

All you need to know
about modern coastal
protection.

Elastocoast®.
Making our coasts safer.

At the mercy of the elements ...





Elastocoast®. Making our coasts safer.

... or protected by Elastocoast.

A single good idea often makes the difference between disaster and safety.





Experts predict that the sea level may rise by up to 50 centimetres in the coming years as a result of global warming. Of course, no scientist can foresee when and how this rise will actually occur – or the ultimate consequences.

This highlights the obvious need to intensify coastal protection and flood prevention activities and particularly to raise the dykes. However, in view of the financial investment involved and for practical reasons such as lack of space, raising the dykes is hardly feasible.

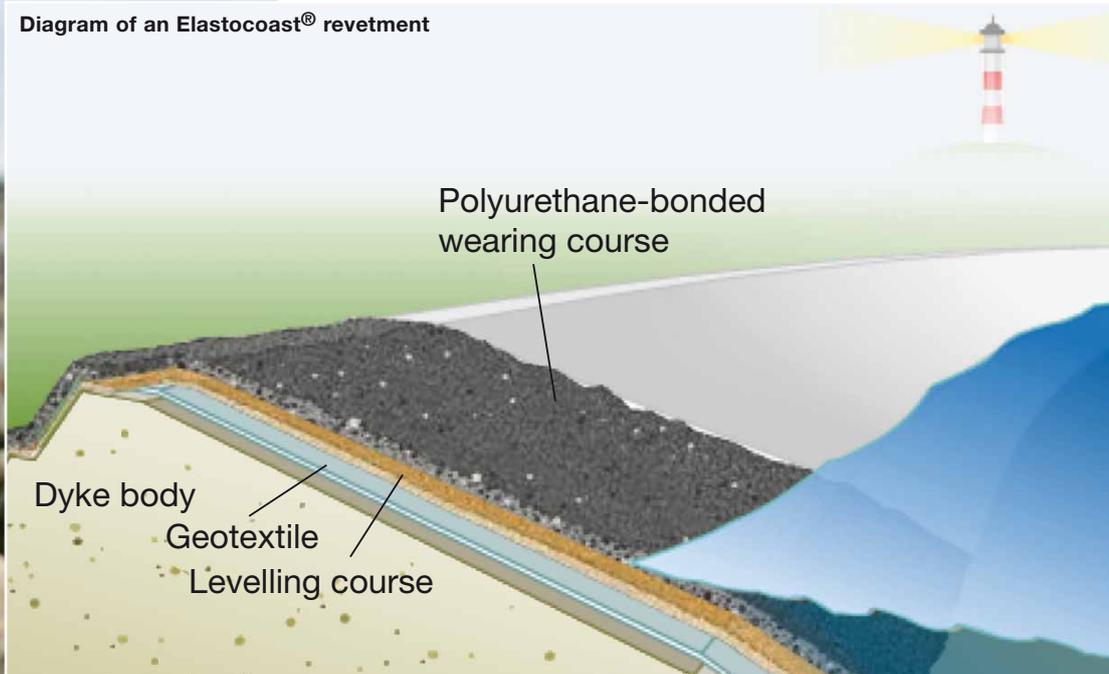
Another dangerous scenario associated with this issue is dyke overtopping, since subsequent erosion on the land side inevitably results in complete dyke failure. The only way to prevent this is to give dyke surfaces long-term protection on the land side. This is where Elastocoast® opens up totally new horizons for coastal protection.

Elastocoast®. Making our coasts safer.

Rock-solid with Elastocoast.



Diagram of an Elastocoast® revetment



Revetments of Elastocoast® are a new, extremely effective coastal protection system. These consist of aggregate (crushed rock) mechanically bonded with an environmentally compatible two-component polyurethane plastic. This mixture is applied to previously prepared dykes, slopes, breakwaters and other sea- and freshwater shorelines. The outcome is a highly durable, strong and hence secure bulwark against the waves and flooding.

Elastocoast® makes existing dykes safer without their having to be continually raised. Instead, an open-pored wearing course prevents wave impact energy from attacking and destroying their surface. The surface protected with Elastocoast® creates a higher standard of safety by significantly reducing wave run-up with its open, energy-absorbing structure. The wave energy is distributed over a larger area, thus diminishing local concentrations of surface pressure. The revetment as a whole is subjected to less stressing. This way, older dykes can be made safer, even when they are completely overtopped. And even if higher standards of coastal protection are called for as a result of long-term climate change and rising sea levels.

