

CEDA Dredging Days 2019

Conference and Exhibition

7-8 November 2019

Rotterdam Ahoy, the Netherlands

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CEDA Dredging Days 2019

7-8 November 2019
Rotterdam Ahoy, the Netherlands



Central Dredging Association

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Welcome to CEDA Dredging Days 2019

CEDA president Polite Laboyrie welcomes all attendees to this year's flagship dredging event and looks forward to two days filled with informative and inspiring discussions

It is with great pleasure that I welcome you, on behalf of my fellow directors on the CEDA Board, to the 23rd CEDA Dredging Days – our flagship conference and exhibition.

CEDA Dredging Days is widely acclaimed among dredging professionals and the wider industry for its high-quality technical content and excellent networking opportunities, and we're very proud of that.

Led by Professor Cees van Rhee, the Technical Papers and Programme Committee has designed an informative and inspiring programme that includes:

- a panel discussion on the very timely subject of energy transition
- presentations of the latest technical and scientific advances
- an interactive session on environmental and social impact management and stakeholder interactions
- Young CEDA pitch talks

You will also have the chance to see a sneak preview of three upcoming publications of CEDA's working groups and commissions. One of them, in fact, will even be launched at CEDA Dredging Days 2019.

I encourage you to browse this programme for more details.

For the first time, interested delegates will also have the opportunity to hear directly from our exhibitors as they pitch the latest about their innovative products and services in very short, snappy talks.

As always, we would not be able to curate such a high-quality technical programme without the authors, speakers, and panellists who so generously share their time, knowledge, and experience. We are eternally grateful.

In addition, I also want to thank our exhibiting companies and our sponsors for their generous support of CEDA Dredging Days 2019.



The synergy offered by CEDA Dredging Days 2019 and Europort 2019, under the same roof, helps to make this a uniquely productive event for discerning professionals.

I warmly invite you to join us at CEDA Dredging Days 2019 this November and encourage your colleagues and business contacts to do so as well. I am confident that you will have two productive, well-spent days away from the office. At the very least, you can expect to leave with some directly usable knowledge and connections that benefit your projects.

I look forward to seeing you at the CEDA Dredging Days 2019.

Chairman's welcome

Professor Cees van Rhee of Delft University of Technology – and chairman of CEDA Dredging Days 2019 Papers and Programme Committee – outlines this year's event

This year, the Dredging Days kick off with a panel discussion on energy transition and how this transition will affect the dredging industry, seen from different angles. Stakeholders from governments, port authorities, contractors, suppliers and the knowledge institutes are present in the panel.

The successful interactive session, well known from previous years, is also scheduled into this year's programme. The topic is interaction with stakeholders in project design and construction. This makes dredging projects often complex and high-profile.

The regular sessions are filled with an interesting mix of papers dealing with the latest developments in dredging technology, exciting presentations about case studies, project management and managing environmental effects. In the traditional academic sessions, young professionals will present high quality papers on numerical modelling of slurry transport and hopper sedimentation. During this session, we will also hear about laboratory experiments on cutting of rock.

Young CEDA will again host the fast-paced pitch talks in the PechaKucha 20x20 style this year. Students, graduates, and young professionals will present and promote their work enabling them to get in contact with experienced professionals in the audience.

In all, thanks to the authors and the papers committee, we are confident that we have put together an interesting programme that will bring you up to speed with dredging's latest developments.





17 - 19 March 2020
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Programme at a glance

Thursday 7 November

- 07:00 – 09:00 Dredging exhibition build-up
-
- 08:00 – 19:00 Registration desk open
-
- 09:30 – 10:55 **Session 1: Opening and keynote speeches**
-
- 10:00 – 21:00 Europort 2019 open
-
- 10:55 – 11:25 Coffee and tea served in the exhibition area
-
- 11:25 – 13:00 **Session 2: Projects and project management**
-
- 13:00 – 14:15 Lunch served in the exhibition area, sponsored by Royal IHC 
-
- 14:15 – 15:45 **Session 3: Interactive session**
-
- 15:45 – 16:15 Coffee and tea served in the exhibition area
-
- 16:15 – 17:10 **Session 4: Latest developments in dredging technology**
-
- 17:10 – 17:30 International Dredging Directory visualised: what the dredging market can learn from the vessel data
-
- 17:30 – 18:00 CEDA Annual General Meeting
-
- 18:00 – 19:00 CEDA Netherlands reception

Friday 8 November

- 08:00 – 17:30 Registration desk open
-
- 09:00 – 10:35 **Session 5: Academic research**
-
- 10:00 – 17:00 Europort 2019 open
-
- 10:35 – 11:05 Coffee and tea served in the exhibition area
-
- 11:05 – 12:20 **Session 6: Latest developments in dredging technology**
-
- 12:20 – 13:35 Lunch served in the exhibition area
-
- 13:35 – 14:35 **Session 7: Young CEDA pitch talks**
-
- 14:35 – 15:05 Coffee and tea served in the exhibition area
-
- 15:05 – 16:40 **Session 8: Assessing and managing environmental effects**
-
- 16:40 – 16:45 Presentation of the IADC Young Author's Award
-
- 16:45 – 16:55 Conference chairman's closing remarks
-
- 16:55 – 18:00 Farewell drinks

The organisers wish to thank the following companies for their support:

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Conference programme

Day 1, Thursday, 7 November

08:00 Dredging Days registration desk open

09:30 SESSION 1: OPENING AND KEYNOTE SPEECHES



Chair: Prof Dr Cees van Rhee – Delft University of Technology, the Netherlands

OPENING REMARKS



Polite Laboyrie, CEDA president – Witteveen+Bos, the Netherlands

INTRODUCTION



Prof Dr Cees van Rhee, Technical Papers and Programme Committee chairman – Delft University of Technology, the Netherlands

PANEL DISCUSSION

Energy transition: the views in our dredging community

In this panel discussion several “captains of industry” will give their views on the challenges, pros, and cons of the energy transition in our industry. The panel will represent the full width of our dredging industry: contractors; governments; port authorities; consultancies; suppliers; and knowledge infrastructure.

