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Opinion Article

Analyzing the Impacts of Port Brackish Waters on Coastal Erosion

Yuan Haxid*

Department of Coastal Erosion, University of California, California, USA

DESCRIPTION

The salinity of brackish water is higher than that of freshwater but lower than that of seawater because it is produced naturally. It can take place in brackish fossil aquifers or in estuaries where fresh and salt water are mixed.

It is hard to evaluate how the port breakwaters effect coastal erosion without altering the structure in its whole context. When approaching it, it is also necessary to take into account the connection between "vulnerability" and "risk." Hydraulics, the erosive power, and morphology, to a lesser extent, are the factors that pose the most risk. It is well recognized that the vulnerability is connected to morph dynamics and lithology.

Drawing generalizations that hold true in all situations is exceedingly difficult because to the vast range of parameters and the fact that a port breakwater is nearly always a prototype. The primary effects of the port breakwaters on the ecosystem, however, may be understood if we restrict ourselves to a few select conventional circumstances.

We look at the lips of three different kinds of ports:

Ports situated in a rural area

Remote ports have tidal seas and little to no river input into the basins. In this case, the incidental waves diffract on the pier head and the breakwater is positioned perpendicular to the direction of propagation of the incident waves. Depending on the lithological composition of the shore, this phenomenon affects the wave directions that attack the coast, disrupting an existing equilibrium and producing erosion of different importance.

If there is no coastal current, erosion on sandy coasts is considerable but limited in extent; on rocky coasts, erosion is modest.

Erosion processes are controllable, but because basins are relatively isolated structures with little to no interface with the open sea, they are not the same as those connected with pollutants brought on by harbor activity.

An oceanic river mouth port

Ports located in a body of water near a river's mouth may be impacted by tides and coastal currents. The breakwater, which protects against incidental waves in this case, shouldn't obstruct the river's flow. Therefore, they are designed to lengthen the bed of this one. Two parallel breakwaters that are often built perpendicular to the coast make up the port's entrance, which is as a result.

In tide- and coastal-current-affected oceans, the stability of the coast depends on a precise balance between erosion brought on by the movement of sediments downstream and fattening brought on by the addition of sediments from upstream. Building breakwaters parallel to the coast blocks the flow of coastal trash and upsets this equilibrium.

Higher erosion results from the coastal current being blocked by the breakwater because the sediments it carries downstream are not compensated for by deposits upstream. Because of refraction surrounding the activity, the coastline downstream is consequently heavily pummelling by waves.

A port with a significant estuary at its mouth

Here, safeguarding the mudflat region of the estuary is more important than making sure the coastal feature is stable. In fact, when there is no human involvement, the top part of an estuary usually resembles a wetland that is significant ecologically.

In contrast, ports build breakwaters to protect themselves from the silting up of their basins. By the contributions of the river sediments, these wetlands or mudflat areas migrate permanently towards the downstream. As they continue to fill upstream, these breakwaters actually canalise river water, preventing sedimentation and, as a result, any migration of the mudflat areas towards the downstream. Despite the fact that they are essential from an ecological standpoint, this results in the extinction of the wetlands.

This issue has only recently come to the attention of the numerous parties involved in the management of coastal zones. In order to preserve these wetlands without impeding economic

Correspondence to: Yuan Haxid, Department of Coastal Erosion, University of California, California, USA, E-mail: yuan@gmail.com

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growth, compensatory measures were created, for example, during the expansion of the port of Le Havre near the mouth of the Seine.