

Beach Design and Management Tool BDMaT

In the design of any artificial beach, it is desirable to avoid or minimise future maintenance commitments by designing the initial beach plan-shape in such a way that it remains in equilibrium under the incident wave climate experienced. Crenulate bays, or embayments, where a sandy beach is held between two erosion resistant headlands, tend to evolve to a stable beach plan-shape with little movement of the beach contours over time.

and predicting shoreline changes arising from structures built on a curved beach. Application of this parabolic equation has largely been in manual form, by tracing the calculated bay shape on a map or aerial photograph following hand calculations. This manual process, although straightforward, is repetitive and laborious. To overcome this drawback, a software package called Beach Design and Management Tool (BDMaT) has been developed by HR Wallingford in ArcGIS.



Several empirical bay shape equations have been derived to fit curves to the shoreline planform of headland bay beaches. The parabolic bay shape equation is the most widely used for evaluating beach stability

BDMaT calculates the idealised shoreline planform of a headland-bay beach in static equilibrium based on the parabolic equation. It then presents the results graphically within GIS, overlaying an image or map of the existing beach coastline. BDMaT therefore allows the stability of a headland-bay beach to be assessed visually by comparing the existing shoreline periphery with the static equilibrium planform. The software also allows the design of proposed artificial beaches, offering an intuitive environment with simple inputs and instant visualisation of the results. BDMaT provides engineers with a valuable tool for practical applications on waterfront developments, shoreline protection and coastal management.