

CAPABILITY SHEET

EXCAVATOR WITH POSITIONING AND DREDGEVIEW CRANE MONITORING SYSTEM (DV CRANE)

INTRODUCTION

A shore-based hydraulic excavator with position monitoring can accurately perform various tasks at locations that would otherwise be inaccessible because of the excavator's tracks. These tasks are mainly performed onshore or in the transition between land and water. The excavator can also operate from a pontoon and thus practically becomes a backhoe dredger. The positioning system enables the excavator to position the bucket with an accuracy of a few centimeters.

EXCAVATOR WITH CRANE MONITORING SYSTEM (CMS)

The key parts of an excavator with positioning are:

- Excavator on tracks with boom stick and bucket, grab or another tool
- Positioning system consisting of high accuracy Real Time Kinematic Global Navigation Satellite System (RTK GNSS), GNSS heading sensor, Roll/pitch sensor, angler sensors
- Boskalis DredgeView Crane Monitoring System (DV Crane)

SUITABILITY

Excavators with positioning are used in dredging and backfill works for shore approaches, shore protection and roadworks. In dredging works, the excavator can dredge near shore within reach of the crane on difficult to reach locations. In shore protection works, the excavator is mainly used to place geotextile, graded filter stone, rock and Xblocs, and in road works to profile sand material.

WORK METHOD

For dredging, the excavator can be placed on elevated tracks, on a pontoon, or can work from the shore. The Crane Monitoring System (CMS) and positioning show the position of the bucket opposite to any required dredging design.

In shore protection works, the excavator is used to profile the under layers, to place the geotextile, the



- A** Excavator with CMS
- B** Excavator Dredging and profiling with DV Crane
- C** Stick Angler

filter layers and stones, and finally to place the concrete top layer of Xblocs, accropodes, or similar material. The different layers are visualized by the CMS positioning system to enable the operator to place each layer to the required thickness. The grid shown in the top view enables the operator to place the Xblocs in the defined grid, and in the defined orientation when the echoscope is used.

DV CRANE

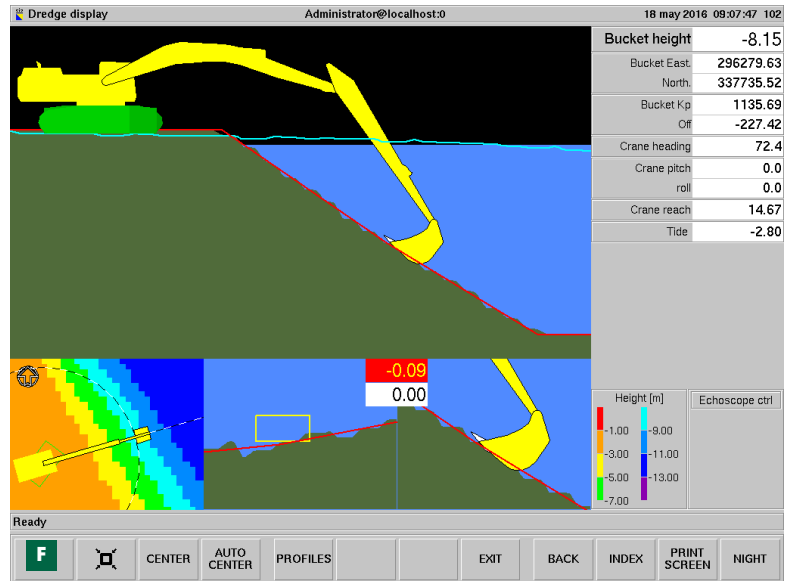
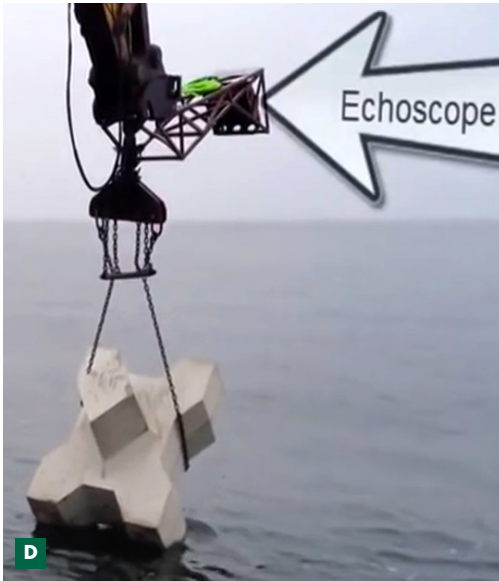
Boskalis developed DV Crane, an advanced system for positioning excavators and backhoes. The system displays the excavator and its bucket, grab, or any other configuration together with design levels and survey levels in a top view, side view and 3D view. With input from the accurate positioning, heading, roll/pitch and angler sensors, the accuracy of the measuring point can be achieved to within 10 cm in a horizontal and vertical plane.

