DRAGFLOW
ULTIMATE EFFICIENCY

Proceedings of Western Dredging Association and
Texas A&M University Center for Dredging Studies
"Dredging Summit and Expo 2015"

The ultimate dredging solutions provider

ENVIRONMENTAL DREDGING AT HIGH DEPTH

DAM DREDGING

Dredging Projects

Dredging is becoming a crucial activity for the development of our society.

Some applications include:

- Maintain efficient harbor networks
- Restore a dam's capacity
- Open safe and efficient water-ways

However, new challenges demand not only efficient dredging solutions but solutions that also assure environmental protection.

Dredging Projects

Dredging projects cause a high and complex environmental impact.

Sediments under water can be polluted by different materials:

- Metals
- Hydrocarbons
- Bacteria
- Chemical substances

Therefore, if the sediments are re-suspended without any type of control we put in danger the surrounding flora and fauna.

Dragflow Pumps

Our advanced dredging systems achieve a **high solid concentration** while maintaining **low turbidity levels** during dredging operations

For more than 25 years we have been focused on the manufacture of **SUBMERSIBLE PUMPS** with agitator blades, taking care of every possible detail in the functioning of these machines.

With our pumps it's possible to handle heavy mixtures, increasing the dredging efficiency and **minimizing operation costs**.

Our Technology

- Along the years, DRAGFLOW has become a respected and reliable name in the Dredging and Mining industries providing pumping solutions for clients working in specialized sectors and under extreme conditions.

- Thanks to the experience in leading technology projects, Dragflow continuously enhances its ability to deliver high-quality products.

WE ARE CERTIFIED

DRAGFLOW invested in ISO9001 QUALITY CERTIFICATION and in its information systems, because believes in the importance of business processes management, not only for improving efficiency but also to provide excellent service to Customers.

bsi. ISO 9001 Quality Management

WHY SUBMERSIBLE PUMPS?