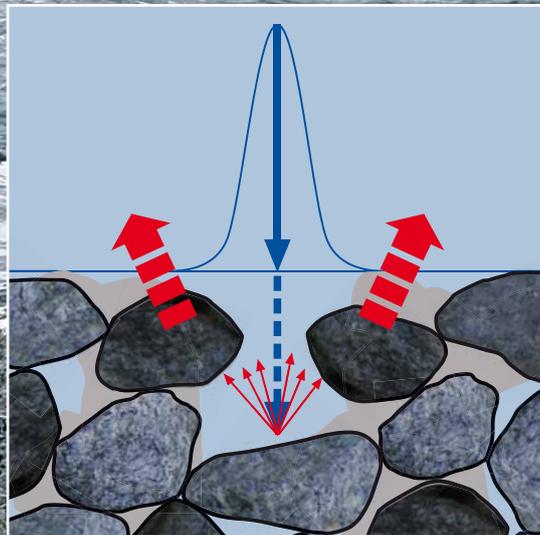
Elastocoast®. Making our coasts safer.

Weathering the storm – stemming the tide of rising costs.

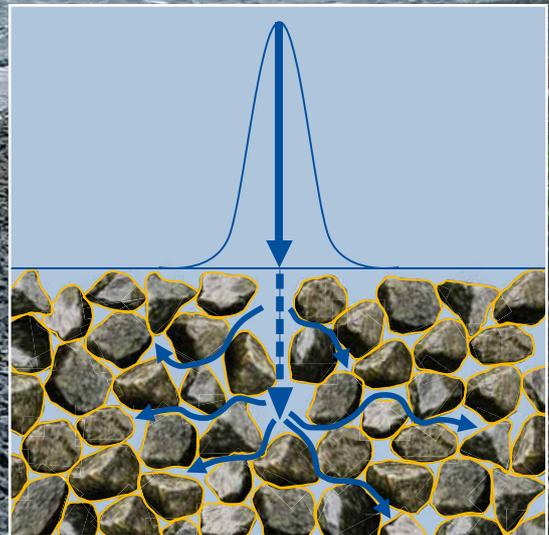


Thanks to Elastocoast®'s extremely open-pored structure and high mechanical strength, revetment courses can be designed up to 50 per cent thinner. Revetments grouted with bitumen or concrete require crushed rock 200 to 300 mm in size.

Elastocoast®, on the other hand, makes use of aggregates of smaller sizes (20 to 60 mm). This quickly yields considerable savings in the cost of construction materials, transport and processing. The overall benefit is of the order of 20 to 30 per cent. Ultimately, using Elastocoast® thus not only improves safety,



Stressing of a conventional revetment made of concrete



Revetments using Elastocoast® efficiently absorb wave energy

but also makes installation schedules more flexible and significantly eases the strain on the coastal protection and flood prevention budget.

But there's another advantage of the revetment's extremely porous nature. During flooding, storms and heavy rain, the dykes become waterlogged with a dangerous build-up of pressure. When water levels then fall, this pressure has to be released as quickly as possible. Here again, the open-pored Elastocoast®-rock mixture proves to be vastly superior to other systems and techniques.

Elastocoast®. Making our coasts safer.

**An ideal substrate for
flora and fauna.**





Elastocoast® ensures rapid new growth of algae and grasses

Biological studies by the University of Amsterdam have shown that revetments with Elastocoast® are colonized by the flora and fauna typical of the local region within just a few weeks. After only a few months, researchers also verified a proliferation of green and red algae and sea grass and an abundance of periwinkles and limpets.

These findings are a clear evidence of the sustainable repopulation of the surface by maritime organisms – organisms that are also a vital source of food for the likes of gulls and oystercatchers. Unlike conventional impervious coastal defence structures, Elastocoast® revetments with their cavities provide additional habitats for the animal and plant world. And thanks to the transparency of the material, the revetment blends noticeably better into the local coastal landscape.

