Hythe to Folkestone Harbour Coast Protection Scheme

The Hythe and Folkestone frontage is located on the south Kent coast and comprises two distinct characteristics. The western part of the frontage is a continuation of the marine storm gravels that extend from the shingle cuspsate of Dungeness. Extensive coastal development has taken place on the low alluvial plain at Hythe and at the foot of the cliffs at Sandgate. Here, where the cliffline meets the coastline, the problem of flooding is replaced by the risk of coastal erosion.

The shoreline in this area has been defended since the middle of the 19th Century and over time the beaches have eroded and the existing timber groynes and seawalls had deteriorated. The frontage has frequently suffered localised flooding and the seawall, which is in a poor state of repair, has failed numerous times in recent history.

In order to reduce the risk of coastal flooding and erosion a new scheme was designed and procured by Shepway District Council. The specialist marine contractor, Van Oord began construction work in March 2004. The Hythe to Folkestone Harbour coast protection scheme protects nearly 3,000 residential properties from coastal flooding and erosion and cost approximately £13 million. The scheme used 210,000 tonnes of rock armour to construct new rock groynes and headlands and incorporates 380,000m$^3$ of shingle beach renourishment. It also included improvements to existing seawalls and access ways and was completed in September 2004 on time and on budget.

Of the five new rock structures that have been constructed, two are traditional rock groynes approximately 110m in length and complement and extend the ongoing beach management approach that has been adopted by the Council along the Hythe frontage.

At the eastern extent of the scheme, this philosophy could not be extended. The majority of the scheme frontage faces due south, whereas the last easternmost 1km, known as Marine Walk, faces south-southeast. This rapid change in alignment gives rise to a significant increase sediment drift rates and this is the primary reason for the higher concentration of rock structures at this location.

After detailed option appraisal, the preferred solution for Marine Walk was to form two static equilibrium bays using control structures constructed from rock armour and shingle imported as part of the beach renourishment phase of the scheme. It had already been identified by the mathematical wave modelling that a strong unidirectional focus of waves existed in this region and that this type of wave climate lent itself well to the formation and long-term sustainability of static equilibrium or crenulate bay beaches.

Crenulate bay beaches occur naturally on coastlines all over the world and this static equilibrium shoreline form was identified by coastal engineers and geomorphologists in the 1940s. It was noted that beach bays held between headland structures adopt a shape that is similar to a log spiral and it is this specific relationship between the mathematical form and incident wave direction that formed the basis for the design of the static equilibrium beaches at Marine Walk.