Our panel of industry experts includes (at time of press):

- Michel Deruyck - Jan de Nul, Belgium
- Kaj Portin - Wärtsilä, Finland
- Klaas Visser - Delft University of Technology, the Netherlands

Full details of the panel will be confirmed on the conference website and in the conference app.

FEATURED CEDA PRESENTATIONS

Effective contract selection: CEDA’s guide to optimised contracting methods



Charles Wilsoncroft, on behalf of the CEDA Working Group on Effective Contract/Procurement Type Selection – HKA, UK

Practical considerations for project owners on soil investigation



Kathleen De Wit, on behalf of the CEDA Dredging Management Commission (DMC) – IMDC, Belgium

Energy efficiency of dredging projects and equipment



Paul Vercrujisse, on behalf of the CEDA Working Group on Energy Efficiency – DEME, Belgium

10:55 Coffee and tea served in the exhibition area

11:25 SESSION 2: PROJECTS AND PROJECT MANAGEMENT



Chair: Dirk Roukema – Blue Pelican Associates, the Netherlands

Production estimates are key to budgets and schedules



Simon Burgmans, Ralph Brevet, and Greg Miller – in2Dredging, Australia

The CEDA Dredging Days 2019 Technical Papers and Programme Committee reserves the right to adjust or change the programme if necessary

An assessment of the comparability of dredging cost standards to industry market rates for trailing suction hopper dredgers



Colm Sheehan and Leigh Holmes – Anthony D Bates Partnership, UK

Dredging in Monaco: challenges and solutions



Camille Kapela – Egis Ports, France;
Tom Van Slambrouck – Jan De Nul, Belgium

State-of-the-art spraying – case study CenterPoint of Indonesia project



Maarten Betman and Sander van Ouwerkerk – Royal Boskalis Westminster, the Netherlands

13:00 Lunch, sponsored by Royal IHC, served in the exhibition area



14:15 SESSION 3: INTERACTIVE SESSION



Facilitated by:
Mike Van der Vijver – MindMeeting, the Netherlands



Presented by:
Thomas Vijverberg and Daniël Ouddeken – Hydronamic/Boskalis, the Netherlands



15:45 Coffee and tea served in the exhibition area

16:15 SESSION 4: LATEST DEVELOPMENTS IN DREDGING TECHNOLOGY



Chair: Niels Borgers – Smals Dredging, the Netherlands

Water injection dredging and fluid mud trapping pilot in the Port of Rotterdam



Alex Kirichek – Deltares, the Netherlands;
Ronald Rutgers – Port of Rotterdam, the Netherlands

Next-generation marine aggregate dredger as platform for innovation and basis for fleet renewal



Frank de Hoogh, Justin Rietveld, and Marc de Roo – Damen Shipyards, the Netherlands; Frank Bosman – Damen Dredging, the Netherlands; Mark Williams – CEMEX UK Marine, UK

17:10 INTERNATIONAL DREDGING DIRECTORY VISUALISED: WHAT THE DREDGING MARKET CAN LEARN FROM THE VESSEL DATA



Ines Nastali – IHS Markit, UK

17:30 CEDA ANNUAL GENERAL MEETING

18:00 CEDA NETHERLANDS RECEPTION



Conference programme

Day 2, Friday, 8 November

08:00 Dredging Days registration desk open

09:00 SESSION 5: ACADEMIC RESEARCH



Chair: Jort van Wijk – IHC MTI, the Netherlands

3D CFD modelling of hopper sedimentation



Lynyrd de Wit – Svašek Hydraulics, the Netherlands

Slurry transport in a channel with TwoPhaseEulerFoam



Thijs Schouten, Geert Keetels, and Cees van Rhee – Delft University of Technology, the Netherlands

Unstable behaviour of a sand cap placed over a weak sensitive clay deposit



Mario Martinelli, Dirk Luger, Arno Talmon, and Vahid Galavi – Deltares, the Netherlands

Experimental study on rock cutting with a pickpoint



Tom Rutten, Xiuhan Chen, and Sape Miedema – Delft University of Technology, the Netherlands; Gongxun Liu and Guojun Hong – CCCC National Engineering Research Centre of Dredging Technology and Equipment, China

10:35 Coffee and tea served in the exhibition area

11:05 SESSION 6: LATEST DEVELOPMENTS IN DREDGING TECHNOLOGY



Chair: Johan Pennekamp – Deltares, the Netherlands

Energy storage system size estimation for hybrid dual fuel powered dredging vessels



Benny Mestemaker, Henrik van den Heuvel, and Bernadete Gonçalves Castro – Royal IHC, the Netherlands

