

IHE Delft WSE/HI programme 2019-2021

Exercise River Modelling in SOBEK: Flood Diversion Problem

Copy the directory Exe_2020.lit from e-campus to CLabs, under Sobek 216 folder and open the project in SOBEK.

This project describes a small model for the simulation of flood diversion from the Ciliwung river in Indonesia to a neighbouring wetland, to reduce flood peaks downstream. The diversion route will be created via a tunnel. Diversion of flow is initiated as soon as the crest of the fixed entrance weir is overtopped.

You are asked to investigate the following:

General analysis

1. Check the model schematisation. Make a sketch of the network and indicate clearly the types of hydraulic structures present in the system.
2. Give your opinion on the types and locations of boundary conditions being used. [for each boundary condition if it is the appropriate type and location or not, and why. Add a short, one or two sentences, explanation for each boundary condition]

Sensitivity of the numerical parameters

Investigate the sensitivity of the water level downstream of the diversion at the end of the main river reach, on:

1. the computational time step (Δt) used in the model; [Report downstream water level graphs for the base case and two alternative time steps. Give a short, one or two sentences, interpretation of your result: e.g. it is sensitive or not, or a little, as can be seen from..]
2. the computational distance step (Δx) used in the model. [Report downstream water level graphs for the base case and two alternative distance steps. Give a short, one or two sentences, interpretation of your result: e.g. it is sensitive or not, or a little, as can be seen from..]

Sensitivity of hydraulic parameters

Investigate the sensitivity of the downstream water levels at the main river reach to:

1. the dimensions of the intake structure; [Report downstream water level graphs for the base case and two alternative dimensions (size). Give a short, one or two sentences, interpretation of your result: e.g. it is sensitive or not, or a little, as can be seen from..]
2. the type/shape of intake structure [Report downstream water level graphs for the base case and two alternative structures. Give a short, one or two sentences, interpretation of your result: e.g. it is sensitive or not, or a little, as can be seen from..]

Design

1. Do you see possibilities to save construction costs by modifying the design of the intake structure, e.g. by reducing materials needed for the structures? [Explain your idea in max. 5 sentences]
2. Modify the model to test whether your alternative design will reduce the downstream water level peak to the same extend as in the base model. [Report alternative structure design, and the resulting water level graph downstream in the main river]

Deadline for submission of your pdf-report: Monday 2 March, 8:45 AM.