

'Blowing' a slope into place

June 28 2013



Research scientists have developed a new method for stabilising areas with difficult soil mechanics. The concept is based on blowing expanded clay (Leca) spheres into enormous "sausage skins" made from geotextiles.

Building and renovation in steep, difficult terrain can be challenging. Urban areas where accessibility with construction vehicles is difficult pose similar problems.

These days, the prevalence of [landslides](#), shifting sediments and unstable substrates is drawing increasing attention to these problems. Closed roads and railways and the evacuation of residential areas which have to be rehabilitated and rebuilt are expensive for society, and this has prompted researchers to think innovatively.

"We have developed a solution in which material is simply blown into place, making it possible to get to places where space is limited, there is no access for construction machinery and existing roads or railway lines have collapsed, to mention just some of the problems," says Arnstein Watn, SINTEF's Research Director.

Advanced "geomaterials" make it possible

Geotextiles are woven or knitted fabrics or nets based on polymers, which can be used to reinforce sedimentary masses. They are stacked up to create a light wall – a kind of shuttering. The wall is then bonded firmly to the uncompacted material behind using hooks and an anchoring system which is also made from geotextiles. This solution saves both time and space because it does not require an access road for heavy construction machinery.

The result is a light, stable wall capable of withstanding slopes of up to 90 degrees, and which can also be concealed by various facings, such as turf, [climbing plants](#) or various types of façade sheets as required.

When the wall is in place, the space behind is filled with light expanded clay aggregate, either using conventional construction machinery or by blowing it in.

"What makes the method unique is that it facilitates drainage and the result is light and stable as well as being easy to put in place," says Watn.

Already tested in the field

SINTEF has been responsible for developing the technical solution and the construction method used. So far the method has been tested at two localities. At Saint-Gobain Weber's factory property in Fredrikstad, an

embankment was first built in the form of a 2.5-metre high pilot wall to test the principle and construction process. Later, an almost five-metre high test wall was built at Weber's factory property in Rælingen, where erosion and surface slips on sloping ground were causing problems for the operation of the plant.

"Our experience with the field trials was very positive as regards both the development of the product itself and the building method. We now also have a demonstration site where interested parties can see the solution and various types of façade coverings," says Arnstein Watn.

"The system is primarily intended to enable the building of vertical structures without using large, heavy machinery," adds Oddvar Hyrve at Saint-Gobain Weber.

The development has taken place as a Eureka project, funded by the Franco-Norwegian Foundation in Norway and OSEO in France. In addition to SINTEF and Saint-Gobain Weber, which manufactures light clay aggregate, the French geotextile manufacturer Texinov and the French National Conservatory of Arts and Crafts (CNAM) have been participants.

More information: Weaving a new landscape in Svalbard:
geminino.no/2006/11/vever-nytt-landskap-pa-svalbard/

Provided by SINTEF

Citation: 'Blowing' a slope into place (2013, June 28) retrieved 18 April 2024 from
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