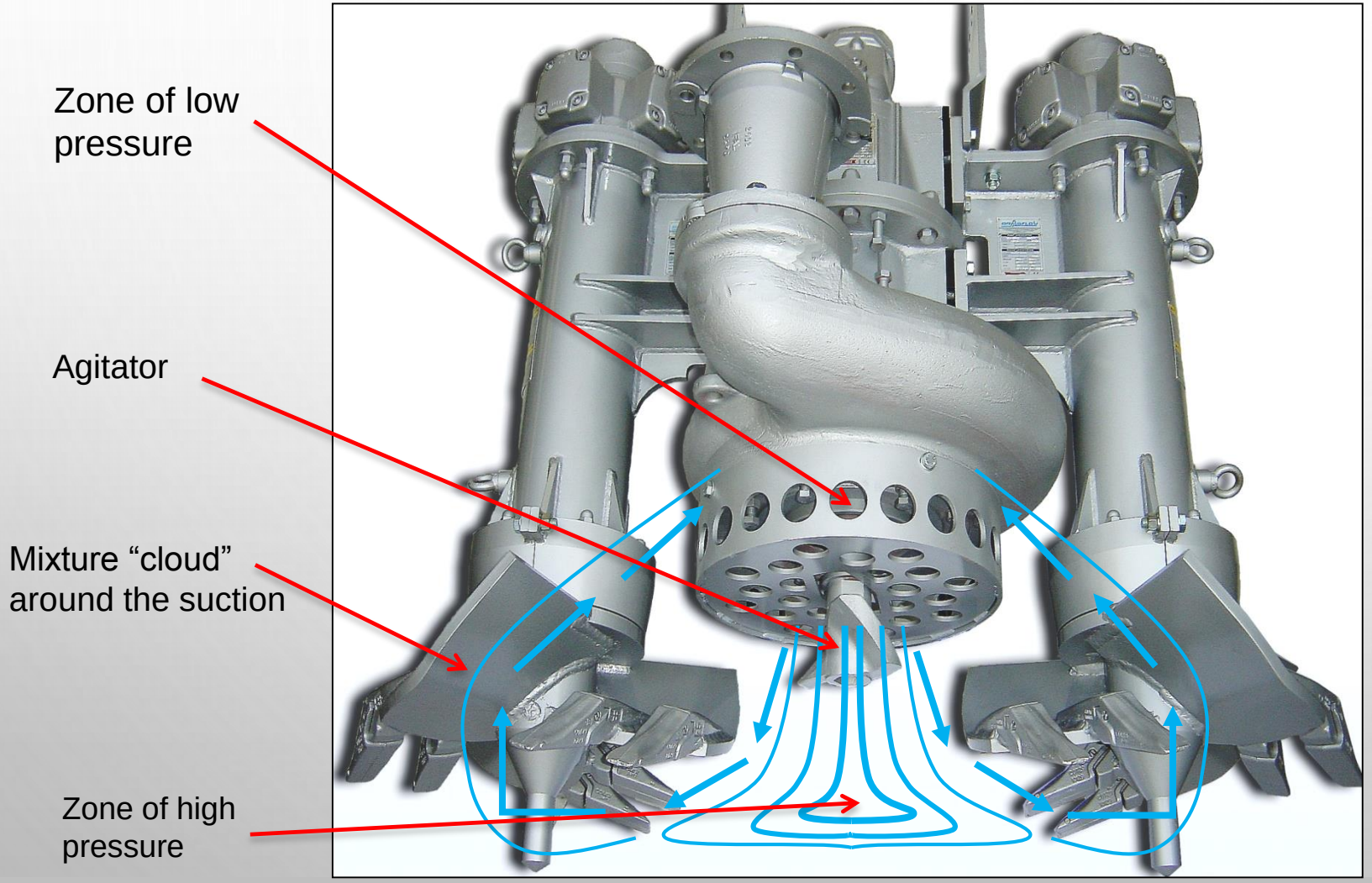
Efficiency

The presence of a double blade agitator directly in contact with the material enables DRAGFLOW pumps to create around the suction really high concentrated mixture containing up to **70% by weight** and **50% by volume** solid concentration.

Higher solid concentrations means using the energy to move solids instead of water.

This translates into:

- Smaller Diesel engines
- Reduced operating costs
- Smaller discharge pipes
- Smaller machines
- Lower environmental impact
- Higher solid production



How it works:

1) The **AGITATOR** not only prevents solids from blocking the pump inlet by mixing them with the liquid, but with its rotation with pump shaft it creates a downward flow that generates a **HIGH PRESSURE AREA** in front of the pump that put the settled material in suspension thus creating a cloud of slurry around the pump suction.

2) Above the agitator, inside the strainer, a **LOW PRESSURE AREA** is created. This together with the action of the impeller allows to pump a high concentration of solids.

3) The **SIDE CUTTERS** run at low rpm and at every rotation they bring additional material to the suction.

WHY SUBMERSIBLE PUMPS?

Versatility

Due to the own weight of the pump, it can be lowered into the water simply using a hoist with a **steel cable**.

This together with the pressure compensator kit allows Dragflow pumps with **no limitations on working depth**.

At Dragflow we also introduced an innovative **double cutting system** in which cutter heads turn in opposite directions cancelling the torsion as the dredging unit is balanced even if is suspended from a single cable.

Environmental Dam Cleaning

Anti-Turbidity Bell

A few consequences of turbidity when dredging at dams could be:

- **Damage** to Hydroelectric turbines due to fine solids in suspension
- **Contamination** of potable water sources

