Comprehensive analysis of siltation dynamics of Thane creek



The Thane creek which houses two major commercial ports; Mumbai & Jawaharlal Nehru Ports faces periodic siltation problems. The maintenance dredging, carried out to keep navigational channel navigable, incurs high annual cost. A detailed understanding of the dominant processes causing morphological changes is required in tackling the problem of siltation. An attempt has been made to simulate the annual morphological changes occurring within Mumbai port limits, using a process-based hydrodynamic and morphological numerical model. The tidal levels and currents of the numerical model are validated with in situ measurements, carried out at three different locations in the vicinity of main navigational channel. Seawater samples, at various spatial and temporal scales, collected during field measurements, were analysed in laboratory to obtain the suspended sediment concentrations, one of dictating parameters of siltation. Using the field data and adopting the concepts of morphological acceleration technique, the quantity of siltation deposited annually in the main navigation channel, is estimated. The modeling results reveal a siltation rate up to 1 m/year in the harbor basin. Some of the technical solutions to minimise the siltation rate have also been explored.

Prof. Balaji Ramakrishnan, Department of Civil Engineering, rbalaji@iitb.ac.in