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Coastal Constructions and shoreline response: A case study at Wadduwa loading out point

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A study was carried out to investigate the adverse impacts on the shoreline in Wadduwa, due to the construction of the Loading Out Point (LOP) - a sheltered basin protected by breakwaters-to facilitate material transport by barges to the construction work of the Colombo South Harbour Expansion Project. The constructions have caused changes in the shoreline profile, resulting in severe silting and scouring on either side of the breakwaters. Seasonal variations of wave action may have had a major influence on these processes, with varying responses during two monsoon periods. The absence of field data on beach profile is a major setback in assessing such impacts and thus field measurements of beach profile were carried out at pre-established locations in the vicinity of the LOP. Based on the collected data, an assessment of sediment transport was carried out in an attempt to quantify the shoreline response in the locality of the LOP.

Wadduwa is located on the western coastline of the island and due to its geographical location and nearshore wave climate, the alongshore currents mainly flow in a northerly direction, causing the net sediment transport to be also oriented in that direction. Within the predominant pattern of flow and sediment transport, the intensity of the wave action and sediment transport is highly dependent on seasonal variations of climatic patterns. The southwestern and northeastern monsoonal wind patterns are the major causes of these variations. Regular measurements of the coastal profile are thus vital to quantify the variation and extent of adverse impacts. In the view of these considerations, field measurements were started soon after the construction of the LOP and continued at regular (monthly) intervals.

The computations based on the field measurements reveal sand deposition on the southern side, indicating the obstruction caused by the coastal constructions to the northward movement of sediments and the impact on the dynamic equilibrium of the system. The effects of seasonal monsoon are also evident, where an erosive tendency can be observed as the southwestern monsoon starts to be effective by the month of May. The results thus indicate that the shoreline constructions carried out at Wadduwa has a significant impact on the stability the beach in its vicinity. It was also evident that the seasonal variations in the wave climate have an impact on the adverse effects caused by the constructions.

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