

Wing Cones

Lime cement columns

Lime cement columns are becoming more commonly used in the UK ground improvement industry for stabilising soft soils. The big advantages to this method is that it produces no spoil, it is relatively quiet and vibration free.

Verification

Once the columns have been created, there needs to be some kind of verification to prove that the proposed level of ground improvement has been reached. This is done by one of two methods outlined in the Swedish Geotechnical Society report: SGF Report 4:95E.

Push-in wing cone

This method uses a wing cone of varying diameters depending on the diameter of the columns. The wing cone is pushed through the column and total force needed to push the cone is measured. With the wing attachments you are looking at the force over the whole column not just a single point in the column.

Advantages

It can be randomly used on any column. No cables used.

Disadvantage

The top of the column has to be revealed so as to check that the probe is going down the centre.

Pull-out wing cone

With this method a winged probe is installed at the base of the column when the column is being constructed. A cable is attached to the probe, which comes up the centre of the column, and to the rams of a CPT rig. The force required to pull the cable is then recorded.



see next page

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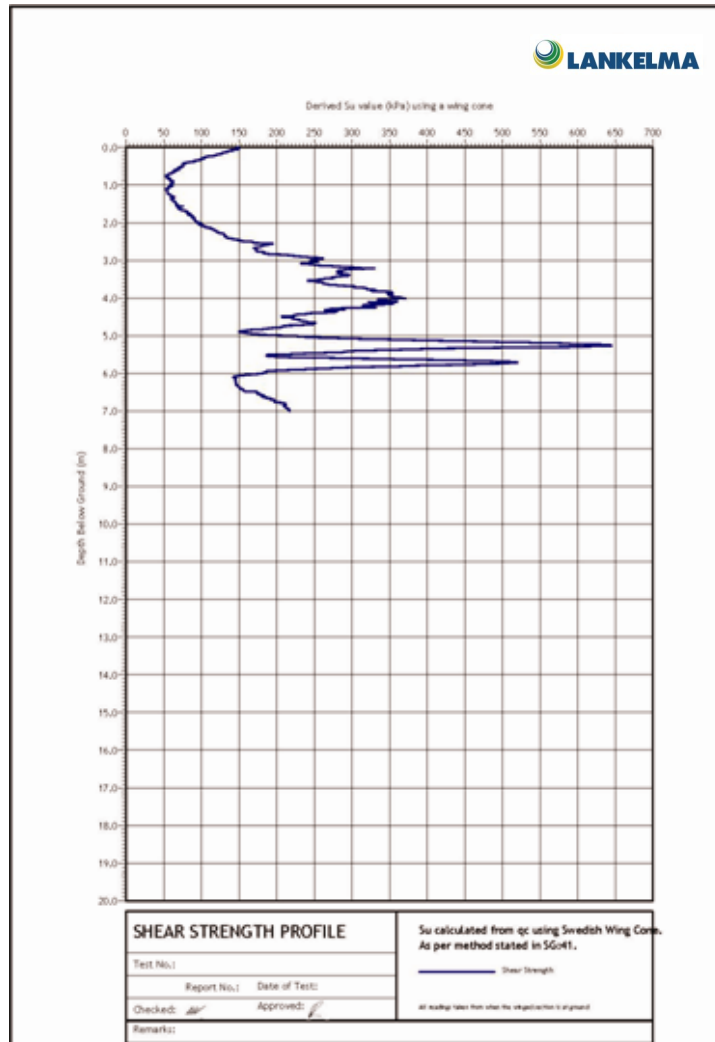
Advantages

It is installed in the column.

Disadvantages

They are installed in predetermined columns, not randomly. The cable can snap inside the CPT rig.

The figure below shows the derived shear strength values, S_u , using a wing cone. The S_u values are used to verify that the lime cement column has reached the required design strength. The original output of the test is a total pushing or pulling force (kN) which is then converted into S_u values as described in the SGF Report 4:95E.



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