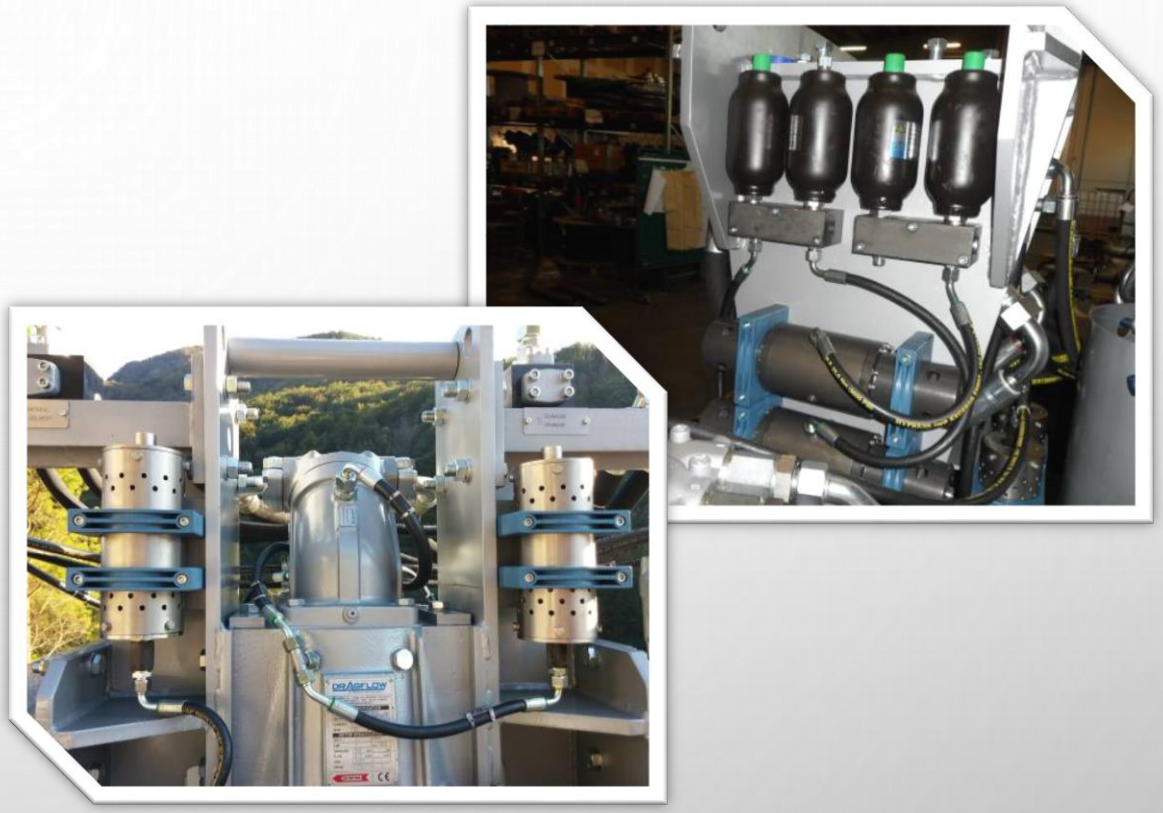
Dragflow's anti turbidity bell **limits the turbidity** deriving from the dredging process to a circumscribed area.

Therefore, the disturbance of the aquatic environment is kept at an absolute minimum.

Other High Depth Systems

Pump and Cutters

Dragflow has developed a line of hydraulic and electric pumps for high depth applications.



These pumps are equipped with a pressure compensation system based on a hydraulic accumulator that **equals the pressure inside** the seal chamber to the high **external water pressure.**

A second hydraulic system mounted on the pump and cutter motors **prevents abrupt interruptions of oil flow**, protecting the motors and internal components.

Other High Depth Systems

High Depth Jet-Ring System

For additional cutting power, Dragflow pumps can be equipped with a compensated high pressure water Jet-Ring system.

The system is composed by two main elements:

- **Jet-Ring Frame** with nozzles for high pressure water jets around the pump suction
- **Compensated high head pump** connected with a special frame to the dredging unit

Other High Depth Systems

Umbilical Lines

When working with several long oil hoses, Umbilical system are ideal to combine environmental safety and usability. It consists of a set of oil twisted around a core non stretchable rope, which **absorbs all the strains and shocks**, and is covered by a **protective layer**.

Hydraulic Spoolers

Hydraulic reel controlled from the power pack and equipped with **automatic brake for descending and recovery for ascending operations**. Rotating junctions and base frame for trouble free recovery of the umbilical line.

