

The Seabed Dredger SBD2, manufactured by Skadoc (The Netherlands), is a multipurpose bottom tracking vehicle with the main feature of deepwater dredging. The operating max. depth at the moment is 150 meters, however the SBD2 can be upgraded to operate in deeper water. The vehicle can be adapted for all kinds of use and be upgraded with other equipment.

Applications:

- *Deepwater dredging (max.3000 meters)*
- *Debris removal*
- *Drilling*
- *Excavating*
- *Video inspections*
- *Diver assistance and observation*
- *Hydraulic power platform for underwater tools*
- *Salvage assistance*
- *Archeology work*
- *Environmental work*
- *High pressure cleaning*



SBD2 at it's current configuration, fitted with an water jet and airlift on the manipulator.

The present capabilities of the SBD2 are:

- Deepwater dredging (max. 150 meters) and jetting with a surface controlled 3 function manipulator
- Video observation, using the color high resolution video zoom camera with pan & tilt unit mounted on top of the SBD1 and a color video camera mounted on the end of the manipulator.

Possible other capabilities which can be installed on the SBD2:

- Hydraulic power take off for hydraulic tools.
- Diver assistance platform for dredging, the suction and jetting hose can be extended to the use of a diver.
- Extra video camera's for work observation.
- Diver assistance for removal of loose debris with the aid of slings, shackles and hooks which can be pulled out with the vehicles.
- Installation of a small winch 1,5-2 tons for diver assistance.
- Installation of a small grabber on the manipulator for removal of debris.
- Hydraulic propeller excavator for generating a high volume water column for excavating loose sediment between the debris. (max. 65 kW)

Short description of the SBD2:

The seabed-dredger is a remote controlled vehicle, capable of working in narrow spaces. It can carry out mud/sand suction and seabed soil jetting for efficient dredging. It can also be equipped with other specific tools if needed by the client.

It consists of a crawler on which a manipulator with suction pipe and water jet is mounted. On this manipulator also a pan and tilt color video camera is mounted.

The crawler contains further the electric-hydraulic aggregate with valve pods, the water jet pump which is hydraulically driven, and the electronic pod which contains the North seeking Gyro, the pressure transducers and the electronics with the PLC (Programmable Logic Control) with the aid of which the SBD2 communicates with the control panel on the surface. The vehicle is propelled by means of two tracks which have a total track force of 2.500 kg.



The Seabed dredger ready for a test run in Holland. The SBD2 is fitted with a water jet, 125 m³/hr.-900kPa and a 10" airlift(hose not mounted) on the manipulator. On top you can see the pan & tilt unit with a color zoom video camera and a light.

On the surface is situated the control panel which contains all the controls necessary for working with the SBD2.

The control panel contains the so called status display. On this display is the crawler indicated with all its functions displayed in a side- and top view. By means of these views it is possible to work with the manipulator and to steer the crawler.

The display contains further the heading indicator, the inclinometer in both directions, the depth of the vehicle, the covered distance of the crawler, the oil-pressure of the system, the suction pressure of the mud pump, the electrical current consumption, the insulation resistance of the umbilical, etc.

There is also a monitor which gives the picture of the color video camera which is mounted together with the underwater lights on top of the manipulator.(suction pipe).

At the present moment the SBD2 is fitted with a sonar and a tracking system.

The umbilical is reeled on an umbilical winch which is situated on the surface vessel.

The SBD2 should be launched and recovered with an additional hoisting unit, which forms no part of the installation. During work the lifting cable can be kept connected to the SBD2 or disconnected.



