

“HYPER clay”, a clay barrier with superior sealing properties

DuraBUILDmaterials, a consortium of research laboratories of Ghent University, is seeking partners interested in commercializing a new type of clay barrier for sealing landfills or other sealing applications

Introduction

Waste liquids in the environment may result from several sources, for instance uncontrolled dumping of pure solvents, spills or infiltration of water through solid waste in landfill disposals resulting in contaminated leachate.

Clay barriers are used to isolate pollutants from the environment. Bentonite clay is widely used in barriers for landfill systems because of its good sealing capacity in the presence of water. However, exposure to leachate can cause loss of efficiency of the clay as hydraulic barrier with consequent harm to the environment.

Clays have therefore been engineered in order to improve their chemical and physical properties, but there is still a need for a clay which is well protected - for a sufficiently long time period - from chemical attack by aggressive electrolyte solutions.

Technology

Researchers at Ghent University have developed an industrially useful and easy method to engineer “HYPER clay”, a product consisting of clay, such as bentonite, or any other clayey material such as dredging soil, with an absorbed anionic polymer, such as sodium carboxymethyl cellulose. HYPER clay is made by mixing the clay with a solution comprising an anionic polymer and subsequently dehydrating the slurry of clayey material and polymer in order to expel the water molecules and adsorb the polymer on the clay surface.

Applications

HYPER clay can be used in hydraulic clay barriers to isolate harmful contaminants from the environment, for instance in cover systems and bottom liners of landfills. HYPER clay may also be used for sealing construction joints, below-ground waterproof systems, boreholes, underground excavations in rocks etc.

Advantages

HYPER clay owes its excellent sealing properties to the following physical/chemical features:

- a dispersed clay structure;
- an increased water absorption capacity;
- an improved swelling ability;
- a low hydraulic conductivity to, for instance, CaCl_2 and sea water;
- a favorable long-term chemico-osmotic efficiency;
- a low diffusion coefficient.

Status of development

The physical and chemical properties of HYPER clay were tested extensively and for long time periods in the laboratory. HYPER clay tested favorably when compared to two commercially available polymer-treated clays.

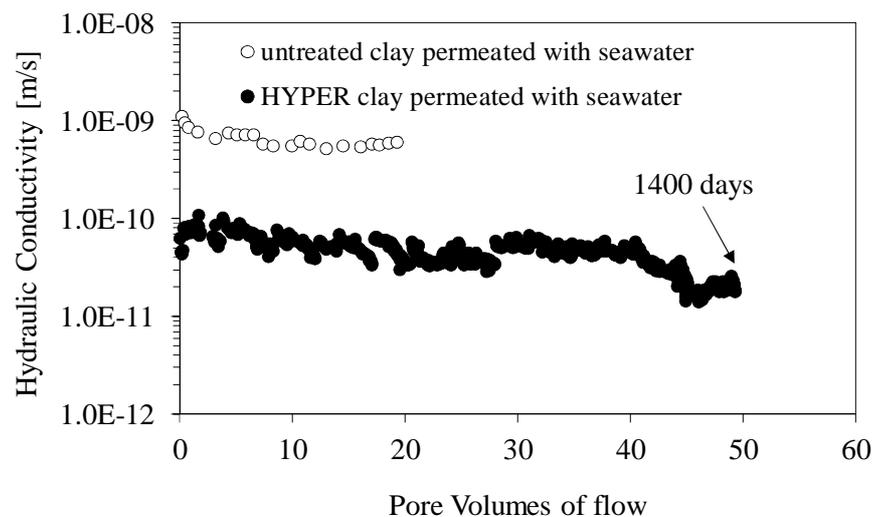
Partnership

Ghent University is looking for a partner interested in developing HYPER clay as a commercial product for sealing landfills or for other sealing applications.

Intellectual property

An international patent application was filed as PCT/EP2011/064542 on 24 August 2011 (priority date 27 August 2010).

Figure



The HYPER clay maintains its hydraulic efficiency to aggressive solutions in the long term. Its permeability is in fact lower than that of the untreated clay

The Inventor

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Keywords

Clay, hydraulic barrier, environmental, waste, pollution, long-term efficiency

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