HARDWARE USED WITH DV CRANE

The following hardware is used for a standard DV Crane setup:

- Trimble SPS85x RTK GNSS receiver
- Trimble SPS55xH Heading RTK GNSS receiver
- AE sensors XB2i roll and pitch sensor
- Seatools Rotax HD digital Angler sensors
- Nexcom fanless industrial computer NISE with DV Crane software.





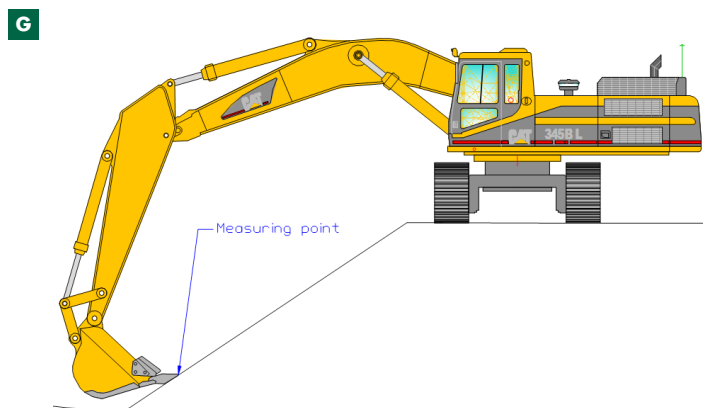
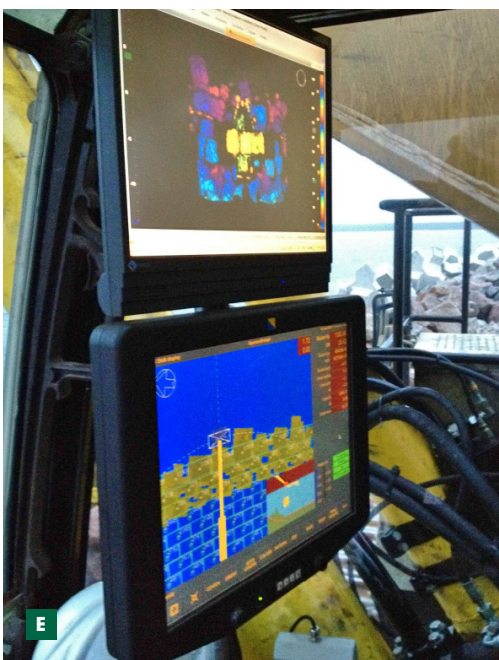
TOPOGRAPHIC AND HYDROGRAPHIC SURVEYS

The high accuracy of the positioning system enables surveys to be performed at locations where other survey systems cannot be used, for instance, for safety reasons. On stone slopes or at the transition between land and hydrographic surveys, survey points can be taken within reach of the bucket or tool. The data are saved in a comma delimited file. The logged files are processed in the Boskalis DV-Office Survey package and converted to a 3D digital terrain model (DTM) for use in producing charts, cross profiles and volume calculations. The data can be used as final as-built survey.

ECHOSCOPE

Boskalis has the option to install the echoscope for placing Xblocs, Accropodes and other concrete blocks for shore protection. This is a complicated process in which the Xblocs are placed in an interlocking pattern in a specified orientation.

While the DV Crane is used to position an Xbloc, the echoscope provides an accurate 3D view in real time of the Xbloc underwater in relation to the adjacent Xblocs. The tool at the end of the excavator's stick is used to rotate the Xbloc to place it accurately underwater and in the correct orientation.



- D** Echoscope installed on XBloc installation tool
- E** Echoscope and DV Crane displays
- F** Typical DV Crane screen pages
- G** Survey with CMS of excavator system

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