



## Wanda User Conference

Introduction


November 19th 2008

## Programma

14.00	Introduction	Ruud Lemmens
14.15	Special WANDA applications	Kees Kooij
14.45	Usage of Pumpenergy at BrabantWater	Jack Ruijten
15.15	WANDA WiKi	Michiel Tukker
15.30	Coffee break	
16.00	New and Improved in WANDA 3.70	Kees Kooij
16.30	WANDA Data Model Integration	Simone De Kleermaeker
17.00	Wanda 4 Developments	Anton Heinsbroek
17.30	Questions and Discussion	
18.00	Diner at the Corporate restaurant	

November 19th 2008







**Deltares**

**Institute for Delta technology**

November 19th 2008




## Pooling strengths

Combination of renowned Dutch institutions with a combined history of more than 400 years:

- **WL | Delft Hydraulics** – hydraulic engineering and integrated water management
- **GeoDelft** – geo-engineering
- A part of **TNO Built Environment and Geosciences** – soil and groundwater
- Sections of **Rijkswaterstaat** (RIKZ, RIZA and DWW) – integrated water management and hydraulic engineering.

November 19th 2008



## Facts and figures

- Legal form: foundation
- Established 1 January 2008
- ± 800 employees (full-time basis)
- Annual turnover of € 87 million (initial phase)
- Branches in Delft and Utrecht
- Serves the public and private sector
- National and international activities
- Exact sciences, integrated with social sciences



November 19th 2008

**Deltares**

## Strategic principle

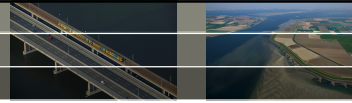
# Enabling Delta Life

Technological breakthroughs and innovations are needed to keep coastal areas and river basins habitable. Deltares has an integrated approach to the development of innovative solutions that make living and working in deltas safe, clean and sustainable throughout the world.

November 19th 2008

**Deltares**

## Delta technology



The need for advanced knowledge and solutions requires an 'integrated approach' that benefits the habitability of delta areas.

We call this approach

# Delta technology

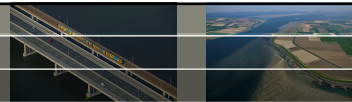
**Integrated** means:

- water *and* subsurface
- high-tech *and* high-touch
- the full range of scientific disciplines
- theory *and* practice
- together with others

November 19th 2008

**Deltares**

## Delta technology expertise



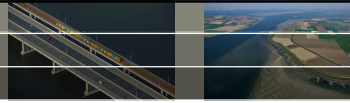
- Sediment transport and morphology
- Soil mechanics
- Chemistry and microbiology
- Ecology
- Hydro-engineering
- Eco-engineering
- Spatial sciences
- Life and social sciences
- Measuring and monitoring
- Mathematics and information technology
- Hydrology
- Hydrodynamics
- Geology
- Geo-hydrology
- Risk management
- Geo-engineering



November 19th 2008

**Deltares**

## The roles of Deltares

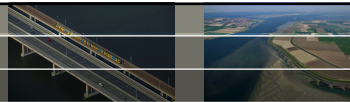


- **Knowledge centre**  
Management and acquisition of knowledge, accessibility and maintenance
- **Development centre**  
The innovative and multidisciplinary development of new concepts
- **Knowledge broker**  
The development of partnerships and keeping up the performance of knowledge networks
- **Specialist consultant**  
Advice about national and international issues relating to water, the subsurface and delta areas
- **Delta explorer and evaluator**  
A clear assessment of delta issues and policy in the Netherlands and elsewhere

November 19th 2008

**Deltares**

## We work for



### National and international

- government authorities (care)
- knowledge institutions (precision)
- business sector (competitive position)
- community organisations (transparency)
- the general public (safety, comfort)



November 19th 2008

**Deltares**

## Worldwide projects



A world map with a green landmass and blue oceans. Numerous small white dots are scattered across the map, indicating project locations in North America, South America, Europe, Africa, Asia, and Australia. The text 'E08011a' is visible in the bottom left corner of the map area.

November 19th 2008

**Deltares**

## Hydraulic Engineering


6 Units on three different locations  
Unit Hydraulic Engineering consisting of:

1. HCO: Harbours, Coastal and Offshore Engineering
2. IHY: Industrial Hydrodynamics
3. Coastal Structures and Waves


November 19th 2008

**Deltares**


## Which Harbours, Coastal and Industrial Projects ?




design and layout optimisation of ports, harbours and berths



optimisation of intake/outfall configuration for (power and) desalination plants



reclamation schemes and coastal protection works



marine pipelines and offshore infrastructure


November 19th 2008

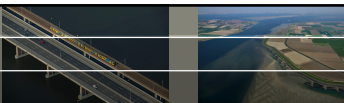
## Industrial Hydrodynamics

Applied research and specialist consultancy in the field of:  
hydraulic questions and bottle necks of pipeline systems:

- > physical scale experiments
- > full scale testing and calibration
- > hydraulic design and simulation

November 19th 2008





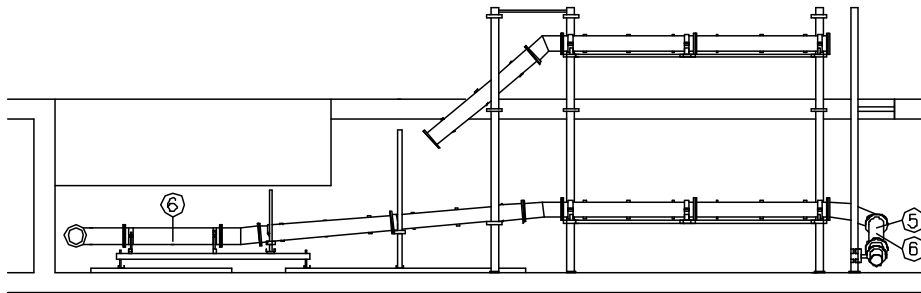
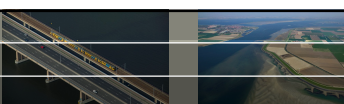
**Services:**

