

A Brief Note on Coastal Engineering in Architecture

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Abstract

Coastal engineering is a field of civil engineering that deals with the unique challenges of building near or on the coast, as well as the evolution of the coast itself. Coastal engineers face a variety of challenges, including the hydrodynamic effect of waves, tides, storm surges, and tsunamis, as well as the (often) harsh environment of saltwater, as are morphodynamic changes in the coastal terrain, which are produced by both natural and man-made changes. Coastal engineering is concerned with the coastlines of oceans, seas, marginal seas, estuaries, and large lakes.

Keywords: Coastal engineering; Large lakes; Coastal engineers; Building

Description

Due to their particular expertise of the coastal environment, coastal engineers are typically involved in integrated coastal zone management in addition to the design, building, and maintenance of coastal infrastructure system's hydro- and morph dynamics. This might involve supplying information and technology for environmental impact assessments, port development, coastal defense plans, land reclamation, offshore wind farms, and other energy-generating infrastructure, among other things. Waves, storm surges, tides, tsunamis, sea level fluctuations, sea water, and the marine ecology are all problems unique to this field of engineering.

Metoccean conditions, such as the local wind and wave environment, as well as data and information on other relevant hydrodynamic factors, are commonly required in coastal engineering projects. Relevant characteristics of sea bottom sediments, water, and ecosystem parameters are required for investigations of sediment transport and morphological changes.

Coastal engineering is a kind of civil engineering that deals with the planning, design, building, and upkeep of shoreline infrastructure. Management of shoreline erosion, improvement of navigation channels and harbors, protection against flooding caused by storms, tides, and even seismically triggered waves (tsunamis), improvement of coastal recreation, and pollution management in nearby marine environments are all goals of these tasks. Coastal engineering usually entails the construction of buildings as well as the transportation and possible stabilization of beach sand and other coastal materials.

Functions and responsibilities of coastal engineering

- Erosion and Coastal Engineering

- Flood Control and Coastal Engineering
- Harbors and Coastal Engineering
- Dredging Operations and Coastal Engineering

Long and Short Waves

Sea waves, surges, tides, and tsunamis all require an engineering understanding of their physics as well as models, which include both numerical and physical models. Coastal engineering techniques are increasingly based on models that have been tested and validated through experimental data.

The impacts of the waves are significant for waves arriving from deep water into shallow coastal waters and the surf zone, in addition to the wave changes themselves. Wave loading on coastal structures such as breakwaters, groynes, jetties, sea walls, and dikes wave-induced currents, such as the long shore current in the surf zone, rip currents, and sediment movement and morphodynamics are influenced by drift. Wave agitation in ports, which might lead to port closures; wave overtopping over seawalls and dikes.

Importance of Coastal Engineering

Coastal engineering is critical for the survival of the marine ecology. Coastal engineers create inlets and canals that increase water quality while also preventing habitat loss. They are in charge of preserving the maritime land environment. Coastal engineers examine what is happening in the region surrounding the beach. Waves, winds, sea levels, sand movements, and water quality are all taken into account. It also includes improving one's understanding of the mechanisms that drive the coast to behave as it does.