Modelling cutterhead/soil interaction for a cutter suction dredger in waves



Amir Blanken and Jan Los – Royal IHC, the Netherlands

Cutterhead spillage when dredging sand or gravel



Sape Miedema and Bas Nieuwboer – Delft University of Technology, the Netherlands

12:20 Lunch served in the exhibition area

13:35 SESSION 7: YOUNG CEDA PITCH TALKS



Chair: Mark Petri – Royal IHC, the Netherlands

Young CEDA pitch talks will consist of seven short and sharp presentations, among which are the following speakers:

The art of artificial reefs



Paul Peters - Royal Boskalis Westminster, the Netherlands

ULEV technology in dredging and offshore technology



Angelo van Tongeren – Jan De Nul, Belgium

Small scale NPSHr tests for centrifugal pumps



Maarten in 't Veld – Royal IHC, the Netherlands

14:35 Coffee and tea served in the exhibition area

15:05 SESSION 8: ASSESSING AND MANAGING ENVIRONMENTAL EFFECTS



Chair: Thomas Vijverberg – Royal Boskalis Westminster, the Netherlands

On the application of OBS measurements on mixed sediments and the coupling to fixed turbidity limits



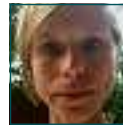
Ulrik Lumborg – DHI, Denmark; Klavs Bundgaard – NIRAS, Denmark

A GIS-tool to identify ecosystem services delivered by smart sediment management strategies



Annelies Boerema, Katrien Van der Biest, Dirk Vrebos, and Patrick Meire – University of Antwerp, Belgium; Marcel Taal – Deltares, the Netherlands; Gijsbert van Holland – IMDC, Belgium; Sebastiaan Mestdagh and Tom Ysebaert – NIOZ, the Netherlands; Frederik Roose – Department of Mobility and Public Works, Belgium

Applying the ecosystem service concept to Waterborne Transport Infrastructure



Annelies Boerema – University of Antwerp, Belgium; Jochen Hack – TU Darmstadt, Germany; Sabine Apitz – SEA Environmental Decisions, UK; Arjen Boon – Deltares, the Netherlands; Al Cofrancesco – US Army Engineer Research and Development Center, US; Gosse de Boer – Royal Haskoning DHV, the Netherlands; Greg Guannel – The Nature Conservancy, US; Dave Hopper – New South Wales Government, Australia; Martin Krebs – Wasserstraßen- und Schifffahrtsamt Emden, Germany; Ine Moulaert – Jan De Nul, Belgium; Katherine Chambers – US Army Corps Headquarters, US; Elmar Fuchs – Bundesanstalt für Gewässerkunde, Germany

Mapping water quality with drones – test case in Texel



Liesbeth De Keukelaere, Robrecht Moelans, Els Knaeps, and Gert Strackx – VITO, Belgium; Emile Lemey – Jan De Nul, Belgium

16:40 PRESENTATION OF THE IADC YOUNG AUTHORS' AWARD



René Kolman, secretary-general – International Association of Dredging Companies, the Netherlands

16:45 CONFERENCE CHAIRMAN'S CLOSING REMARKS



Prof Dr Cees van Rhee, Technical Papers and Programme Committee chairman – Delft University of Technology, the Netherlands

16:55 Farewell drinks

Interactive session

Thursday, 7 November, 14:15

Does this contract maintain a social license to operate?

Following the enthusiastic response of CEDA Dredging Days attendees to the inaugural 2017 interactive session, this has now become a recurring feature of the CEDA Dredging Days technical programme.

Dredging projects literally turn water into land and land into water. This makes them usually complex and high-profile. As a consequence, there are often many stakeholders involved, with a multitude of interests and backgrounds. Thoughtful management of these varied interests is essential to a project's operational, reputational, and financial success.

During this year's session, we will focus on the social license to operate: environmental and social impact management and stakeholder interactions. As the world is rapidly changing, so is the playing field for dredging project developers, consultants, contractors, authorities and regulators, finance and insurance entities, watchdog NGOs and civil society.

More than ever, those players are interacting with each other and able to voice their interests and influence development. Particularly the role and responsibility of contractors in project design and construction has changed.

Whilst national legislation establishes the basic requirements for the impact management of dredging projects, it is the financial institutions, such as the IFC, Equator Principles banks, and export credit agencies, which take the lead in setting the bar.

Infrastructure developments that do not meet their standards may not be eligible for financing or insurance. Moreover, dredging projects that do not meet stakeholder expectations, may face legal action, protests, delays, reputational damage, and other activist pressure.

Consequently, effective incorporation of public interests can only be achieved by early and inclusive engagement. Dredging projects have to gain and maintain their social license to operate from a wide range of stakeholders with opposing interests.



During this session, we will experience stakeholder dynamics and potential consequences, in a realistic and interactive case study. We will draw on the recently published CEDA/IADC book: *Dredging for Sustainable Infrastructure*, and the highly acclaimed interactive session on stakeholder involvement at the accompanying conference, which took place in November 2018 and celebrated the launch of the book.

Note that the setting, case and lessons for this year's session are different compared to the previous edition, making it challenging for both new and experienced participants!

The session will be educational, inspirational, invigorating and lots of fun!