- desk studies (feasibility, design, control, safety)
- software development
- experimental (testing, validation of numerical models)
- training
- trouble shooting

November 19th 2008

**Deltares**

**Experimental set-up**



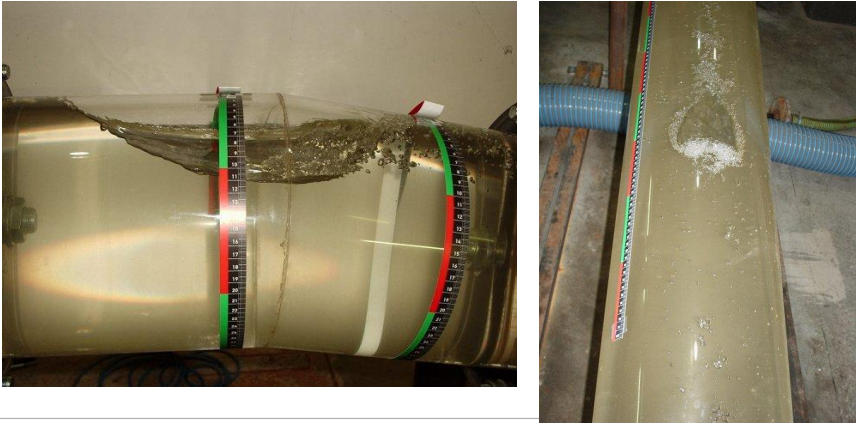
November 19th 2008

**Deltares**



**Results**

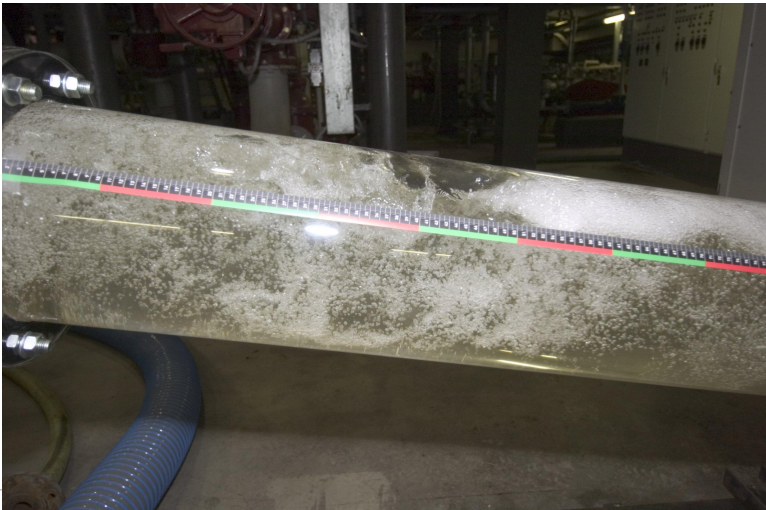
Mechanisms of air transport



November 19th 2008

ictures

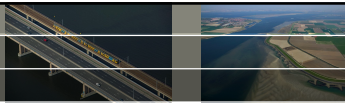
**Results**



November 19th 2008

ures

## IHY Clients



**Water industry:**

- drinking water
- sewage transportation

**Water boards**

**Oil & gas industry**


**Process industry**

**Pipeline owners**

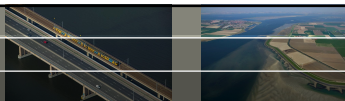
**Engineering consultants**

**Component manufacturers**

November 19th 2008



## Software



IHY is supported by IT group of Deltares

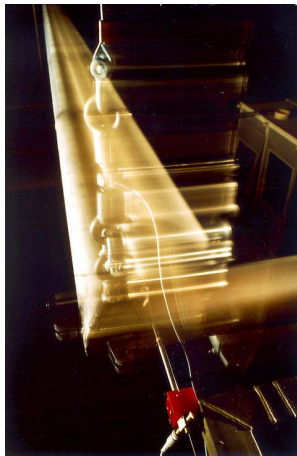
WANDA

- 1D code for hydraulic design and control of arbitrary pipe systems


Flustrin

- 1D code for fluid-structure-interaction in serial pipelines



CFX (3D code)



November 19th 2008



# WANDA



Modular concept

- Engineering
- Transient
- Control

es

November 19th 2008

# WANDA

Arbitrary pipe systems

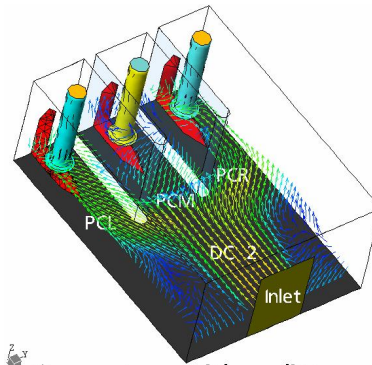
es

November 19th 2008

## Numerical modelling of pump sumps (CFD)

special flow phenomenae still difficult:

- air entrainment
- small local temporary flow separations
- submersed vortices



Geometry with splitters CFX

November 19th 2008

**Deltares**

## Experimental services (Flow laboratory)

Component testing

- stationary or dynamic
- check valves, (control) valves, pressure relief valves, degassers, flow meters
- water flow (2 m<sup>3</sup>/s)
- air flow (10 kg/s)
- 2 component flow (water-air)

Pipe flow phenomena

- water-air or water-sand as model fluids
- sufficient area and pump capacity for dedicated circuits

November 19th 2008

**Deltares**

