

## Dewatering of Dredged Sediment by Natural Solutions

de Lucas Pardo, Miguel; Kirichek, Alex ; Lasus, Mathieu

**Publication date**

2025

**Document Version**

Final published version

**Citation (APA)**

de Lucas Pardo, M., Kirichek, A., & Lasus, M. (2025). *Dewatering of Dredged Sediment by Natural Solutions*. Abstract from 14th International SedNet Conference 2025, Madrid, Spain.

**Important note**

To cite this publication, please use the final published version (if applicable).  
Please check the document version above.

**Copyright**

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

**Takedown policy**

Please contact us and provide details if you believe this document breaches copyrights.  
We will remove access to the work immediately and investigate your claim.

# Dewatering of Dredged Sediment by Natural Solutions

Miguel de Lucas Pardo<sup>1,2</sup>, Alex Kirichek<sup>1,3</sup>, Mathieu Lasus<sup>3</sup>

<sup>1</sup>Medeina Engineering, Luxemburghof 30, 2628ZT, Delft, the Netherlands

Phone: +32-(0)-467-040703

<sup>2</sup>Delatres, Boussinesqweg 1, 2629HV, Delft, the Netherlands

E-mail: m.delucas@medeina.nl

<sup>3</sup>Delft University of Technology, Department of Hydraulic Engineering, Stevinweg 1, 2628CN, Delft, the Netherlands

<sup>4</sup>City of Rotterdam, Coolsingel 40, 3011AD, Rotterdam, the Netherlands

Conference theme number(s): 3, 6

**Introduction:** Dewatering of dredged sediment often relies on chemicals and heavy machinery, which increase fossil fuel use and emissions [1]. Traditional sediment dewatering methods only worsen the financial and environmental burdens associated with sediment management. When the slurry eventually dries at dewatering fields, it is perceived that the biological quality of the resulting sediment does not meet the standards of healthy soil, meaning it is rarely reused. It is also important to note that none of the existing commercial dewatering methods improve the environmental quality of the final product; they only address its physical properties.

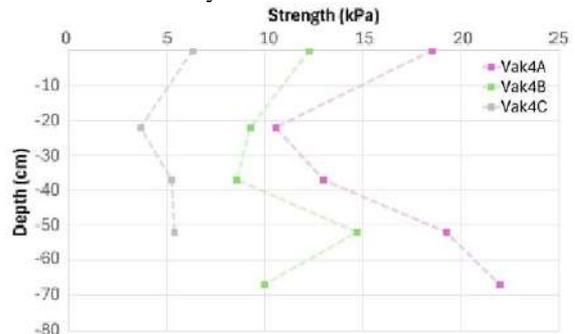


**Fig. 1:** One of the dewatering ponds after having been filled with dredged sediment.

Over the past decade, more nature friendly innovative methods have been developed [2]. These methods use only endemic fauna and flora to significantly accelerate the dewatering process for various types of slurry. Additionally, the treated final product resembles closely biological properties of soil. Soil is a valuable resource, which would otherwise need to source it from the commercial soil market, a process that is both expensive and environmentally harmful due to operations-related emissions.

**Methods:** The goal of this research is to demonstrate that dewatering can be sped up without increasing the financial and environmental costs of sediment management, while also improving the quality of the dried product so it can be reused after the treatment. This can be achieved through the application of natural technologies. To achieve these objectives, the City of Rotterdam and Medeina conducted a pilot

project. In this pilot, natural dewatering technologies were implemented after filling in dewatering ponds with dredged sediment (see Fig 1). Three dewatering ponds, each approximately 15m x 15m, with a total capacity of around 250 m<sup>3</sup> were filled with slurry. One pond (Vak4A) was treated with worms and plants, one pond was only dewatered with worms (Vak4b) and one pond was used as a reference (no treatment). During the pilot, an intensive monitoring was conducted to capture the changes in solid content and strength of soil for a period over 4 months. This pilot marks a pioneering effort of using natural solutions for sediment circularity and reuse.



**Fig. 2:** In-situ soil strength measured 3.5 months after filling dewatering fields. Vak4A was treated by worms and plants, Vak4B was dewatered by worms and VAK4C was used as a reference (no treatment).

**Results:** The solid content of the slurry was increases by 15% over three months by suing natural solutions, while the reference depot showed virtually no average increase in solid content. Looking at the soil strength (see Fig 2), natural solutions exhibited strengths ranging between 10 and 20 kPa after 3.5 months, with the reference remaining around 5 kPa. This explains why the two depots that were treated with Medeina were accessible up to 80% of their surface, whereas only a quarter of the reference depot could be walked.

**References:** [1] Tarleton (1992) *Filtr. Sep.* **29**:246-252; [2] de Lucas Pardo et al. (2020) *Terra et Aqua* **161**:6-19; [3] de Lucas Pardo and Kirichek (2020) *Land/Water* **8/9**.