Testing the SBD2 jetting nozzles

Specifications:

General Vehicle	
Dimensions:	
Length vehicle	3,40 m
Length vehicle and manipulator	5,00 m
Width (including tracks)	2,00 m
Height	2,30 m
Length manipulator	(can be prolonged) 3,00 m
Maximum reach forward	(can be prolonged) 1,50 m
Weight in air	4.400 kg
Tracking force	2.500 kg
Operational depth	Present 150 meters, can be upgraded to 3000 meters
Electro hydraulic aggregate	4x 60 ltr/min, 180 bar 72 kw
Hydraulic driven water jet pump	6", 125 m ³ /hr, 9 Bar with a 32 mm nozzle.
Umbilical	
Composed power and data line	200 m enwrapped with reinforced hose
Movements:	
Tracks	Forward / backwards / turning
Manipulator	35° swing SB and PS
	Up (3,5 m above track level) and down (-0,5 m under track level)
	Bending
Power requirements	380-440 volts 125 kw
Mounted equipment:	
Triple frequency scanning sonar	Use: Obstacle avoidance and search
Basic vehicle tracking system	Tracking accuracy +/- 2 m
Color zoom video camera on Pan & Tilt unit	¼" CDD, 470 TVL, 0.5 lux, 3.8 – 40 mm zoom lens, Pan 350°, Tilt 170°
Underwater lights	3x 250 watt
Depth sensor	0,1 m resolution
Gyro compass	1° resolution with turn counter
Pump pressure sensors	Pump pressure measurement on inlet and outlet
Surface control unit	
Controls:	
Vehicle movements	1 joystick, forward, backwards and turning
Manipulator movements	2 joysticks, 1 for up-down, SB-PS-swing first arm and 1 for up and down second arm
Pumps	On/off
Lights	On/off /dimmer
Video camera	On/off
Pan & Tilt	Pan 350° Tilt 170°

Umbilical winch	control up/down (only for transport)
Readings:	
Turning counter	Analog
Gyro compass course	Analog and digital
Depth	PC
Graphical showing of the vehicle and manipulator movements	Pc-software graphical top and side view of the vehicle and manipulator
Power consumption	Analog
Isolation of cable and vehicles	Analog
System pressure	PC
Track pressure	PC
Pump pressure in/out	PC
Video monitor with recorder	Color monitor with Digital / S-VHS recorder
PC with monitor for vehicles movements readings	386 with color monitor
Extra equipment on surface consol	
Laptop P2-266 MHz with sonar software	Color image of scanning sonar and controls
PC-P3-400 MHz with tracking hardware and software	Tracking of vehicle in a radar like image

Possible work that the SBD2 can carry out in it's current state:

