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Monitoring of Currents in the Entrance of Amerikahafen using a horizontal ADCP moving over the Water Depth

Kunde: Ports of Lower Saxony GmbH & Co. KG

Location/Port: Cuxhaven, Elbe Estuary, Entrance Amerikahafen/Steubenhöft

Scope of Work: Long-term ADCP measurement, measurement of turbidity

Methodology: horizontal ADCP moving over the water depth, turbidity sensor, meteorological sensors, platform

INTRODUCTION

Maintenance dredging at Amerikahafen had to be optimized. Therefore, current velocities were measured over the water depth in the entrance of Amerikahafen for a period of 6 month.

METHODOLOGY

A horizontal ADCP (HADCP) was installed on a vertical slide, which was mounted on a chain guide. This chain guide was fixed on a pile, which was located at the north side of the entrance of the port at Steubenhöft. The chain guide ended in a platform, where a winch was mounted for vertical movement of the slide (Fig. 1 - 3).



Fig. 1: Location of the Pile/Platform at the north Side of the Entrance of Amerikahafen at Steubenhöft



Fig. 2: Vertical Slide (left) and Pile with mounted Chain Guide of the HADCP (right)



Fig. 3: Winch at the Platform to move the Slide on the Chain Guide

RESULTS

Measurements identified main currents in the entrance, responsible for sediment transport to the port. The influence of passing ships and maintenance dredging itself was visible.

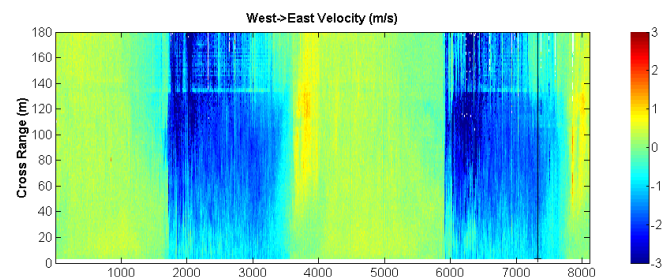


Fig. 4: HADCP-Measurement at the Entrance of Amerikahafen – Current West -> East (Ebb Current, Tuesday 29.11.2011, 10.49^{58sec}, Height HADCP: -0,25 mSKN)

It was also shown, that HADCPs can identify higher sediment concentrations, e.g. after/during maintenance dredging nearby. Therefore, the measurement must cover the whole water column.