

Groyne Field Technique Against the Erosion of Salt Marshes - Renaissance of a Soft Engineering Approach

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Abstract

Many salt marshes along the German North Sea coast experience erosion. Counter-measures are necessary for the purpose of flood defence, because the foreland in front of the sea-dyke is valued as part of the coastal defence system. On the other hand, the salt marshes are part of the 'National Parc Wadden Sea' and shall be preserved as a natural ecosystem. The concept of nature preservation aims to promote the dynamics of the natural processes, but also asks for erosion control and enhancement of salt marsh accretion. There are different techniques available to defend erosion. In general, the responsibility for flood defence leads to arguments for solid constructions, whereas nature preservation asks for 'soft' solutions. The 'groyne field technique' is principally suited as a compromise. This technique traditionally uses natural material, and it has been extensively applied in the tidal flat areas of the Southern North Sea for land reclamation in the past. The constructed groyne fields support the accretion of fine material in the higher parts of the tidal flats. This effect leads to a smooth transition zone between the salt marsh and the lower parts of the Wadden Sea.

The application of the techniques is nowadays based on long-term experiences as well as on results of research. The existing knowledge allows a judgement on the success with respect to the natural conditions of a specific location and provides design rules for the groyne field system and the maintenance-procedure. The technique is also of interest for wetlands, salt marshes along non tidal waters. Experiences drawn from the Southern North Sea can principally be transferred to other locations with comparable natural conditions.