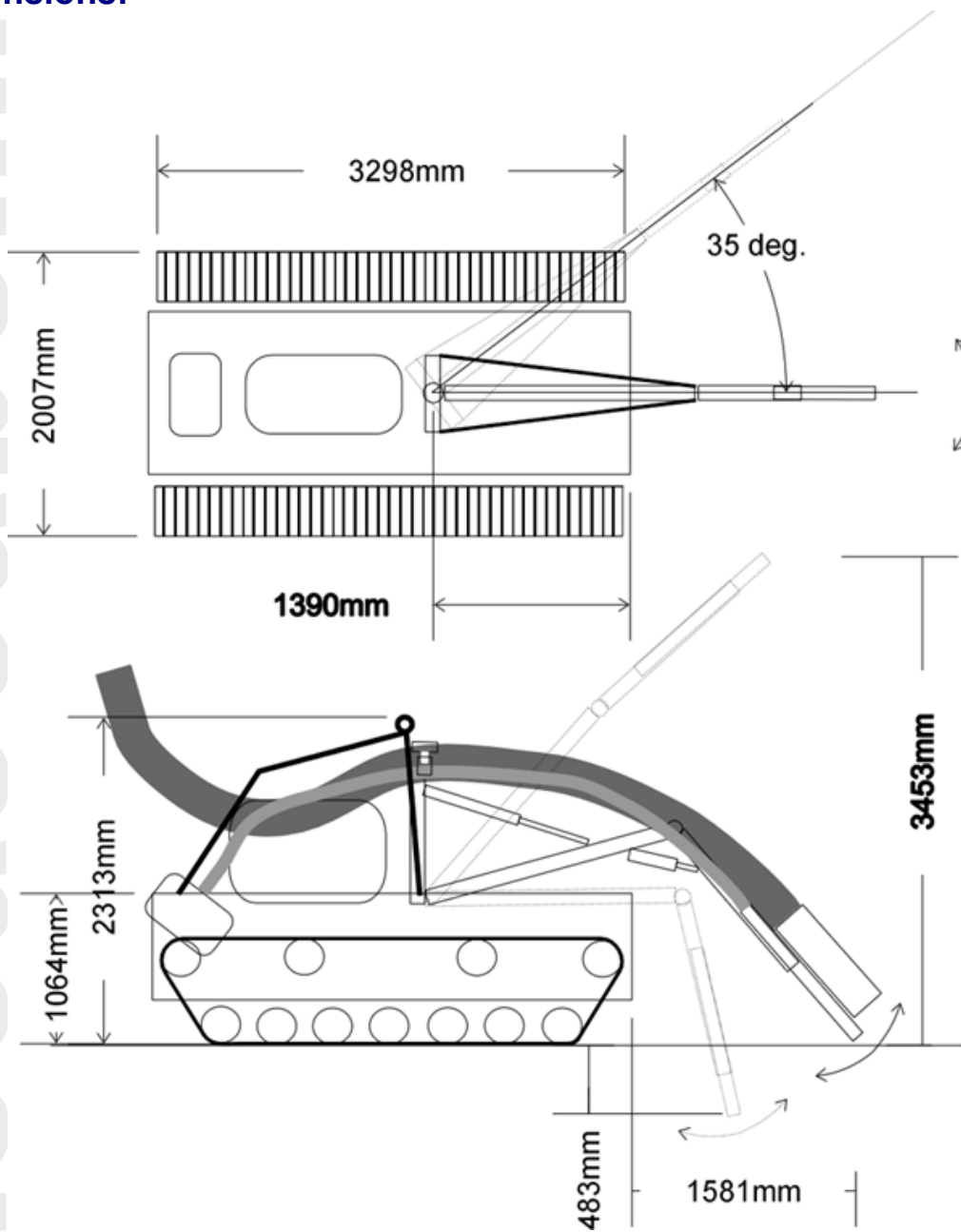
- Dredging
 - The present jet pump with a capacity of 125 m³ /hr. with a 32 mm nozzle with a working pressure of 900 kPa jet pressure with a speed of 45 m/s at the nozzle will excavate in 3-5 minutes a hole with a diameter of 2 m and a depth of 1,5 m in a soft sand/mud seabed soil. This is based on test at shallow water near a beach. Using the combination of the water jet pump and the 10" airlift can probably realize an effective dredging productivity of 10-15% of the airlift capacity of 360 m³ /hr. which in this case will be 36 - 54 m³ /hr. of seabed soil.
 - The Dredging depth of the manipulator is +- 0.5 meter under track level and a the distance is about 1.0-1.5 meters in front of the vehicle.
- Video observation platform
 - The present two video cameras are mounted on the SBD2 one with a pan & Tilt unit which is mounted on top of the SBD2 and one mounted on the end of the manipulator and can be used the monitor any activity on the seabed, this can be the jetting and dredging.
- Diver assistance platform
 - The SBD2 can be used for hydraulic power take off for any hydraulic underwater tool.

- Diver dredging assistance, a flexible pump and jet hose could be mounted on the present dredging and jetting pumps. The diver can use this to dredge in difficult reachable areas.
- The SBD2 can be used to mount any equipment which may be needed for the diving operations.

Optional equipment and possibilities for the SBD2:

- Dredging
 - Replacing the airlift by a hydraulic driven mud/sand pump and placing a smaller jet pump. The total available hydraulic power is 65 kW.
 - Extending the second arm of the manipulator with an retrievable suction and jetting pipe, will make it possible to dredge deeper and further away from the SBD2. Dredging depth of +- 1.0 meter under track level and a distance of 2.5 – 3.0 meters in front of the vehicle can be realized.
- Video observation platform
 - Extra camera's can be installed.
- Diver assistance platform
 - Diver assistance for removal of loose debris with the aid of slings, shackles and hooks which can be pulled out with the vehicles.
 - Installation of a small winch 1,5-2 tons for diver assistance.
 - Hydraulic power take-off for any type of hydraulic underwater tools.
 - Diver controls for the vehicle movements.
- Installation of a small grabber on the manipulator for removal of debris.
- Hydraulic propeller excavator for generating a high volume water column for excavating loose sediment between the debris. (max. 65 kW)

Dimensions:



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