method has a limited depth range of only 7 to 8 meters in which it can be applied for consolidating ground. Removal of ground material further requires to material to be transported away or to be left on site where it may obstruct or hinder on-site activities.

In another method drains are applied vertically in the ground. The drains are connected at their top sides collectively to a pump for entraining ground water from the drains. This can be done by connecting the vertical channels to a horizontal drain that is connected to a pump or otherwise connect the individual drains to a collective pump. However, leakage of the known drain system easily occurs, which drastically reduces the pumping capacity. The drains and their connections at the top have to be installed individually in the ground in a non-continuous process, which is not efficient and only a limited amount of water can be pumped away.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a method for consolidating ground that efficiently consolidates within a relatively short time span.

It is another or alternative object of the invention to provide a method for consolidating ground that can be provided in a relatively short time.

It is another or alternative object of the invention to provide a method for consolidating ground that requires a minor amount of effort to apply.

It is yet another or alternative object of the invention to provide a method for consolidating ground that does not require removing and/or transporting of ground material.

It is yet another or alternative object of the invention to provide a method for consolidating ground that can be applied to depth of several tens of meters, for instance, 60 meters.

It is yet another or alternative object of the invention to provide a method for consolidating ground that allows the consolidated ground to be brought back into its original but still consolidated state.

In a first aspect of the present invention, at least one of these objects is achieved by a method for consolidating water-containing ground, the method comprising

- providing an elongated drain element, the drain element allowing both collection and transport of fluid along a longitudinal direction of the drain element;
- providing a pump to a bottom end of the drain element, the pump being a gas-driven Venturi pump, especially an air-driven Venturi pump;

In a second aspect of the invention there is provided a corresponding drain element for use in a method according to any one of the embodiments as described herein, the drain element having an elongated configuration, allowing both collection and transport of fluid along a longitudinal direction of the drain element, and comprising a pump constructed and arranged to discharge collected fluid from the drain element, the drain element being configured such that the pump is provided at a bottom end of the drain element and being configured to be provided with the pump into the ground to be consolidated, wherein the pump is a gas-driven Venturi pump, especially an air-driven Venturi pump.

In an effective embodiment the pump is arranged within the drain element.

In an embodiment the drain element is configured such that the pump is provided at a bottom end of the drain element.

Advantageously, the pump is a gas-driven Venturi pump, especially an air-driven Venturi pump.

In a preferred embodiment the drain element comprises a drain member having a corrugated cross-section transverse to the longitudinal direction of the drain element.

In yet a further preferred embodiment the drain member has a plate-like configuration having corrugations of the corrugated cross-section in a width direction and having a thickness corresponding a height of the corrugations of the corrugated cross-section.

In yet a further preferred embodiment the drain element comprises a fluid-permeable covering that is impermeable to the ground, and wherein the pump is provided inside the covering.

In yet another preferred embodiment the drain member is provided inside the covering.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will further be described with reference to the accompanying drawings, in which like or same reference symbols denote like, same or corresponding parts, and in which

Figure 1 schematically shows a drain element according to the invention provided in ground to be consolidated;

Figure 2 shows a detail of a bottom end of the drain element of figure 1, part of a coverage of the drains shown removed;

Figure 3 shows a cross-section of the drain element of figures 1 and 2;

Figure 4 schematically shows a pump of the drain element in a detailed view;