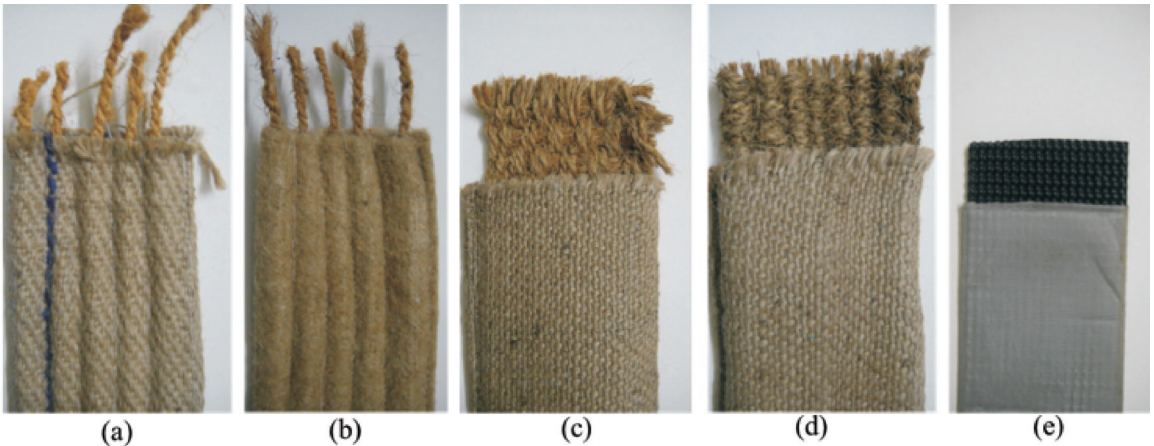


## Natural prefabricated vertical drains in marine clay

Consolidation of soil by surcharge loading with prefabricated vertical drains is an effective ground improvement technique in saturated cohesive soils such as marine clay. Four types of band-shaped drains made from single-layer woven and non-woven jute geotextile filter fabric wrapped around a core of coir ropes or mats, designated as natural drains, were developed and fabricated. Laboratory marine clay confined discharge capacity and large-scale consolidation tests were conducted on the natural drains and commercially available polymer-based drains.



Prefabricated vertical drains: (a) NPVD 1; (b) NPVD 2; (c) NPVD 3; (d) NPVD 4; (e) PPVD

The effect of compressive stress on the discharge capacity of the natural drains was studied and compared with the polymer based drains. The consolidation performance of the drains in remoulded marine clay was studied with consolidation tests on marine clay with and without the drains. It was observed that the rate of settlement of marine clay was almost identical in all the marine clay samples with the drains. All the drains accelerated the consolidation in marine clay.

Numerical simulations of experimental consolidation tests were carried out using PLAXIS. The magnitude and rate of settlement obtained from numerical consolidation analysis matched closely with the experimental results. It is concluded that eco-friendly and easily fabricated natural drains help in accelerating consolidation in marine clay.