

COASTAL FLOOD DEFENCES: GROYNES

Coastal flood defences are key to protecting our coasts against flooding, which happens when normally dry, low-lying flat land is inundated by sea water. There are both hard and soft coastal engineering methods which can be used to mitigate the risk of flooding and coastal erosion.

Sea walls are a form of hard engineering - these methods are often used as a temporary measure to protect against coastal flooding as they are costly and only last for a relatively short amount of time before they require maintenance. They are very effective at protecting the coastline in the short-term as they are immediately effective as opposed to some longer term soft engineering methods. However, they are often intrusive and can cause issues elsewhere at other areas along the coastline.

What are groynes?

Groynes are low lying wood or concrete structures which are situated out to sea from the shore. They are designed to trap sediment, dissipate wave energy and restrict the transfer of sediment away from the beach through long shore drift. Longshore drift is caused when prevailing winds blow waves across the shore at an angle which carries sediment along the beach. Groynes prevent this process and therefore, slow the process of erosion at the shore. They can also be permeable or impermeable, permeable groynes allow some sediment to pass through and some longshore drift to take place. However, impermeable groynes are solid and prevent the transfer of any sediment.



Advantages and Disadvantages

- ✓ Groynes are easy to construct.
- ✓ They have long term durability and are low maintenance.
- ✓ They reduce the need for the beach to be maintained through beach nourishment and the recycling of sand.
- ✗ Wooden groynes are less durable than rock groynes.
- ✗ They can have a negative, visual effect on the landscape.
- ✗ Groynes prevent sediment being transported to beaches further down the coast and therefore increase the amount of erosion and sediment loss at those beaches.
- ✗ The down drift erosion caused by the groynes may cause the need for regular maintenance and beach nourishment on the downstream side.

Case Study: Walney Island, Cumbria



Walney Island is a narrow island off the west coast of England, which forms a part of Barrow-in-Furness. The island is home to 13,000 residents and is approximately 11 miles in length and covers 5 square miles. The island is relatively narrow at points, with the narrowest section being 250 metres wide. The west coast of the island is exposed to the Irish Sea and the east coast has many low lying wet marshlands. Exposure to high tides and storm surges has caused progressive coastal erosion over time as well as extreme flood events. Often, these flood events have been capable of breaching the narrowest parts of the island, separating the south of the island from the north and at times, this has cut off access to more rural communities and businesses. In order to reduce the flood risk and limit the amount of coastal erosion, wooden groynes have been built along the coastline. It is hoped that these defences will also prevent the island being divided during high tides.