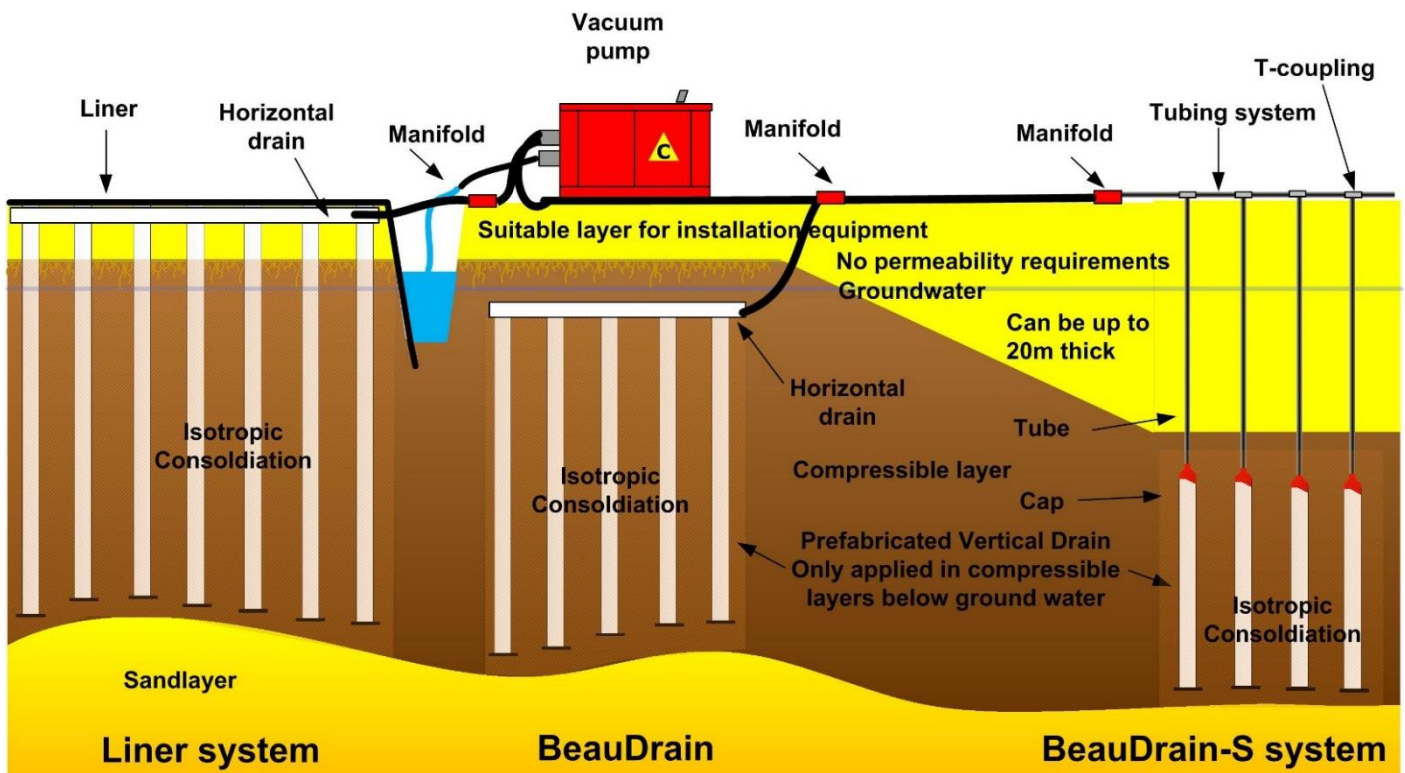


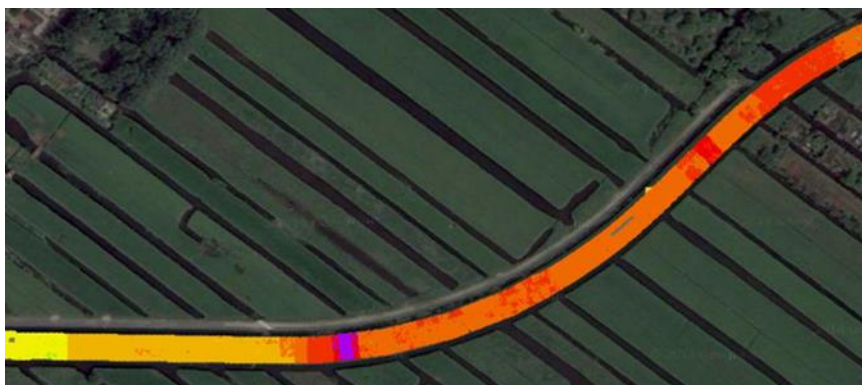


General

Vacuum consolidation was introduced in 1952 by W. Kjellman, the inventor of the paper prefabricated vertical drain (PVD). Since then, vacuum consolidation has been in frequent use in projects with a high risk for instability or in constructions with a shortage of surcharge material.

The system acts in principal similar to the system of prefabricated vertical drains (PVD) with surcharge. But contrary to the previous principle the surcharge load is replaced by creating a vacuum pressure equivalent to that load. The system consists of a lowering of the atmospheric pressure inside the PVD to pre-stress the soil in order to accelerate the consolidation.





Cofra has multiple vacuum consolidation systems within its range of techniques, amongst which Beaudrain, BeauDrain-S and the traditional vacuum consolidation method using a synthetic liner. All concepts, except for the BeauDrain system which uses an in-house developed special plough, are installed by using our own PVD rigs. Every system has its own solution to overcome loss of vacuum in sand layers.

Monitoring

During the installation process, Cofra has the ability to use advanced GPS based loggers to not only register, but also to show the installation data and provide digital drawings to the operators for process control.

With these data Cofra is able to provide its clients installation maps showing working progress as well as cross sections through the treated soil showing the push force at intervals in depth.

We have our in house geotechnical department and can provide you with turn key solutions for ground improvement questions in pre-tender advise, do the consolidation design, monitoring and hand-over approval. Feel free to ask for your specific project situation and requirements.

Results

Making use of vacuum consolidation, the settlement period is shortened considerably with reduced risk for instability, whereas no surcharge material is needed. We are happy to assist you on choosing the best vacuum system for your particular case. This, as well as the result that can be achieved, is depending on the soil conditions and depth of potential permeable layers. We have the knowledge and experience based on many projects in various circumstances.

With vacuum consolidation the subsoil adapts to a higher load than is actually present when creating the embankment.

As a result of this, in particular the first fill layers of the embankment can be considerably thicker and embankment creation process can take place faster without increasing risk of instability.

Characteristics

We see the following characteristics:

- Short installation period and clean work site after installation
- Large working depth achievable thanks to the use of vertical drains
- System can overcome loss of vacuum in sand layers.
- Increase in effective pressure which reduces the risks of instability in the case of ongoing embankment creation
- Work site available (and remaining so) for other activities immediately after installation
- Considerably reduced horizontal deformation in the event of ongoing embankment creation

