



Coastal Erosion: Factors that Influence the Coastal Erosion and its Control Methods

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DESCRIPTION

Coastal erosion is the loss or displacement of land along the coast, as well as the long-term removal of silt and rocks, caused by the action of waves, currents, tides, wind-driven water, waterborne ice, and other storm-related impacts. Over a temporal scale of tides, seasons, and other short-term cyclic events, the landward retreat of the shoreline can be measured and characterized. Hydraulic action, abrasion, impact, and corrosion by wind and water, as well as other natural and unnatural forces, can all contribute to coastal erosion [1].

Coastal erosion on non-rocky coasts produces rock formations in regions where the coastline contains rock layers or fracture zones with different erosion resistance. Softer parts erode considerably more quickly than tougher ones, resulting in landforms like tunnels, bridges, columns, and pillars. The coast usually evens out with time. Rock formations are worn away as sediment erodes from hard places into softer ones. In addition, erosion is widespread in locations with strong winds, loose sand, and soft rocks. A sandblasting effect is created by the blowing of millions of sharp sand grains. This effect aids in the eroding, smoothing, and polishing of rocks [2].

The capacity of waves to erode the cliff face is determined by a variety of elements. The rock strength and the existence of fissures, fractures, and layers of non-cohesive materials such as silt and fine sand affect the hardness of sea-facing rocks. The speed at which cliff fall debris is removed from the beach is determined by the strength of the waves. To remove material from the debris lobe, this energy must reach a critical threshold. Debris lobes can be quite tenacious, taking several years to totally vanish. When the foreshore is stable, it should spread and become more effective at dispersing wave energy, allowing fewer and weaker waves to get beyond it. The presence of up drift debris on the foreshore beneath the cliff contributes to the stability of the beach.

Globally, rising sea levels have had a significant impact on coastal erosion. On the Eastern seaboard of the United States, there has been a significant increase in coastal erosion. Coastal erosion has been observed in places like Florida. As a result of

these increases, Florida and its local counties have raised their expenditures to restore the eroding sands that attract visitors and help support the state's multibillion-dollar tourism businesses [3].

Coastal erosion control can be divided into three categories. Soft-erosion controls, hard-erosion controls, and relocation are the three.

Soft-erosion control methods provide a temporary solution, whereas hard-erosion control methods provide a long-term answer. Semi-permanent infrastructure includes seawalls and groynes. These structures will need to be renovated or replaced as a result of normal wear and tear. A seawall's average life duration is 50–100 years, while a groyne's average life span is 30–40 years. These buildings are thought to be a final answer to erosion because of their relative permanency. Seawalls can also restrict public access to the beach, causing significant changes to the beach's natural nature. Groynes also have a significant impact on the beach's natural state. Groynes have been suggested as a way to shorten the time between beach nourishment initiatives, however they are not considered a solution to beach nourishment [4].

Soft erosion techniques are short-term options for reducing erosion's consequences. These measures, such as beach nourishment and sandbags, are not meant to be long-term or permanent solutions. Another approach, beach scraping or beach bulldozing, can be used to create an artificial dune in front of a building or to preserve the foundation of a building. Beach nourishment programmes are one of the most frequent techniques of soft erosion control. These initiatives entail dredging sand and transporting it to beaches in order to replenish sand that has been lost due to erosion. In other cases, such as regions with sand sinks or frequent and heavy storms, beach nourishment is not an appropriate erosion management measure.

"Living shorelines" are remedies to coastal erosion that include vegetation. Plants and other natural components are used to create living shorelines. Living shorelines have been shown to be more storm-resistant, enhance water quality, promote biodiversity,

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and provide fisheries habitat. Marshes and oyster reefs are examples of vegetation that can be used to create living shorelines because they act as natural wave barriers. Incoming waves can be absorbed by fifteen feet of marsh, which can absorb 50% of their energy [5].

CONCLUSION

It is also possible to relocate infrastructure and residences further away from the coast. In rebuilding, both absolute and relative sea level rise and erosion are taken into account. Relocation can involve just moving inland a short distance or fully removing improvements from an area, depending on considerations such as the severity of the erosion and the natural terrain of the property. Historically, popular support for "retreating" has been minimal. However, if a community decides to relocate its buildings along the coast, it is usual for the land to be turned into public open space or transferred into land trusts to ensure that it is protected.

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