Introduction to the project

This is a collaborative project between Deltares and COSIA (Canadian Oil Sands Innovation Alliance). This project has the ambition to pushing the boundary of state-of-the-art in physical processes and predictive tool to assess and improve soft sediments / tailings deposition and fines captures.

Sediment waste of mine processes (tailings) as well as dredged sediments are deposited in dedicated deposits, or beneficially re-utilized to build new lands (e.g. Marker Wadden), to improve resilience of flood defences or enhance habitat restoration. The ability to improve the prediction capabilities of the sediment deposition dynamics as well as the characteristics and properties of the resulting deposits (e.g. distribution of sand and mud, strength, total settlement and time scale) is critical to reduce cost and risk of these activities. Current knowledge and predictive tool is nowadays limited. This project aims to contribute to close this key knowledge and tool gap. Confluence spaces are great for sharing content and news with your team. This is your home page. Right now it shows recent space activity, but you can customize this page in anyway you like.

Objectives of this project

One of the key challenges in Delta Technology is related to possibilities of building on and with soft material. Soft materials (e.g. from dredged material and mine tailings) can be reused to form robust water defences, enclosure dams and for land building. The material can be used to combat settlement in Sustainable Delta Cities, as a cost-effective material for flood defences, and as the basis for nature-based land reclamations like Marker Wadden. As such, "Bouwen met Slib" has been identified as an important innovation to strengthen the international position of Dutch engineering companies. This project will deliver a new upgraded version of the numerical tool Delft3D to improve prediction of geometry and material properties distribution in fine sediments and disposal site deposits.

Activities

1. Data Collection and Analysis. Most of the data will be provided by COSIA. This will be integrated with literature and Deltares data;
2. Optimization of the current model in 2DV. This includes:
   a. Comprehensive rheological model assessment (including literature and knowledge inventorization);
   b. Implementation of the new relevant theory in Delft3D-1D;
   c. Implementation and improvement of Delft3D-2DV;
   d. Upgrading Delft3D-slurry to main stream Delft3D
3. Verification of the new model against COSIA data.
4. Reporting, model delivery and preparation of a publication

Deliverables

The overarching deliverable of this project is the report attached here below. This reports refers to other subdeliverables. These are:

- The mater thesis of Hanssen, 2016 and van Es, 2017. These can be downloaded at the Technical University Thesis portal;

Full reference to these deliverables are given in the reference section below. For more information please contact Luca Sittoni (luca.sittoni@deltares.nl) or Vincent van Zelst (vincent.vanzelst@deltares.nl).
Another deliverable of this project is the software developed during this project. To obtain a copy of the software, please contact Luca Sittoni or Vincent van Zelst. The software is in continuous development, so we are happy to provide the latest version available, together with the complementary documentation.

Publication related to Delft3D-slrurries


Other publications related to sand-settling non-Newtonian slurries deposition


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