- Lower stepping spud.
- Lift pontoon upward by spud wires stable dredging position can be maintained.
- Recommence dredging.



A

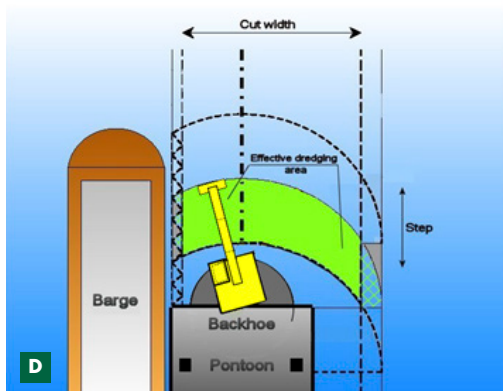


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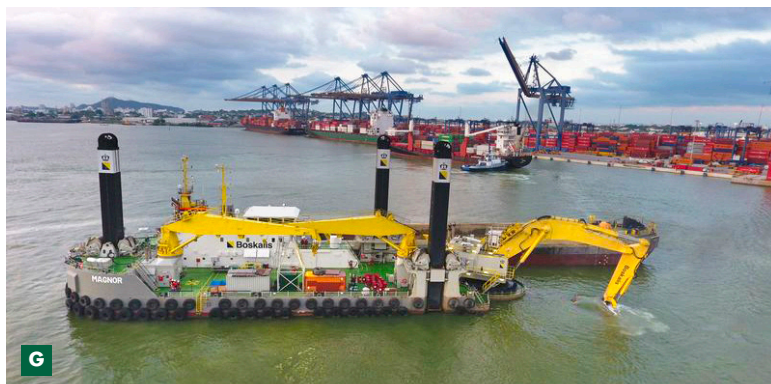
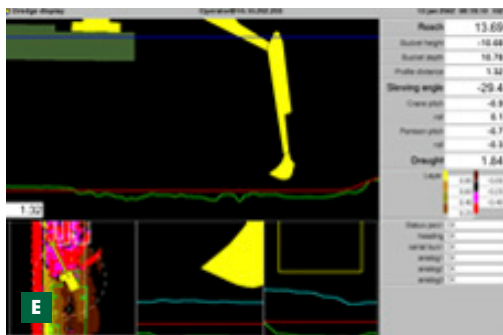
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- A** BHD Dredging boulders
- B** BHD 'Manu Pekka' with barge
- C** BHD 'Colbart'



SUITABILITY

Different buckets can be mounted on the stick for different soil conditions. Boulders or debris can also be removed by the BHD. Depths up to 25 meters can be achieved with a large BHD. Different sizes of sticks and booms are available for the BHD to have an optimum configuration for different depths. The BHD is frequently used for trench dredging, dredging in harbours and other shallow or confined waters. Although a BHD is a stationary dredger it is a limited obstacle to shipping traffic because there are no anchors needed for positioning. It is especially suitable for working in narrow areas and in the near presence of obstacles (like jetties, pipelines, etc.).



DREDGING CONTROL

A BHD is able to dredge with high accuracy. Depending on soil conditions and slopes, a tolerance of 0.25 m on average can be achieved with the Boskalis in-house developed Dredge View 2.0 Crane Monitoring System (DV2-CMS).

FLEET OF BOSKALIS

Boskalis has approximately 20 BHDs, including one of the largest in the world, the 'Magnor'. Some of the BHDs of Boskalis are listed below. For the complete list of BHDs of Boskalis check on www.boskalis.com.

BACKHOE DREDGERS - BOSKALIS FLEET

Some of Boskalis' BHD's are listed below

Name	Installed power (kW)	Bucket capacity (m ³)
Magnor	3,356	20.0-40.0
Baldur	2,016	15.0-23.5
Nordic Giant	1,600	9.0-22.0
Colbart	1,008	3.5-14.0
Cornelius	1,008	3.5-14.0
Manu Pekka	840	3.5-14.0
Attila	765	4.2-10.0
Koura	765	4.2-10.0
Odin	1,600	9-22
Oceanus	960	5.5-11
Kuokko-Pekka 2	350	2-8
Texel	268	3-6
Kreeft	390	4-8

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D Work method BHD

E Dredging control, with DV2-CMS

F Operator's view from the cabin

G BHD Magnor