

**Title of the project:**

Analysis of the flow characteristics of overtopping waves by conducting unique large-scale experiments

**Assignment no.:**

13.24

**Internal/external:**

Internal and External (TU Delft)

**Head graduation committee:**

Dr. Jord Warmink

**Daily supervisors:**

ir. Niels van der Vegt

**Other supervisors**

Dr. ir. Bas Hofland (TU Delft)

**Name(s) of participating companies or institutes:**

University of Twente, Delft University of Technology

**Start of the project:**

Between September 2024 and January 2025

**Required courses:**

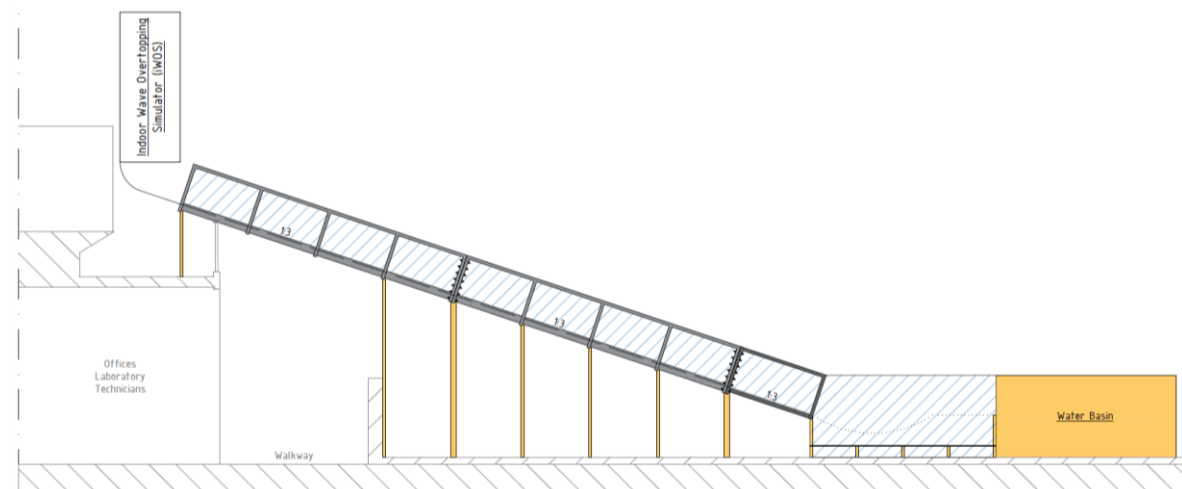
Data Analysis, Mathematical Physics, Hydraulic Engineering, Wave Dominated Coastal Dynamics

**Short description and objective of the project:**

One of the most common ways for a dike to fail is due to erosion caused by wave overtopping (see figure). Currently, it is assumed that erosion of the grass cover is primarily caused by the front velocity of the overtopping wave. However, this is uncertain as the hydraulic loading caused by the overtopping flow on the landward slope is not fully understood.



As part of the Future Flood Risk Management Technologies project, we plan to build a large-scale experimental setup at the Delft University of Technology to study the flow characteristics of an overtopping wave (see figure below). These unique experiments allow to study the overtopping flow on a 3 to 4 meter high slope. Currently, we are preparing the experimental setup and aim to start these experiments around April 2025.



Within this thesis, you will conduct unique experiments to study the hydraulic loading from overtopping waves on the landward slope of a dike. The primary focus is to collect data on flow

characteristics such as the layer thickness, (front) velocity, and duration of the loading, and analyse how they develop over time and along the landward slope. Furthermore, if time allows, other flow characteristics such as pressure and shear stress may be analysed using sensors or particle image velocimetry (PIV).

The research project is available starting from September 2024 up to January 2025 (pre-package start) with the experiments planned from April 2025. Part of your research will be conducted at the Delft University of Technology.