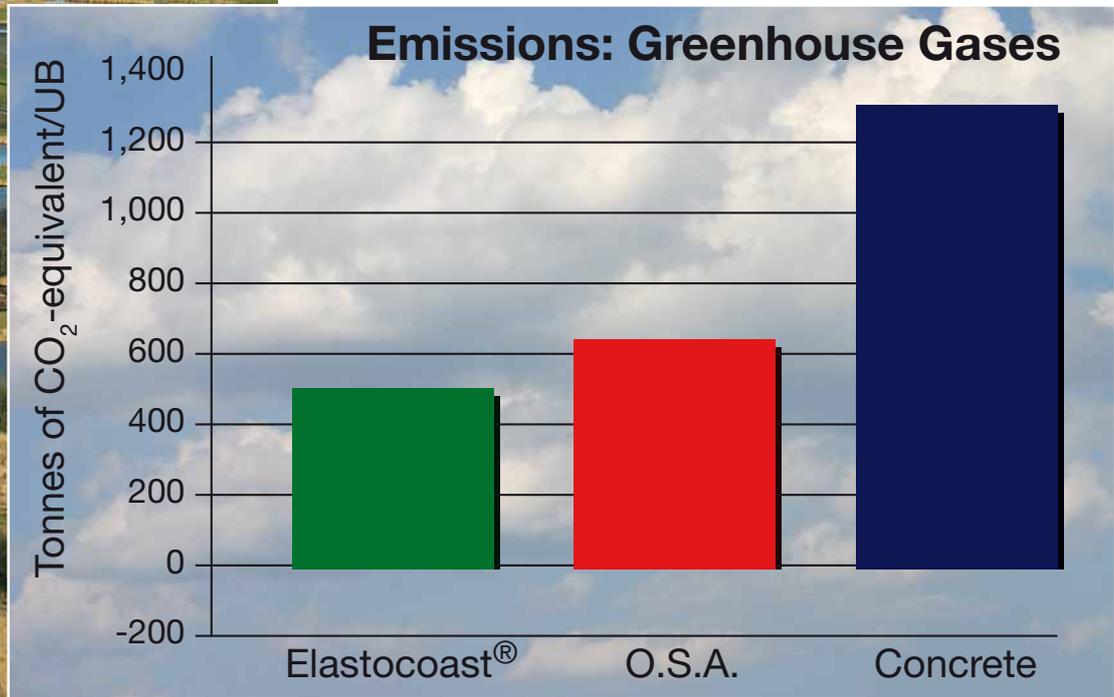
Finally, when it reaches the end of its useful life, this amalgam of materials is classified as completely safe in the European Waste Catalogue and can be re-used, e.g. as a new raw material for road and path construction.

Elastocoast®. Making our coasts safer.

The eco-efficiency analysis
says it all.



Elastocoast® revetment in Bathpolder (NL)



Elastocoast[®] CO₂-emissions compared to other materials

To demonstrate the environmental impact and environmental benefits of the new Elastocoast[®] technology, an extensive eco-efficiency analysis has been carried out. This involves a life-cycle analysis of various products and processes in terms of their impact on the environment.

The ecological assessment is based on DIN EN ISO 14040 and 14044 and has been certified by TÜV (Technical Control Board) Berlin as an overall method.

Elastocoast[®] was compared to traditional coastal protection methods such as concrete and open stone asphalt (O.S.A.) on a surface area of 20,000 m².

Elastocoast[®]. Making our coasts safer.

The best people for the best results.



Peter Beismann, LKN, Husum

“Revetment construction and maintenance are essential for the protection of the islands and holms in the North Frisian Wadden Sea. In our search for technical alternatives that also deliver economic benefits, we have been using Elastocoast[®] as the standard method since 2004. Its application requires only little manpower and light equipment. What’s more, the revetment can be loaded immediately after installation.”



Prof. Henk Jan Verhagen, TU Delft, Faculty for Hydraulic Engineering

“In the Netherlands we need new coastal protection methods because traditional dyke design will not be sufficient to protect our coasts and the hinterland from the rising sea level over the coming years. Elastocoast[®] is an opportunity for a new approach and for the flexible and progressive planning of sea defences.”



Prof. Dr.-Ing. Hocine Oumeraci, TU Braunschweig, Leichtweiß Institute for Hydraulic Engineering

“The main advantage of Elastocoast[®] is the structure’s permeability compared to other revetments. Its higher porosity helps to distribute wave energy, reduce wave impact on the revetment and hence mitigate its destructive potential.”