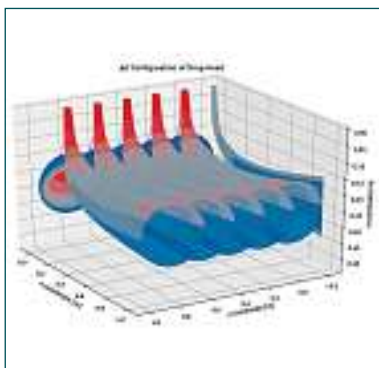
About the papers

Session 2

Production estimates are key to budgets and schedules

Simon Burgmans, Ralph Brevet, and Greg Miller – in2Dredging, Australia

- Unrealistic and optimistic budgets and schedules are an issue for both contractor and client
- Suction and discharge production rates can be reliably estimated for most projects
- Rock cutting production estimates should consider the entire cutting installation
- Typically, low jetting production rates in impermeable sand and stiffer clay can be accurately estimated
- Both contractors and clients can and should monitor dredges' performance by acquiring digital data



Jet modelling of a drag head's heel jets

Session 2: continued

An assessment of the comparability of dredging cost standards to industry market rates for trailing suction hopper dredgers

Colm Sheehan and Leigh Holmes – Anthony D Bates Partnership, UK

- Market rates compared to costs standard estimates
- CIRIA cost model used for comparison: widely used standard cost model for dredgers
- 150 data points compared
- Demonstrating the sensitivity of key cost model inputs
- Illustrative examples of sensitivity, and impact to market rate comparison
- Potential mitigating factors discussed
- Encourage more in-depth discussion when using cost models for greater alignment to market conditions
- Beneficial in cases where CIRIA cost standards are used e.g. dispute resolution

Session 2: continued

Dredging in Monaco: challenges and solutions

Camille Kapela – Egis Ports, France; Tom Van Slambrouck – Jan De Nul, Belgium

- Land reclamation in Monaco to create the first eco-friendly residential area
- Among a wide range of challenges: strict environmental requirements
- Accurate dredging, treatment and valorisation of contaminated sediments
- Dredging and disposal of non-contaminated materials to reach the bedrock
- Developing specific validation methods for the dredging works



Dredging in Monaco: an example of environmental mitigation measures

About the papers

Session 2: continued

State-of-the-art spraying – case study CenterPoint of Indonesia project

Maarten Betman and Sander van Ouwerkerk – Royal Boskalis Westminster, the Netherlands

- Reclamation on extremely soft cohesive soils without the use of a traditional sand key
- Autonomously manoeuvring spray pontoon using real time production data from TSHD
- Adjustable spraying depth, reducing the induced turbidity in the surrounding area



Spraying in Makassar

Session 4

Water injection dredging and fluid mud trapping pilot in the Port of Rotterdam

Alex Kirichek – Deltares, the Netherlands; Ronald Rutgers – Port of Rotterdam, the Netherlands

- Sediment trapping and WID in the Calandkanaal
- Overview of monitoring tools for settling and /consolidation of mud
- Rheology of mud
- Nautical bottom (density vs yield stress)
- Fluid mud layers



Monitoring tools for WID

Session 4: continued

Next generation marine aggregate dredger as platform for innovation and basis for fleet renewal

Frank de Hoogh, Justin Rietveld, and Marc de Roo – Damen Shipyards, the Netherlands; Frank Bosman – Damen Dredging, the Netherlands; Mark Williams – CEMEX UK Marine, UK

- Steady and increasing demand for marine aggregates
- Aging aggregate dredger fleet in need of renewal to meet the increasing demand of marine aggregates
- Increasing focus on safety, reliability and sustainability
- New take on marine aggregate dredging equipment
- Joint effort of dredger operator, equipment specialists and shipbuilder in the search for the next generation design



Rendering of marine aggregate dredger *Cemex Go Innovation*

Session 5

3D CFD modelling of hopper sedimentation

Lynyrd de Wit – Svašek Hydraulics, the Netherlands

- Predict hopper loading and overflow losses with 3D multiphase CFD model
- 3D information of PSD inside hopper bed
- Time evolution of overflow SSC and overflow PSD
- Varying multiple overflow and inflow pipe locations possible
- Model also applicable for ballasting GBS, and caisson or simulating land reclamations



Simulated 3D hopper bed

Session 5: continued

Slurry transport in a channel with TwoPhaseEulerFoam

Thijs Schouten, Geert Keetels, and Cees van Rhee – Delft University of Technology, the Netherlands

- A CFD model for simulating sand-water mixtures in pipelines
- Validation of implemented drag relation with simulations of settling particles
- Comparison of velocity profiles from simulation with existing experiments
- Comparison of concentration profiles with existing experiments



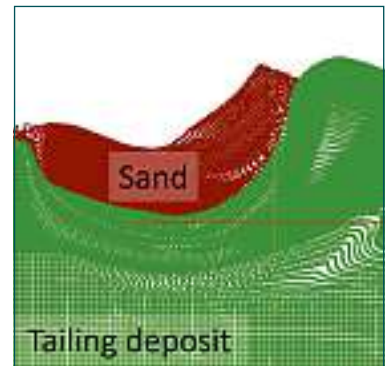
Sand concentration in a sediment laden channel

Session 5: continued

Unstable behaviour of a sand cap placed over a weak sensitive clay deposit

Mario Martinelli, Dirk Luger, Arno Talmon, and Vahid Galavi – Deltares, the Netherlands

