

## Beach recycling

### NOC Southampton

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When I first heard of this proposed workshop, I didn't think Bournemouth had anything to offer, because we don't recycle sediment along the coast. However, when I heard of the volumes and costs involved from other participants, I realised that we spend as much on recycling sand across the beach, than others spend on moving it along the coast.

Bournemouth has a historic problem with windblown sand, illustrated by the 1811 map. Note the description "Sand Banks" on the cliff top, which I interpret to mean "sand dunes".

The geological map shows the extent of wind blown sand in the east of Poole Bay.

This recent photo of Southbourne shows sand blown up the cliff path onto the roadway.

Our problems at promenade level seem to be worse after beach replenishment.

We have carried out 4 "Beach Improvement Schemes" (BIS) and placed 3.7 million m<sup>3</sup> of sand and shingle on the beach in 40 years. We chose not to recycle because:

- The distance involved (Hengistbury Head to Alum Chine) is too great
- The beach and promenade is too busy; it would be dangerous
- it is expensive to recycle (about £20 per m<sup>3</sup>)
- New fill is very cheap (only £4.58 per m<sup>3</sup>)
- Our down drift loss directly protects our own "undefended" coast at Hengistbury Head, and indirectly feeds Christchurch BC and New Forest DC in Christchurch Bay

We typically move 10,000 to 20,000 m<sup>3</sup> per year at a cost of £200,000 per year. a lot of money by any standards. So, why do we need to do it, and how is it done?

#### Why do we need to do it.

we rely on

- beach replenishment to provide a protective beach, spending wave energy
- Groynes to hold the beach fill in place
- The life-expired seawalls are completely buried by the man-made beach

So the seawall, and the promenade behind them, are no longer part of the active coast protection suite. Sand clearance (recycling) is therefore done:

- to maintain amenity, service and emergency access
- to maintain a strategic cycle route, and part of the National Cycle network
- to return sand bought with FDGiA to the beach, for as long as possible.

#### How is it done?

There is a 4-stage process:

- Firstly, 3 tractors equipped with dozer blades push sand along the promenade into piles, then pick it up and deposit on beach, lifting it over the kerb or the hand railing
- Secondly, tractors equipped with brushes push dry sand to one side
- Thirdly, labourers with shovels, brushes and wheel barrows pile remaining sand onto beach.
- Fourthly, the sand piles resulting from this process form a ready reservoir of sand to blow back onto the promenade, so the tractors then blade the sand down the beach, 50/60m to the Low

Water Mark. This removes the unsightly piles and smoothes the beach; and *slightly* delays the return of sand to the promenade.

Since Beach Replenishment in 2006, the amount of sand on the promenade has increased, and a "sand proof fence" is put in place every autumn to reduce sand entry to the promenade. Unfortunately it cannot be continuous because of gaps in the hand railing at access steps, so a certain amount of sand entry occurs, particularly where structures focus the wind, e.g.

- Groynes junction with seawall
- Bastions (and shelters) on the seawall
- New infrastructure such as bin holders, bike stands etc.
- Or where groundwater normally flows across the prom (the wet surface attracts sand).

Of course the blowing sand also fills the gullies and blocks the drainage system, which has to be completely cleared every spring; often more than once!

Bournemouth Pier acts like a groyne, slowing the rate of littoral drift and causing a ness to form. It also acts as a windbreak, and now has large dunes up to 3m high formed on both sides.

Blown sand threatens Britain's first dedicated beach wedding hut. These dunes formed around the hut in September this year.

#### To summarize,

Sand clearance of Bournemouth promenade is a 364-day a year operation (only Christmas day off). We typically move 10 to 20,000m<sup>3</sup> at an annual cost of £200,000; so it costs up to £20 per m<sup>3</sup>. Wind blown sand volumes are greater in recent years, with a healthy beach volume.

We hope an MSc student will shortly look at the factors involved in sand transport. We think 2011 was much worse than usual, and would like to know why.

Volumes could be reduced if we coarsened the beach fill; but who wants a shingle beach?

Our total annual loss is 70,000 m<sup>3</sup>. If we recycle 20,000 m<sup>3</sup> that's 28% saved, so perhaps our sand recycling might qualify for Grant Aid; or as a *contribution* to future coast protection.