Other High Depth Systems

Power Packs

DRAGFLOW variable flow Hydraulic Power Packs are engineered for use with the DRAGFLOW hydraulic pumps, which coupled with hydraulic excavators make up a **complete dredging plant.**

For High Depth applications, our Power Packs have:

- Pump R.P.M flexibility due to variable oil flow
- Separate hydraulic circuits for pump and cutters
- Assisted descent of the dredging unit
- Oil boosters and oil compensators
- Container style enclosures

Options

- Operator Cabin
- Sound proof canopy
- Remote control
- Wireless radio control
- Container construction
- For low temperature (-40°C)

High Depth References

Dirillo Dam dredging (60m working depth) Sicily, Italy 2006

Project Description: Removing alluvial sediments accumulated in the lake near the dam bottom spillway.

Dragflow Product: Diesel driven dredge with Hydraulic Pump HY300B and Hydraulic Cutters EXHY35, everything compensated for maximum working depth of 60 mts.

Average Production: 300 m^3/h of solid material at 1.000 m of discharge distance.

High Depth References

Offshore project (120m working depth) Azerbaijan 2007

Project Description: Removing sand and silt around the jacket of an off shore platform for petroleum extraction from the bottom of the sea.

Dragflow Product: Hydraulic Pump HY50B plus cutters EXHY20 with Hydraulic Spooler, Umbilical and protective off-shore frame.

Average Production: 60 m^3/h of solid material at 200m of discharge distance at sea bed level.

High Depth References

Offshore dredging (270m working depth) Russia 2012

Project Description: Trench dredging in Deep Ocean. Vessel equipped with dynamic positioning and ROV system able to detect position of the pump.

Dragflow Product: Dredge HY85B with cutters EXHY20S with Hydraulic Spooler, Umbilical and protective off-shore frame.

Average Production: 100 m^3/h of solid material at 270m working depth.

High Depth References

Dam dredging
Colombia 2013

Project Description: Hydroelectric Dam de-silting. Dragflow equipment has been used onto a working vessel equipped with cranes and propellers.

Dragflow Product: Hydraulic Pump HY85/160B with cutters EXHY20S with Hydraulic Spooler and Umbilical.

Average Production: 120 m^3/h of solid material at 500m of discharge distance.

High Depth References

Environmental dam cleaning
Ambiesta Dam - Italy 2014

Project Description: Cleaning of hydroelectric dam using environmental techniques.

Dragflow Product: Hydraulic Pump HY85/160B with cutters EXHY20 and Anti-turbidity bell.

Average Production: 90 m^3/h of solid material at a working depth of 50m.

High Depth References

Sand and Gravel extraction
Russia 2014

Project Description: Sand and Gravel extraction.

Dragflow Product: Dredge DRH400E23-14" with Umbilical line and Hydraulic Spooler installed on a frontal additional floater.

Average Production: 300 m^3/h of solid material at 500m of discharge distance.