- Triggering and the evolution of the failure process of tailing deposits are numerically simulated with the material point method, from small to very large strain ranges
- Rate effects are included to simulate undrained viscous and sensitive response of soft tailing deposits
- The combination of MPM and the constitutive model provides an overlap with computational fluid dynamics tools that are currently being used to analyse flow and deposition of fluid muds



Failure of the weak tailing deposit during sand capping process

About the papers

Session 5: continued

Experimental study on rock cutting with a pickpoint

Tom Rutten, Xiuhan Chen, and Sape Miedema – Delft University of Technology, the Netherlands; Gongxun Liu and Guojun Hong – CCCC National Engineering Research Center of Dredging Technology and Equipment, China

- Many models to predict cutting forces are based on assumptions that do not compare in reality. These appear to restrict the accuracy of the model when comparing predicted with actual measured cutting forces
- We developed a method where we decomposed the measured cutting forces into an additional shear force due to sideways outbreking and an additional force for the removal of the secondary crushed zone due to the blunt tool
- Even though the total measured cutting force appeared to be linear, the shear force increased exponential with the depth
- On the other hand, the secondary crushed zone converges to a constant value over depth
- The above described outcomes open up possibilities for future research. If the existing models can be extended to include this phenomena, which occurred during cutting, a next step in accurately predicting the cutting forces can be made

Session 6

Energy storage system size estimation for hybrid dual fuel powered dredging vessels

Benny Mestemaker, Henrik van den Heuvel, and Bernadete Gonçalves Castro – Royal IHC, the Netherlands

- Engine capability estimation for dealing with the transient loading conditions of dredging
- Fast static analysis method to estimate the size of an energy storage system
- Verification of static results with dynamic simulations
- Transient load response of a natural gas fuelled dual fuel engine



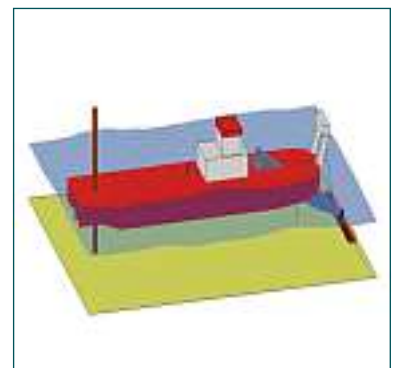
Dual fuel engine load change capability plot

Session 6: continued

Modelling cutterhead/soil interaction for a cutter suction dredger in waves

Amir Blanken and Jan Los – Royal IHC, the Netherlands

- Workability calculations of cutter suction dredgers to evaluate concept designs and achieve design improvements
- A computationally inexpensive approach to model cutterhead/soil interaction
- Implementation in multi body dynamics software DODO
- Nonlinear time domain simulations of cutter suction dredgers in waves



Representation of CSD DODO model with cutterhead/soil interaction

Session 6: continued

Cutterhead spillage when dredging sand or gravel

Sape Miedema and Bas Nieuwboer
– Delft University of Technology,
the Netherlands

- A new analytical model has been developed for the spillage of a cutterhead
- Based on physics, new scale laws have been derived for spillage
- The model has been calibrated with the den Burger (2003) experiments
- The model is validated with the Miltenburg (1983) experiments
- The model (Excel) can be downloaded on ResearchGate/ Miedema

Session 8

On the application of OBS measurements on mixed sediments and the coupling to fixed turbidity limits

Ulrik Lumborg – DHI, Denmark; Klavs Bundgaard – NIRAS, Denmark

- Measuring nephelometric turbidity units (NTU) is a popular and relatively simple method as a proxy for illustrating the suspended sediment concentration (SSC)
- Converting NTU to SSC is not a simple task. Transfer function is sensitive to grainsize
- Conversion factors may vary up to a factor 15 with varying grainsizes
- A specific NTU corresponds to an infinite number of SSCs, depending on the local grainsize
- Applying a certain NTU as an environmental limit does not necessarily provide the required environmental protection



OBS applied in Rødsand, Denmark

Session 8: continued

A GIS-tool to identify ecosystem services delivered by smart sediment management strategies

Annelies Boerema, Katrien Van der Biest, Dirk Vrebos, and Patrick Meire
– Univ. of Antwerp, Belgium; Marcel Taal – Deltares, the Netherlands; Gijsbert van Holland – IMDC, Belgium; Sebastiaan Mestdagh and Tom Ysebaert – NIOZ, the Netherlands; Frederik Roose – Dep. of Mobility and Public Works, Belgium

- Development of smart sediment tool to study ecosystem services
- Investigate and demonstrate the additional environmental and societal benefits of sediment management
- The tool is tested for a series of smart sediment management strategies
- Case: transboundary Scheldt delta (e.g. Roggenplaat in the Eastern Scheldt, the Netherlands)



Demo of the smart sediment tool

About the papers

Session 8: continued

Applying the ecosystem service concept to Waterborne Transport Infrastructure

Annelies Boerema – University of Antwerp, Belgium; Jochen Hack – TU Darmstadt, Germany; Sabine Apitz – SEA Environmental Decisions, UK; Arjen Boon – Deltares, the Netherlands; Al Cofrancesco – US Army Engineer Research and Development Center, US; Gosse de Boer – Royal Haskoning DHV, the Netherlands; Greg Guannel – The Nature Conservancy, US; Dave Hopper – New South Wales Government, Australia; Martin Krebs – Wasserstraßen- und Schifffahrtsamt Emden, Germany; Ine Moolaert – Jan De Nul, Belgium; Katherine Chambers – US Army Corps Headquarters, US; Elmar Fuchs – Bundesanstalt für Gewässerkunde, Germany

