

# **Variation in beach behaviour in relation to groyne spacing and groyne type for mixed sand and gravel beaches, Saltdean, UK**

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## **Summary**

Coastal protection schemes that combine beach recharge and the construction of hard structures are becoming increasingly common. Accurate prediction of the post-recharge behaviour of sand and gravel beach material in such schemes is vitally important to ensure that the vulnerable points of the structures, such as the toes of seawalls or the roots of groynes, do not become exposed through any longshore or cross shore movement of the material. Increasing the volume of material between groynes reduces the risk to the hard structures, but increases costs for both the recharge material and the structures designed to contain them. Monitoring of the behaviour of a mixed beach between groynes of different spacing and type at Saltdean on the southeast coast of England, over a period of 4.5 years, using detailed topographic surveys, has shown; i. that there is no natural cross shore exchange between the mixed beach and the subtidal zone; ii. that the pattern of sediment movement within the groyne bays is very similar, independent of groyne spacing and type, and iii. that the magnitude of change is dependent on groyne spacing. Rock groynes were permeable to gravel at average rates of between 0.5 to 1.1m<sup>3</sup> per day. Surveys also show that rotation of beach planform even under storm conditions is only 9° compared to a rotation of up to 74° that was predicted by numerical modelling in the design study for the scheme. This suggests that almost 50% of the recharge material, costing ~ £1million is in excess of that needed to ensure satisfactory protection and highlights the need for better prediction input to design.