

Sedimentary Response to Coastal Defense Works in São Vicente Bay, São Paulo

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Abstract : The article presents the evaluation of the effectiveness of two groins located at Gonzaguinha and Milion´rios Beaches, situated on the southeast coast of Brazil. The effectiveness of these coastal defense structures is evaluated in terms of sedimentary dynamics, which is one of the most important environmental processes to be assessed in coastal engineering studies. The applied method is based on the implementation of the Delft3D numerical model system tools. Delft3D-WAVE module was used for waves modelling, Delft3D-FLOW for hydrodynamic modelling and Delft3D-SED for sediment transport modelling. The calibration of the models was carried out in a way that the simulations adequately represent the region studied, evaluating improvements in the model elements with the use of statistical comparisons of similarity between the results and waves, currents and tides data recorded in the study area. Analysis of the maximum wave heights was carried to select the months with higher accumulated energy to implement these conditions in the engineering scenarios. The engineering studies were performed for two scenarios: 1) numerical simulation of the area considering only the two existing groins; 2) conception of breakwaters coupled at the ends of the existing groins, resulting in two “T” shaped structures. The sediment model showed that, for the simulated period, the area is affected by erosive processes and that the existing groins have little effectiveness in defending the coast in question. The implemented T structures showed some effectiveness in protecting the beaches against erosion and provided the recovery of the portion directly covered by it on the Milion´rios Beach. In order to complement this study, it is suggested the conception of further engineering scenarios that might recover other areas of the studied region.

Keywords : coastal engineering, coastal erosion, Sao Vicente bay, Delft3D, coastal engineering works

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