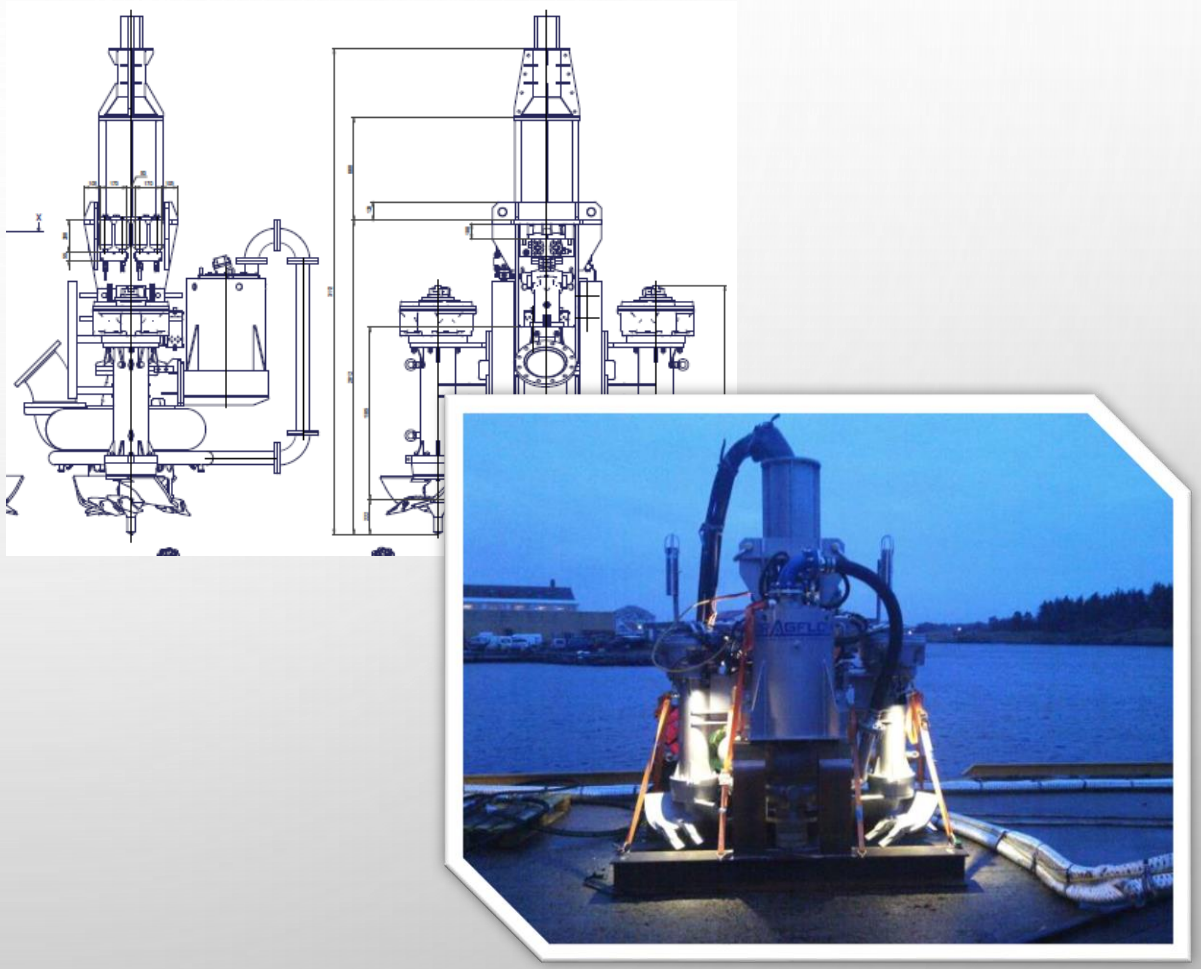
High Depth References

Off-shore dredging
Norway 2014

Project Description: Underwater excavating for concrete foundation at approximately 100m of working depth.

Dragflow Product: N.2 high depth dredging system composed by Dragflow HY85B with 2 cutters EXHY20 and High Depth Jet-Ring System. Dredging unit equipped with n.2 underwater cameras with lights for perfect monitoring of the position of the pump.

Average Production: 100 m^3/h of solid material at sea bed layer.



High Depth References

River dredging for mineral extraction Central Africa 2015

Project Description: Dredging operation at 50 meter depth for mineral extraction. The discharge goes into a washing plant for separating minerals from other sediments.

Dragflow Product:. New model Dredge DRH85/160E22DFHD with automatic hydraulic reel between operator cabin and power pack for optimal view. Dredging unit composed by Hydraulic Pump (HY85/160B) and two Excavators (EXHY20).

