



Soft engineering

Soft engineering uses natural systems for coastal defence, such as beaches, dunes and salt marshes, which can absorb and adjust to wave and tide energy. It involves manipulating and maintaining these systems, without changing their fundamental structures.

- **Beach nourishment:** This is the attempt to replace material that has been lost through longshore drift. It is not unknown for local councils to move material from one end of a beach to the other before the start of the tourist season.
- **Dune regeneration:** The fragile sand dune environment is easily disrupted by human activities. Most damage is caused by the removal of vegetation by either agriculture (overgrazing) or tourism (trampling the dunes). This can lead to blowouts during which large amounts of sand may be carried inland and deposited on valuable agricultural land. Management strategies to regenerate dunes include:
 - replanting vulnerable areas with plants such as marram grass and stabilising the surface with sacking or wire mesh
 - afforestation with quick-growing conifers
 - selective grazing
 - restricting access by fencing off areas
 - providing boardwalks for tourists
 - giving tourists information about potential damage.
- **Managed retreat:** This involves abandoning the current line of sea defences and then developing the exposed land in some way, perhaps with salt marshes, to reduce wave power. If old sea defences such as walls are abandoned, low-lying land will be flooded. This will be reclaimed naturally by marsh plants. The new area of marsh will act as a defence against rising sea levels. In this way the scale of hard sea defences can be reduced. There have been proposals in some areas to ban new developments on the coast. In California, for example, there are already requirements on some stretches of coastline that building must be a certain distance from the shore.
- **Land-use management:** Even if it is inevitable that a coastal area will be eroded or flood in the future, a local authority may be able to mitigate the impact.

This strategy involves addressing people's behaviour and educating the local community. Officials can help people plan for the future, and encourage land owners to think about how they can continue to use land that is at risk. For example, caravan parks on cliff tops can provide an income from the land, but be moved and re-sited quickly when the time comes. Giving land at risk of flooding over to grazing rather than growing crops means the sheep or cattle can be moved if storms are forecast. This strategy only works if the local population agree to having their use of land limited, and it cannot remedy damage that has already been done.

- **Do nothing:** In the first decade of the twenty-first century a school of thought has grown up that asks whether the coast *should* be protected. Tens of millions of pounds are spent annually in the UK on coastal protection and it might be cheaper to let nature take its course and pay compensation to those affected. The storms of December 2013 and January 2014 illustrated how trying to control the power of nature is often futile, with the traditional hard sea defences of places like Dawlish in Devon and Aberystwyth in west Wales proving ineffective against the powerful wind and waves. Some argue that the limited funds available for coastal protection should be targeted to places like this that have significant infrastructural or economic value for large numbers of people. This debate is not new; the House of Commons Select Committee on Agriculture suggested in 1998 that large tracts of land should be 'surrendered to the sea' as trying to protect them is a waste of money. Obviously those living in places deemed not worthy of protection may view the debate quite differently.

The Sefton Coast is used to illustrate how some soft engineering strategies have been used in an attempt to protect another stretch of the Merseyside and Lancashire coast.

Key question

Why do you think the authorities have chosen to adopt soft engineering strategies to protect the Sefton Coast stretch of coastline?