



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

Measurement of Wave Heights at Offshore Basis Cuxhaven during Passage of fast going Vessels

Client: NiedersachsenPorts GmbH & Co. KG

Location: Cuxhaven, Elbe Estuary

Construction: Offshore Basis Cuxhaven, Berth 8

Scope of Work: Measurement of wave heights

Methodology: Measurement of ship induced wave heights and correlation to shipping passages

INTRODUCTION

To verify results of simulations wave heights of deep going vessels were to be measured within range of Offshore Basis Cuxhaven.

METHODOLOGY

For this measurements pressure gauges from General Electric Type PDCR 1830 were taken (measurement range: 10 m, error range: +/- 0,05% of measurement range). Over a period of 4 weeks pressures were measured at 4 stations (Fig. 1) with a frequency of 4 Hz.



Figure 1: Positions of measurement „Europakai“, „Grodener Siel“, „Grodener Außenhafen“ und „Altenbrucher Außenhafen“ (Topograph. Chart 1:50000, © LGN Hannover)

To relate collected data to shipping passages these passages were registered with the AIS-System „AIS Pilot“ Version 3.0 from SPI GmbH and a Microsoft ACCESS database.

RESULTS

Ship induced primary wave system are being damped until they reach the harbor entrance.

The mean drawdown of a fast going feeder with a high periodic wave system at the Europakai was about 65 cm. For longer periods (most frequent case; Fig. 2) the mean primary waves heights were between 50 cm and 76 cm at Europakai and between 10 cm and 16 cm at the Grodener Siel.

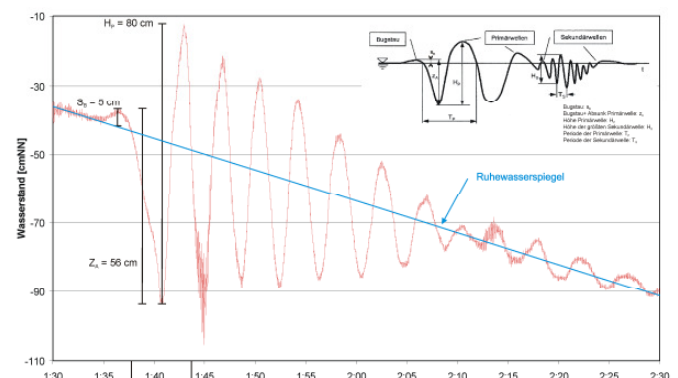


Figure 2: Water level variance at a shipping passage

in this measurement period there were 3 events of passing PanMax and PostPanMax. Primary wave heights of 75 cm at the Europakai were reached with shipping velocities of 9 kn. A PanMax has to have a velocity of 13 kn to cause these wave heights. For this case the primary waves were between 20 cm and 27 cm at the Grodener Siel.

Analysis of periods of passages and traffic intensities showed an accumulation of traffic in the direction of Hamburg in between Tlw - 2,75 hours and Tlw + 0,75 hours.

CONCLUSIONS

The Operation of Offshore Basis Cuxhaven can be managed without a skimming wall or a fixed gate. This is possible if the shipping traffic is being watched closely while operating procedures and critical activities have to be kept out of the time frame between Tlw - 2,75 hours and Tlw + 0,75 hours.