



MATHEJA CONSULT

Königsberger Str. 5
30938 Burgwedel / OT Wettmar
fon: +49 5139 / 402799 - 0
fax: +49 5139 / 402799 – 8
mobil: +49 / 1607262809
email: kontakt@matheja-consult.de
www.matheja-consult.de

Reduction of Sedimentation and Dredging at Jetty of Wilhelmshavener Raffineriegesellschaft (WRG)

Client: HYCON – Hdraulic and Coastal Engineers

Location: Wilhelmshaven, Jadebusen

Construction: Jetty of Wilhelmshavener Raffineriegesellschaft (WRG)

Scope of Work: Simulation of flow velocities, sedimentation and erosion

Methodology: 2D and 3D sediment transport model

INTRODUCTION

In previous studies for WRG Jetty (Fig. 1) sedimentation for different designs was analyzed and evaluated by means of simulation of flow velocities and sedimentation/erosion to develop a final design for construction.



Figure 1: Coastal- and Island Jetty of WRG

METHODOLOGY

For this optimization a 2D and 3D sediment transport model of the Jade were setup. Mesh density in the local model was scaled down to 1.33 m (Fig.2). Due to this refinement, every single pile was implemented (Fig.3 left).

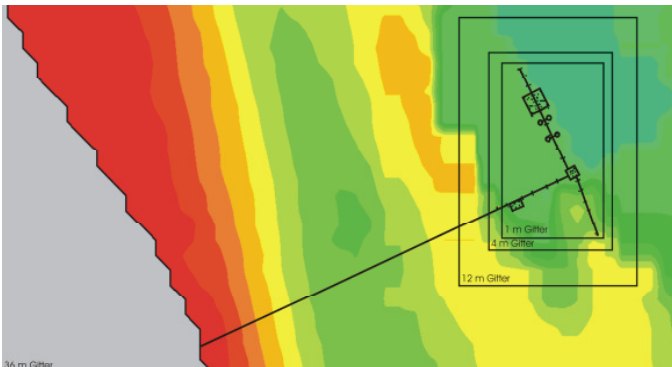


Figure 2: Grid Density of Sediment Transport Models

RESULTS

The constructing of a sea groin was the preferred design (Fig. 3, right) to minimize sedimentation in berth 1, 1a and 2.

Instead of a visible sedimentation like in the initial condition there is now erosion.

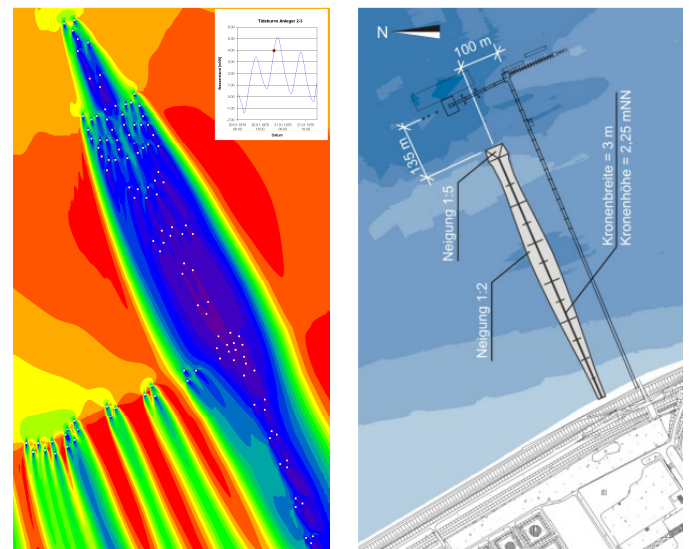


Figure 3: Flow Velocities during fully developed Flood (left) and Location of optimized Sea Groin (right)

CONCLUSIONS

The considerably modified flow situation during a mean tide secures that sedimentation is minimized until a stable morphological equilibrium is reached.

The erosion in the calculated periods of mean tide will not endanger the stability of the pile constructions.

Erosion is so slow, that even in a local redistribution of sediment a local protection can be established.