Dipl.-Ing. Frederik M. Treuel, TU Hamburg-Harburg, Institute of River & Coastal Engineering

“In various laboratory tests at the TU Hamburg-Harburg, we have confirmed the basic suitability of polyurethane for the mechanical bonding of revetments as protection from erosion processes on endangered shorelines.”



Tests in the wave tunnel demonstrate that Elastocoast® is a match for any pressure

New revetment systems have to satisfy wide-ranging requirements. Along with resistance to such phenomena as the wind, waves, surf and changing water levels, the important factors to consider also include various interactive natural processes. In addition to showing long-term stability in the face of environmental influences, revetments also have to be ecotoxicologically neutral and blend visually into their natural surroundings.

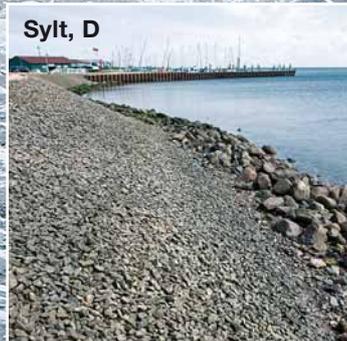
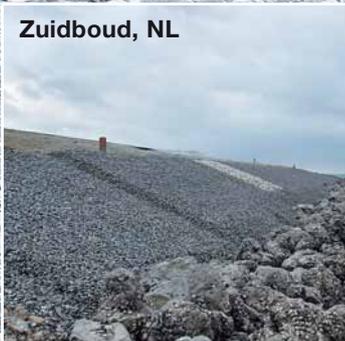
In their years of development work on Elastocoast®, the experts of BASF Polyurethanes GmbH therefore worked closely with other highly reputed specialists from different fields.

The outcome was a cooperative partnership without which the outstanding properties and hence the success of the new revetment system would not have been possible.

Taking punishment in its stride.

To test the strength, erosion resistance and environmental compatibility of Elastocoast® revetments in pilot projects, BASF Polyurethanes GmbH has already surfaced numerous stretches of coastline with the new coastal protection system.

This is where stability, erosion resistance, resistance to weathering and saltwater, recolonization and many other parameters have been constantly monitored and recorded. The results to date already show that Elastocoast® revetments achieve top results on the decisive counts.





Germany

Obermaubach (09/2009)
Kühlungsborn (08/2009)
Cuxhaven (07/2009)
Norddeich (06/2009)
Emden (05/2009)
Kranenburg (04/2009)
Amrum (11/2008 und 2009)
Langeneß (08/2008 und 2009)
Nordstrandischmoor (06/2008 und 2009)
Niebüll (12/2007)
Lemförde (09/2007)
Sylt, Munkmarsch (09/2007)
Hallig Gröde II (06/2007)
Hallig Gröde (07/2006)
Sylt, Ellenbogen (11/2005)
Hamburger Hallig (10/2004)

Netherlands

Bathpolder (07/2009)
Harlingen (11/2008)
Petten (10/2007)
Zuidbout (09/2007)

France

La Bouille (05/2009)
St-Pierre-de-Manneville (04/2009)
Bollène (03/2009)
Département de Seine-Maritime (05/2009)
Grand Port Maritime de Rouen (04/2009)
Compagnie Nationale du Rhône (03/2009)
Grand Port Maritime du Havre (05/2008)
Grand Port Maritime de Bordeaux – Site du Verdon (11/2009)

United Kingdom

Walton (10/2008)
Holland-on-Sea (04/2008)

Canada

Fighting Island (09/2007)

Others

Certified for drinking water applications
in the UK

Elastocoast®. Making our coasts safer.

The best solution for
man and nature.



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Ident-No. 104761

This brochure has been produced with climate-neutral methods.



Any analysis of the ecological, economic and safety features is bound to arrive at a single, inescapable conclusion:

Revetments bonded with Elastocoast[®] are clearly superior to other, conventional technologies in all areas that matter.

Material

Elastocoast[®] polyurethane casting system

Application

New technology for the construction of coastal protection revetments

Properties

- Reduces wave run-up and enhances coastline safety
- Open-pored and water-permeable
- Economic, cuts the cost of construction and maintenance
- Flexible and rapid installation, new scope for design
- Strong and resistant to weathering
- Ecologically compatible and efficient

Elastocoast[®]. Making our coasts safer.

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KUJMM 333-08-10

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