- Use of the ES concept in WTI projects
- ES assessment can be complex and quantitative or more conceptual and qualitative
- Discussion of different ES application types along the WTI project cycle
- Discussion of benefits and added values ES concept can bring to a WTI project
- Lessons learned and recommendations for ES assessments based on a variety of case studies

Session 8: continued

Mapping water quality with drones – test case in Texel

Liesbeth De Keukelaere, Robrecht Moelans, Els Knaeps, and Gert Strackx – VITO, Belgium; Emile Lemey – Jan de Nul, Belgium

- Challenges of airborne drone technology for water quality assessment
- From raw drone data to turbidity maps
- Demonstrated at a dune construction site in Texel under clouded sky
- Validated with *in-situ* water samples



Drone-captured true-colour mosaic with black *in-situ* sampling indicator

Young CEDA programme



Student programme

The student programme has been highly successful in enabling promising students to attend Dredging Days in the past, and hopefully, in 2019.

Under this programme, CEDA offers a considerable number of free registrations to graduate and postgraduate students. They are granted to students who have shown great affinity to dredging technology within their studies.

The free registrations have been organised and co-ordinated by Young CEDA, and 15 European universities and institutions of higher professional education have been offered up to three each.

Participating students will be looked after by members of the Young CEDA Commission who will make sure that they find their way both through the conference and Rotterdam, including meeting other students, young professionals, and more senior members of the dredging community.

Young CEDA pitch talks session

Young CEDA will be hosting a pitch talks session: a series of seven short and sharp presentations on the overall theme of the conference. The pitch talks aim to provide students and young professionals a platform to present their ongoing work, expose their ideas to a broad expert audience, and get immediate feedback and inspiration.



Where to meet Young CEDA?

- In the Young CEDA corner
- During the Young CEDA pitch talks session

Make sure you do not miss the traditional CEDA Netherlands reception on Thursday evening either, where there will be plenty opportunity to meet dredging enthusiasts from all segments of the dredging field, from whom there is a lot to learn and who are fun to talk to.

Technical exhibition



Central Dredging Association

CEDA is an established authority and the leading independent forum for the professional dredging community and associated industries in Europe, Africa and the Middle-East. It represents dredging professionals and organisations from government, academia and business in the region and fosters and promotes the understanding and advancement of dredging to the wider community. Drawing on the collective knowledge of its members, and as an impartial body, CEDA regularly gives expert advice to government and international regulatory bodies.

CEDA members are representatives of consultancies, research and educational institutions, port authorities, government agencies, dredging contractors, designers and builders of dredging vessels, suppliers of ancillary equipment and organisations providing a whole range of related services.

CEDA is part of the World Organisation of Dredging Associations. CEDA's sister associations, WEDA and EADA, serve the Americas, Asia, Australia, and the Pacific region. respectively.

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Rotterdamseweg 183c
2629 HD Delft
The Netherlands

Tel: +31 15 268 2575

Website: www.dredging.org

E-mail: ceda@dredging.org

Contact person: Ms Anna Csiti, general manager



Damen Shipyards

Damen Shipyards Group operates 36 shipbuilding and repair yards and delivers vessels and components in over 100 countries. Based on its unique, standardised ship-design concept Damen is able to guarantee consistent quality.

Furthermore, modular construction, keeping vessels in stock and thorough R&D leads to short delivery times and reliable performance. Damen offers a wide range of products, including tugs, workboats, naval and patrol vessels, high-speed craft, cargo vessels, dredgers, offshore vessel, ferries, pontoons and superyachts.

In addition, Damen Shiprepair & Conversion has a worldwide network of 18 repair and conversion yards with dry docks ranging up to 420 x 80 metres.

Address: Avelingen West 20
4202 MS Gorinchem
The Netherlands

Tel: +31 183 639 911

Website: www.damen.com

E-mail: lissette.mol@damen.com

Contact person: Ms Lissette Mol, secretary



EIVA

For more than 40 years, EIVA has provided equipment and software to the maritime construction and survey industry to a wide range of segments, covering virtually any subsea task, including dredging.

We know and understand the challenges that our customers face, and we work closely together with them to choose and implement the solution that will offer the most value to their operations, with all that implies – including software training and 24/7 support.

Address: Niels Bohrs Vej 17
8660 Skanderborg
Denmark

Tel: +45 4153 2178

Website: www.eiva.com

E-mail: vl@eiva.com

Contact person: Mr Vladut Neag,
marketing co-ordinator



Lagersmit Sealing Solutions

Lagersmit has been in the dredging industry since 1856. This fact in combination with more than 50.000 seals delivered, you can say we have gained the right knowledge, resources and capacity to develop special seals for the dredging industry.

Reliability is the key, when it comes to dredging equipment. You need to keep the dredging process going 24 hours a day, 7 days a week.

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Address: Nieuwland Parc 306
2952 DD Alblasterdam
The Netherlands

Tel: +31 88 0216 200

Website: www.lagersmit.com

E-mail: sales@lagersmit.com

Contact person: Mr Jan Willem Bongers,
sales manager

Technical exhibition



Nonius Engineering

Nonius Engineering develops automation means, 3D-positioning systems, density and velocity meters for dredging and technical fleet. We have now a whole range of solutions ready for all the types of dredgers and mining vessels. Our software and hardware complexes help to increase productivity, save time and energy by showing the most efficient way to work.

