Sediment Removal Technology - Presentation

www.sedicon.no
**Sedicon and HDM JV in India**

- Sedicon is a Norwegian Company established in 2001. Sedicon is the supplier of sediment removal system.

- HDM is an Indian Design and Engineering Company specialized in various services like Technical Due Diligence Services, Design and Engineering, M&A, Debt funding etc in hydro power sector.

- Sedicon from Norway and HDM together is establishing Sedicon India JV company where both the owners 50% equity share holding each.

- This JV has already achieved an order for supply of two units of Sedicon Sluicers in a 6 MW small hydro power project in Himachal Pradesh.
SediCon Technologies and services

The unique principle of self-regulated, gravity powered sediment suction:

• allows sediments removal without pumps or movable parts
• from the deepest reservoirs to tunnel sand traps and the longest desanders.
• with any size and capacity required
Consultancy

- Sediment sampling, including bottom samples from deep reservoirs
- Sediment analysis (LISST)
- Assessment of sediment
- Reservoir sediment removal studies.
- Desilting basin (size) optimisation.
- Advise on location and layout of HPP plants (pre-feasibility stage)
SediCon Dredge – general principle

https://www.youtube.com/watch?v=4RK06KCODGo
Sedicon Dredge Agoyan Project

Sedicon Dredging proposal  Agoyan.mp4
Characteristics of the SediCon Dredge

- Environmental friendly removal of sediment accumulation reservoirs
- The SediCon Dredge uses available water head
- The SediCon Dredge does not require fuel and has no complex mechanisms
- It has a low water consumption
- Can remove compacted and cohesive materials
- Can remove gravel and stones up to 350 mm.
- Capacity up to several 100 m³ meter sediment per hour
Sedicon Dredge at El Canada in Guatemala

• El Canada, owned by ENEL, started operation in 2006

• The 200,000 m³ reservoir was more than 50% filled with sediments in Dec. 2011. (Up to 8 meters of cohesive sediment, very rich in organic material)

• 12” Sedicon Dredge connected to 600 mm bottom outlet pipe, with an efficient 75 kW water jetting system.

• More than 100,000 m³ (twice the expected volume) was removed in 2012, long term sediment removal capacity has exceeded 100 m³/hour

• Long term lease contract, operation by ENEL.
Sedicon Dredge El Canada

Jan 2012  Feb 2012

20 000 m3 removed in one month

https://www.youtube.com/watch?v=xj080cg7e54
The project:

- Malana is a 86 MW run-of-river (ROR) hydropower plant utilising 600 m head on the Malana River. It consists of head regulator, four desilting basins, a 249,000 m³ storage reservoir, a 3.3 km long headrace tunnel with 7% slope ending in an inclined surge shaft.

The challenge:

- The power plant has since commissioning in 2001 suffered from abrasive sediments, leading to severe turbine wear. The turbine wear is caused by the fine sediments particles that pass the desilting basins and is temporarily trapped in the storage reservoir.
The solution:
• SediCon supplied a SediCon Dredge, allowing sediment removal without input of power of any kind. The Hydrosuction system utilises only excess water during monsoon, so no water is lost for production.

The results:
• During two months in the summer of 2005, 36 000 m³ sediments were removed from the storage reservoir and design capacity was more than verified. As sediments were removed only during monsoon and when there is excess water, no water was taken from production.
100 MW Pillur Dam – Tamil Nadu

- Bhavani River
- Reservoir Capacity – 44.40 M Cubic Meter
- Current Capacity – 25.91 M Cubic meter
- Sediment Deposit – 18.49 M Cubic meter
- Dredging – proposed unit for 500 cubic meter of sediment removal per hour
- Time period required to complete the dredging is 4 to 10 years, depends upon the number of dredging unit and number of operating hours.
The SediCon Sluicer: for desanders

- The available head between the sand trap and the outlet is the driving force.
- Very low water consumption
- No movable parts and extreme reliability
- Can be designed for any capacity.
- Sediment up to 200 mm in diameter.
- Sediment deposits of any thickness
2000, Nepal: SediCon Sluicers at Khimti HPP pressurised sand trap

- 100 m³ tunnel sand trap in the headrace tunnel
- Discharges through the Adit to the spoil-tip, automatic operation at given time-intervals.
- The SediCon Sluicer has removed several thousand ton of coarse sand and gravel which is eroded form the tunnel floor
- Only one inspection since commissioning: 2008, everything was in good order

https://www.youtube.com/watch?v=CA7WAiCB26I
SediCon Sluicer at 60 MW Khimti, Nepal

- Thick sediment deposits in the expansion zone has prevented operation of the main flushing system, and manual excavation and flushing of the desilting basins have been frequently required.
- SediCon Sluicers installed 2010
- SAT September 2010, measured:
  - Sum capacity four units: 3000 m$^3$/sand/hour (!)
  - Average sediment concentration 270 kg/m$^3$
  - Highest sediment concentration 520 kg/m$^3$
- Successful operation since 2010.
SediCon Sluicers for Coca Codo Sinclair

- Location: Coca River, Amazon basin, Ecuador
- 1500 MW: One of the high head HPP in the world
- SediCon's largest contract: 6,2 M ton sand/year
- Client: Sinohydro, China.
- 40 SediCon Sluicer Units, 5 units in each basin
- 500 - 800 ton/hour capacity per unit
- No movable parts, designed for 50 years life.
- Supply medio 2015

[Video 1](https://www.youtube.com/watch?v=D30AAwhCvMk)
[Video 2](https://www.youtube.com/watch?v=d0O94GCn4GQ)

From successful model test
1500 MW Coca Codo Sinclair

Illustration of the basins with SediCon Sluicers (red)
SediCon Sluicers discharge into bypass channel

Construction works for 8 basins, each 150 m long and 13 m wide

Outlet of bypass channel
SediCon Sluicers for 6 MW Baner Sangam, India

- Location: Baner River, Kangra, Himachal Pradesh
- 6 MW: Head 42 meter, Discharge 17 Cumecs
- Client: Yogindera Powers Pvt Ltd
- Two SediCon Sluicer Units, one basin
- 940 ton/hour removal capacity
- No movable parts, designed for 50 years life.
- Supply mid 2015
SediCon Sluicers – Video Clips

Live SediCon Sluicer model.mp4

inclair desander sandtrap experiment. Cuernav
Sediment Removal

- It is possible to separate the sediment fractions. However designing of such segregation would be possible after the study of sediment analysis and criteria to use the sediments.
- To avoid sending sediments back into the river, it is possible to establish a dewatering site, which will be a shallow pond to collect the sediments.
- It may be possible to use geotubes to catch and dewater the sediments.
- Sediments can be used in farmland and brick making