

Hydraulic Engineering *Coasts, rivers and dredging*



Breakwaters and hydraulic structures

We design breakwaters, jetties and groynes to prevent erosion and for the protection of harbours. Our solutions range from typical riprap and concrete armour structures to more complex designs such as caissons.

For the protection of sensitive coastal ecosystems we offer sustainable solutions, designed according to the principles of the 'Building with Nature' program. The philosophy behind this program is coastal protection by using elements from nature. Restoration of mangrove forests and salt marshes, placing oyster reefs and smart sand nourishments are examples of such solutions. These designs do not only offer coastal protection but also enhance the ecosystem and create opportunities for recreation and the local economy.

Flood defences

Sea level rise and more stringent hydraulic design conditions have driven the need for higher and more robust dykes along the Dutch coast. The revetment of many primary flood defences isn't strong enough to cope with these conditions and needs to be replaced. We design suitable solutions for dykes and other flood defences, ranging from 'hard' stone or concrete structures to 'soft' environmentally friendly solutions.

Scour protection

The water bottom near sluices and quays is subject to scour from currents and flow from ship thrusters. This causes erosion and could lead to damage or instability of these structures. To protect such environments, we calculate the hydraulic conditions and design the most suitable scour protection system.

Capital dredging and land reclamation

Our knowledge in coastal engineering can also be applied in the design of capital dredging works. Shortage of suitable space in coastal areas can often be solved by reclaiming land from the sea by extending the existing coastline or by developing new artificial islands.