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Morphodynamic Development near a temporary Sheet Pile Wall at Offshore Terminal Cuxhaven Berth 8

Client: F+Z Baugesellschaft mbH

Location: Cuxhaven, Elbe Estuary

Construction: Offshore Terminal Cuxhaven, Berth 8

Scope of Work: Simulation of morphodynamic development during construction period

Method: 2D Sediment transport model

INTRODUCTION

While building berth 8 at Offshore Terminal Cuxhaven a temporary sheet pile wall had to be build in order to construct the final sheet pile wall under dry conditions. Thus, endangerment of erosion during construction had to be simulated with a sediment transport model.

METHODOLOGY

For this study a detailed model (Fig. 1) was extracted out of an existing 2D sediment transport model of the mouth of the Elbe Estuary between Brunsbüttel and Scharhörn. The bathymetry is based on multibeam echo soundings (density of original data is 25x25cm).

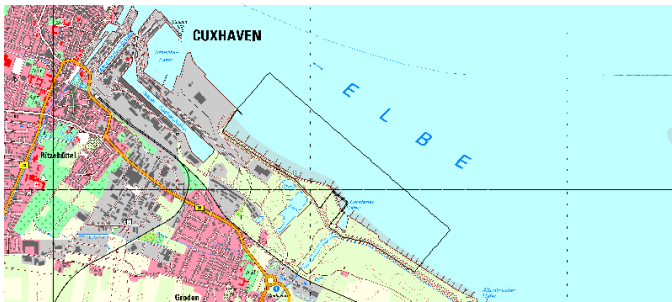


Figure 1: Dimension of detail model

A characteristic spring-neap-tide-cycle over a period of one month was simulated. This cycle was repeated six times for the construction period.

RESULTS

The results (Fig. 2) are showing erosion at the river sided corner of the temporary sheet pile wall and at the end of the protected area of the stream berthing (variants 3 and 4).

Sedimentation accumulates at the transition zone between berth 8 and mainstream.

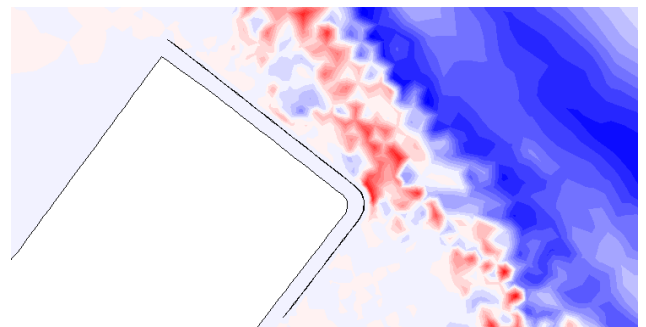


Figure 2: Differences of soil elevation (variant 3)

CONCLUSIONS

For the protection of the temporary sheet pile wall we recommended a local scour protection (Fig. 3). At the river side the protection had to be extended up to 12 m.

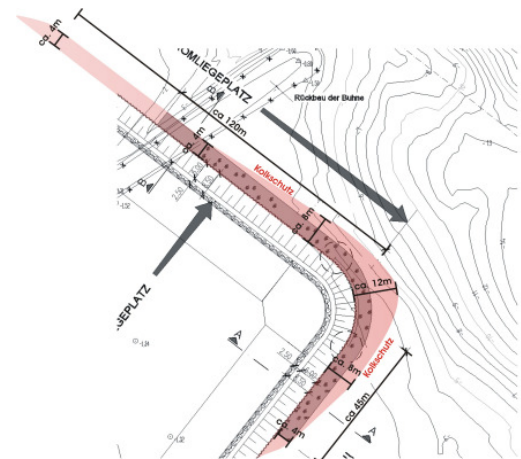


Figure 3: Recommended protection of temporary sheet pile wall

Additionally we suggested echo soundings every 4 to 6 weeks and after higher spring tides or storm events.