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Editorial on Coastal Engineering

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Introduction

Coastal engineering is a discipline of civil engineering that deals with the unique challenges of building near or on the coast, as well as the development of the coast itself. The hydrodynamic influence of waves, tides, storm surges, and tsunamis, as well as the (often) harsh environment of salt seawater, are common issues for coastal engineers, as are morph dynamic changes in the coastal topography, which are induced by both natural and man-made changes. Ocean and sea coasts, seas, marginal seas, estuaries, and large lakes are all regions of interest in coastal engineering. Coastal engineers are frequently involved in integrated coastal zone management, in addition to the design, construction, and maintenance of coastal infrastructure.

This is due to their specialised expertise of the coastal system's hydro- and morph dynamics. This could involve supplying information and technology for environmental impact assessments, port development, coastal defence tactics, land reclamation, offshore wind farms, and other energy-generating infrastructure, among other things.

Specific challenges

Waves, storm surges, tides, tsunamis, sea level changes, sea water, and the marine ecology all present issues unique to this discipline of engineering. Met ocean conditions are frequently required in coastal engineering projects, including local wind and wave climate, as well as statistics and information on other hydrodynamic variables of importance. Bathymetry is also a term used to describe the depth of a body of water.

Relevant features of sea bottom sediments, water, and ecosystem parameters are required for research of sediment transport and morphological changes. Wave phenomena, such as sea waves, swell, tides, and tsunamis, necessitate engineering knowledge of their physics as well as models, including numerical and physical models. Coastal engineering procedures are increasingly based on models that have been verified and validated by experimental data.

The consequences of the waves are crucial for waves arriving from deep water into shallow coastal waters and the surf zone, in addition to the wave transformations themselves. These are some of the effects.

•Wave-induced currents, such as the longshore current in the surf zone, rip currents.

•Stokes drift, affecting sediment movement and morph dynamics on coastal structures such as breakwaters, groins, jetties, sea walls, and dikes.

•Agitation of the waves in harbors, which may cause harbor closures.

•Overtopping of waves over seawalls and dikes, which might jeopardize a dike's stability.

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