Prefabricated vertical drains are part of the consolidation process. If loads are applied on clay and peat layers, the poor permeability of the layers can lead to increased pore water pressure. The pore water will gradually flow away and will slowly alter the consolidation. If embankments or other loads are installed too quickly, stability problems will occur. The installed prefabricated vertical drains reduces the consolidation process from decades to months and the increase of the stability is accelerated.

The project
The PSA Container Terminal is located at the Pacific entrance of the Panama Canal on the west bank opposite to the Port of Balboa where Cofra installed the drains for their container terminal expansion in 2013. The container terminal of PSA is expanded at the north side of the existing container terminal. The area of extension consists of organic clay with dumped rubble on top. The clay has been provided with prefabricated vertical drains of type MebraDrain MD7007. The rubble layer made predrilling necessary. The drains are placed to the (medium) dense sand layer.

Equipment
For the installation of the vertical drain a Caterpillar 330 and a Komatsu PC350 hydraulic excavators with ML25 drain stitchers were used. For the predrilling the Caterpillar 330 hydraulic excavator was used as well together with a Caterpillar 320 hydraulic excavator. Both used M19 drill stitchers.

Drain configuration
The vertical drains are installed in a triangular grid of 1,20 m to an average depth of 12,50 m. The average predrill depth is 5,0 m. 55% of the drains are predrilled.

Review
The drains have been installed in a satisfying way within the time of completion. The drain and predrill depths were determined in close consultation with Employer’s Engineer and were recorded with a datalogger. The drain material has been tested and approved in certified laboratory in USA and Germany.