We are also happy to present Nonius SM – non-nuclear production monitoring system for suction dredgers and dredge pumps. It integrates density and velocity meters and has several important advantages over the existing solutions: no radiation involved, not a cut-in solution and extremely precise.

Address: 15 Chernaya Rechka Emb., office 64
197342 St-Petersburg
Russia

Tel: +7 812 313 6598

Website: www.noniusgroup.ru

E-mail: ma.guschina@noniusgroup.ru

Contact person: Ms Maria-Anna Guschina,
marketing manager



Royal IHC

Royal IHC enables its customers to execute complex projects from sea level to ocean floor in the most challenging of maritime environments. We are a reliable supplier of innovative and efficient equipment, vessels and services for the offshore, dredging and wet mining markets.

With a history steeped in Dutch shipbuilding since the mid-17th Century, we have in-depth knowledge and expertise of engineering and manufacturing high-performance integrated vessels and equipment, and providing sustainable services. With our commitment to technological innovation we strive to continuously meet the specific needs of each customer in a rapidly evolving world.

Address: PO Box 3
2960 AA Kinderdijk
The Netherlands

Tel: +31 88 015 2535

Website: www.royalihc.com

E-mail: ml.dejong@royalihc.com

Contact person: Ms Maaïke de Jong,
event co-ordinator



Teledyne Marine

Teledyne Marine is an organization comprised of 23 leading-edge undersea technology brands. Through acquisitions and collaboration, Teledyne Marine has evolved into an industry powerhouse, bringing Imaging, Instruments, Interconnect, Seismic, and Vehicle technology together to provide total solutions to our customers.

Each Teledyne Marine company is a leader in its respective field, with a shared commitment to providing premium products backed by unparalleled service and support.

Address: Fabriksvangen 13
3550 Slangerup
Denmark

Tel: +45 2077 4712

Website: www.teledynemarine.com

E-mail: helle.aukenlygum@teledyne.com

Contact person: Mr Helle Auken Lygum,
marketing manager



Van Oord Dredging & Marine Contractors

Van Oord is a Dutch family-owned company with 150 years of experience as an international marine contractor. The focus is on dredging, oil & gas infrastructure and offshore wind. Its head office is in Rotterdam. Van Oord employs almost 5,000 staff, who worked in 2018 on 190 projects in 46 countries.

The fleet consists of more than one hundred vessels. Marine ingenuity is characteristic of Van Oord. By using innovative, smart and sustainable solutions, it wishes to contribute to a better world for future generations. In 2018, the company celebrated its 150th anniversary and was granted the title 'Royal'.

Address: PO Box 8574
3009 AN Rotterdam
The Netherlands

Tel: +31 88 826 0000

Website: www.vanoord.com

E-mail: saskia.vanbeek@vanoord.com

Contact person: Ms Saskia van Beek,
communication officer

Registration information

CEDA Dredging Days 2019 will be held at Rotterdam Ahoy, Ahoy-weg 10, Rotterdam, the Netherlands, on Thursday and Friday 7 and 8 November and in conjunction with Europort



Registration

Conference Secretariat CEDA Dredging Days 2019:
Sylvia Minten, Minten Projectmanagement,
Rotterdamseweg 183c, 2629 HD Delft, the Netherlands
Tel: +31 (0)6 1660 3947

E-mail: sylvia@mintenprojectmanagement.nl

NB: Same details apply throughout the conference

Members of CEDA, EADA and WEDA*	€625
Non-members	€875
Speakers	€500
PhD students	€400
Students (undergraduates)**	€50

The above fees are exclusive of the additional VAT (21%), if applicable

* All individual members and employees of corporate members of CEDA are eligible for registration at the member's rate.

** Student registration is only accepted on receipt of a letter of endorsement and a copy of the student card.

Registration can be done online via
www.cedaconferences.org/dredgingdays2019

Registration desk location and opening hours

When you arrive at CEDA Dredging Days 2019, contact the registration desk. You will find it located on the second floor.

NB: To enter Ahoy on the first day you will be asked to show an email, provided by the conference secretariat. We will send it to you a couple of days before the start of the conference.

■ Thursday 7 November – from 08:00 to 19:00

■ Friday 8 November – from 08:00 to 17:30

NB: Exhibitors can set up stands from 07:00 on Thursday 7 November; breakdown will be from 17:30 on Friday 8 November.

Registration entitlements

Conference delegate and student registration fee includes:

- Conference sessions on 7 and 8 November
- A full set of conference documents
- Morning coffees, lunches, afternoon teas, reception and farewell drinks
- The official Europort 2019 exhibition catalogue

Exhibition staff registration fee includes:

- Morning coffees, lunches, afternoon teas, reception and farewell drinks
- The official Europort 2019 exhibition catalogue

NB: This fee does not include the conference papers or entry to the conference sessions. Staff who would like to attend the technical sessions should register as conference delegates.

Name badges

These will be issued to all registered delegates and exhibitors. Badges must be worn for entry to all technical sessions, the exhibition and social functions. Those not wearing a badge will be refused entry.