Average Production: sand and lime 125 m^3/h at 600 m distance

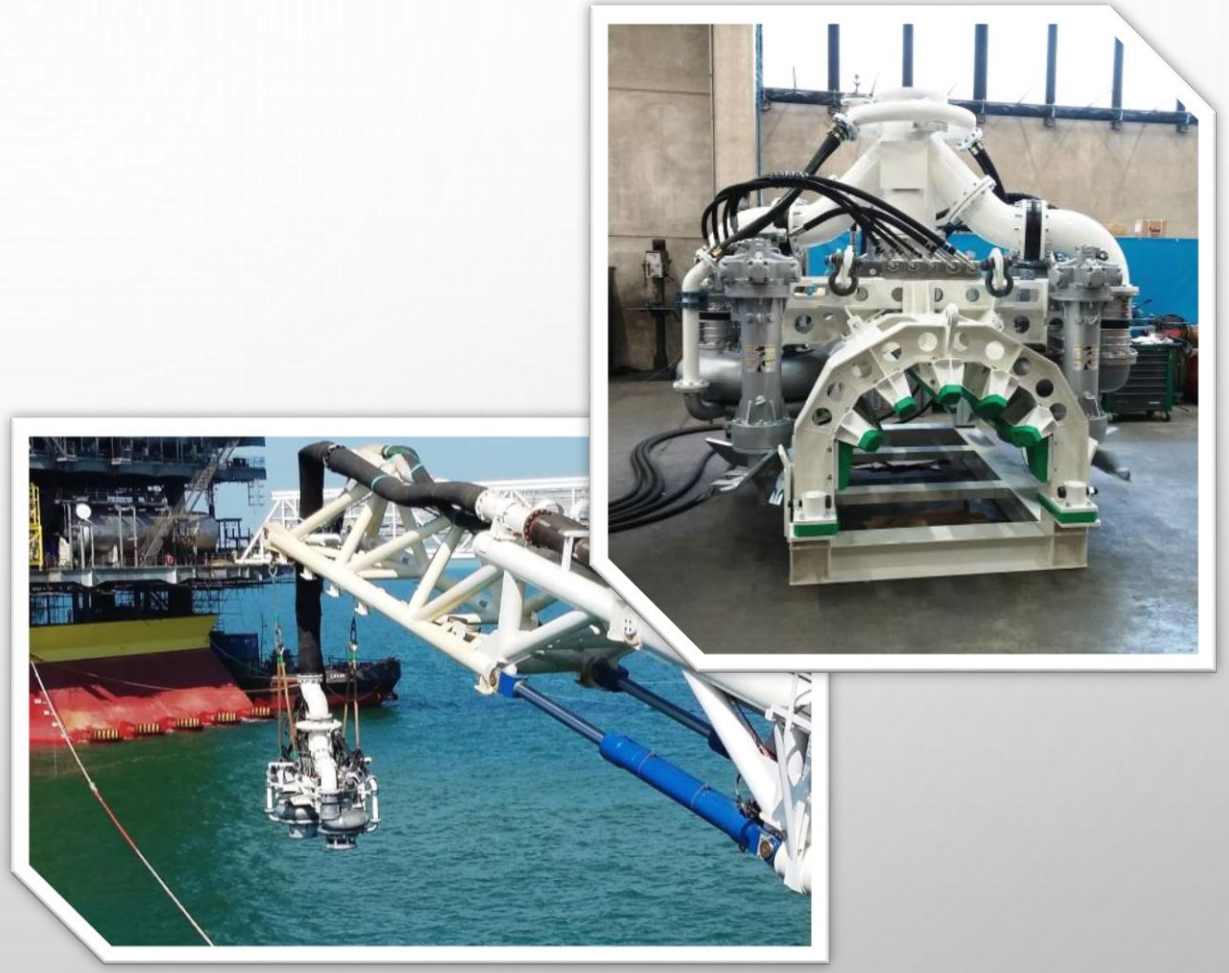
High Depth References

Offshore pipeline maintenance
Caspian Sea 2015

Project Description: Special dredging system allowing sand removing along submerged pipeline.

Dragflow Product: Two Dragflow HY85/180HC High capacity with cutters EXHY20 attached to a steel frame with a protective shield.

Average Production: sand 400 m^3/h at 200 m distance from the pipeline.



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