

# DUTCH DREDGING SIMULATORS



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**Dutch Dredging Simulators** is providing simulators for the dredging industry.

The Cutter Suction Dredger (CSD) simulator has been developed based on a standard CSD, commonly used in the market.

Various controls are provided for operating the simulator/dredger:

- Hoisting and lowering the cutter ladder.
- Set the cutter speed.
- Control of the pump engine rpm.
- Operating speed of the swing winches.
- Moving the spud carriage.
- Joint swing winch operation & brake force of the hauling winch.

The trainee can monitor the dredging activity with the instruments showing the various hydraulic pressures (swing winches, cutter, ladder winch), mixture velocity and density, pump vacuum, pump pressure, and gland pressure.

The simulator can be operated for different soil types: sand, gravel, silt and clay. A soil model is included showing a realistic effect on the instruments (hydraulic pressures, mixture velocity and concentration), and an effect on spill. The soil characteristics can be inserted and changed by the trainer.

The simulator is designed for two user interface types which are used on CSD's. One more conventional interface with all the relevant controls mounted in control desks and two joysticks for swinging; a second one using multipurpose joysticks where most controls are executed with the buttons on the joysticks and the joysticks themselves.



*Stationary arrangement with control dredging chair*

A total of four screens are used; two function as control desks (SB and PS), one as front view and instrument bar, one as back view (on the spuds).



*Front view with instrument bar*

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With the aid of a trainer interface on a separate tablet, the parameters can be set for the training session. The filling of the pipeline during startup, and the anchor positions can be monitored. During the training session the soil strength parameter can be changed, and the anchors can be relocated. Before starting the training session, the soil type and characteristics, discharge pipe diameter, discharge length, geodetic height, water depth, and tide can be defined. The trainer can also trigger a number of practical situations which can occur during dredging like, anchors not holding, blockage of cutter head, general alarm.



Trainer interface

A speaker can be connected to the simulator to provide the sound of the diesel engines. The sound changes with the speed of the engines.

The simulator can be transported in two cases. It can easily be set up in different locations. When a large screen is available locally, this can be connected to the simulator.



Transport cases

A datalogging device (Multiped) is included in the simulator. All available signals can be plotted in time charts or other configurable dashboards. A report can be made on the trainee's training session for further feedback and evaluation.



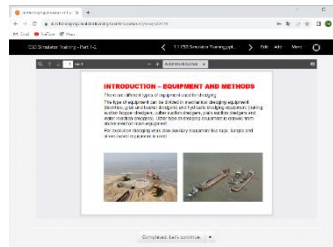
Datalogging and reporting

For CSD operators, **training** can be provided. The training will introduce the trainee with the working principles and functionalities of a CSD and the relevant dredging processes of cutting, sweeping and pumping.

Part of the training can be provided as an E-learning for various difficulty levels.

**E-learning** (web-based training modules):

- Basic course (general dredging, history, types of equipment, CSD components).
- Advanced course (cutter dredging process, soil characteristics, pumps and pipelines).
- Professional course (production optimization, dredging process, operating points, pump characteristics).



E-learning

**Hands-on CSD simulator training**

Since the CSD simulator is a mobile set-up, training can also be provided at a location chosen by the customer with the assistance of an experienced dredge master and/or trainer. The trainee is able to exercise the operation of the CSD with different lay outs of the controls (controls in desks, or controls integrated in joysticks), different soils, and assisted by a trainer and/or dredge master.



Hands-on CSD simulator training