Name badges will be colour coded as follows:

Conference delegate	White
Exhibitor	Orange

Liability and insurance

Registration fees do not include insurance of any kind. It is strongly recommended that when registering for the conference and booking travel arrangements, participants should arrange personal insurance cover for the following:

- Loss of registration and tour fees, deposits, hotel costs and airfares through cancellation of the conference for force majeure or any other reason
- Failure to use pre-booked arrangements due to airline delays, for *force majeure*, or any other reason
- Medical expenses and loss or damage to personal property. CEDA, Minten Projectmanagement and Rotterdam Ahoy will not accept responsibility for any personal injury, damage or loss of property that may occur in connection with the conference. The insurance is to be purchased in the participant's own country.

CEDA Dredging Days 2019 is organised by the Central Dredging Association. Minten Projectmanagement has been appointed as the Conference Secretariat.

About CEDA

The Central Dredging Association (CEDA) is an internationally recognised independent professional association. It is an easy-to access leading platform for the exchange of knowledge and an authoritative reference point for impartial technical information. CEDA actively strives to contribute towards sustainable development by strongly recommending working with nature. CEDA members are corporations, professionals and stakeholders involved in a diversity of activities related to dredging and marine construction. CEDA represents the common interest of all fields related to dredging and marine construction and does not promote the interest of any particular industry sector or organisation.

For more information visit: www.dredging.org



Practical information

What you need to know for CEDA Dredging Days 2019

Transport

By air

■ Rotterdam The Hague Airport

This airport is only 20 minutes away from Rotterdam Ahoy, either by taxi or by metro. For more information see www.rotterdamthehagueairport.nl.

■ Schiphol Airport

Schiphol airport is located 65 km from Rotterdam. The NS Hispeed intercity train will bring you from Schiphol to Rotterdam Central Station in just 27 minutes.

By public transport

■ **By train** – Rotterdam offers excellent train connections. The Thalys high-speed train (ten times a day) makes Rotterdam just a short trip from Antwerp (30 min), Brussels (1h11 min) and Paris (2h36 min).

■ **Metro** – At Rotterdam Central Station, take the metro with direction 'De Akkers' (Line D) or direction 'Slinge' (Line E). Get off at 'Zuidplein' (in front of Rotterdam Ahoy). It will take less than 3 minutes to walk to the main entrance. Please check www.9292ov.nl or www.ret.nl for a timetable of NS and metro in Rotterdam.

Note: a public transport chip card is mandatory for the Rotterdam Metro. It can be bought in Rotterdam Central Station at the entrance to the metro or ordered through the web shop on www.ret.nl, where you can find more information on travelling with the "OV-chipkaart."

■ **Taxi** – You can find the taxi stand at the entrance/exit of Hall 8. You do not need to call taxis yourself – Rotterdam Ahoy will ensure that there are enough taxis.

Parking and shuttle services at Ahoy

Parking – the Ahoy parking area offers space for 3,000 cars at €13 per car and day. Other nearby parking areas are Q-Park Zuidplein and Q-Park Ikazia.

Hotel shuttle service – during Europort, a shuttle service will be available from a wide range of hotels in Rotterdam. A detailed time schedule, including all listed hotels, will be available on its website.

By car

■ Coming from Amsterdam/The Hague

Take the A4 to The Hague; follow the A13 towards Rotterdam; take the A20 towards Hoek van Holland. Take the A4 through the Benelux tunnel, then follow the A15 to Rotterdam. Exit at Rotterdam-Charlois (19). From the Groene Kruisweg take the 4th exit right onto the Oldegaarde. Then turn left onto the Zuiderparkweg at the traffic lights. On the Zuiderparkweg take the first right onto the Ahoy-weg.

■ Coming from Utrecht

Take the A12 to Gouda; follow the A20 towards Rotterdam and take exit A16 towards Dordrecht/Breda. After the Van Brienoord bridge, take the Ring Rotterdam towards Zierikzee/Barendrecht/Europoort (A15). On the A15, follow the Ring A15 towards Rotterdam-Zuid before you reach intersection Ridderkerk, then follow Ring Rotterdam Zierikzee (A29) and take exit Rotterdam-Zuidplein (19A). At the 2nd traffic lights, turn left on to the Oldegaarde. Turn right at the next traffic lights. On the Zuiderparkweg take the first right on to the Ahoy-weg.

■ Coming from Dordrecht/Breda

Stay on the A16 towards Rotterdam. On the A16, take the Ring Rotterdam-Zuid towards Zierikzee (A15). On the A15 follow the Ring A15 towards Rotterdam-Zuid before you reach intersection Ridderkerk, then follow Ring Rotterdam Zierikzee (A29) and take exit Rotterdam-Zuidplein (19A). At the 2nd traffic lights, turn left onto the Oldegaarde. Turn right at the next traffic lights. On the Zuiderparkweg take the first right onto the Ahoy-weg.

■ Coming from Zeeland/Roosendaal

Stay on the A29 towards Rotterdam. Drive to the end of the A29. At intersection Vaanplein, take exit Rotterdam-Zuidplein (19A). At the second traffic lights, turn left onto the Oldegaarde. Turn right at the next traffic lights. On the Zuiderparkweg take the first right onto the Ahoy-weg.

Accommodation

Hotel rooms have been reserved at a special rate. Information about booking remaining accommodation, including an interactive map, can be found on the Europort website where you can make a hotel reservation: <https://europort.nl>.



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