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Title

Development of Miniature Full Flow and Model Pipeline Probes for Testing of Box Core Samples of Surficial Seabed Sediments

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Abstract

The box corer is a relatively new tool used in the geotechnical community for collection of soft seabed sediments. Miniature full flow and model pipeline probes were developed as tools to characterize and obtain soil parameters of soft seabed sediments collected in the box core for design of offshore pipelines and analysis of shallow debris flows. Probes specifically developed for this study include the miniature t-bar, ball, motorized vane (MV), and toroid. The t-bar, ball, and MV were developed to measure intact and remolded undrained shear strengths (s_u and s_{ur}). The t-bar and ball can obtain continuous strength profiles and measure s_{ur} at discrete depths in the box corer while the MV measures s_u and s_{ur} at discrete depths. The toroid is a form of model pipeline testing which was developed to investigate pipe-soil interaction during axial pipeline movement. Vertical loading and displacement rates can be selected for the toroid to mimic axial pipeline displacement for a variety of pipe weights. A load frame for both miniature penetrometer and toroid testing was developed for testing directly on box core samples offshore. This research presents results from offshore and laboratory testing of the box core and recommended testing procedures for full flow and toroid probes on box core samples.

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