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(54) **METHOD OF CONTROLLING WATER PRESSURE ON FLOOR IN FOUNDATION PIT FLOOR CONSTRUCTION OF DEEP FOUNDATION PIT AND STRUCTURE THEREOF.**

(57) A structure of controlling water pressure on a floor in a foundation pit floor construction of a deep foundation pit, including a blind ditch at a bottom of a concrete cushion below a foundation pit floor and stainless steel drainage pipes inserted into the blind ditch in a vertical direction; the blind ditch includes a plurality of annular grooves arranged concentrically and a plurality of radial grooves that are radially distributed in the center and pass through the annular grooves; aggregate mixtures are backfilled in the annular grooves and the radial grooves; a lower end of each stainless steel drainage pipe is inserted into the backfilled aggregate mixtures, and an upper end of each stainless steel drainage pipe passes through a concrete cushion and the foundation pit floor and is exposed on an upper surface of the foundation pit floor; a hydraulic valve is installed on drainage pipes.

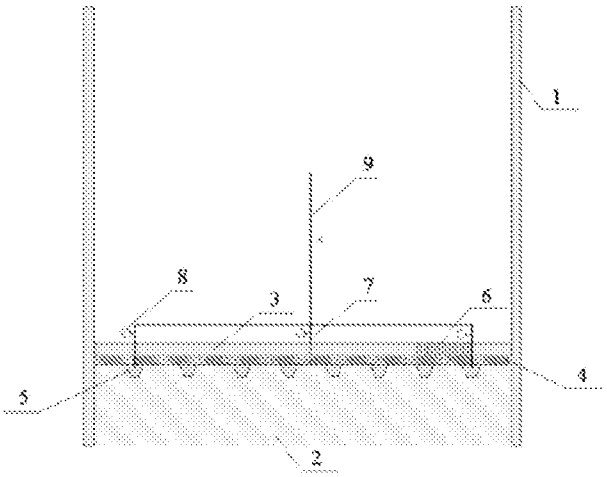

Fig1

DESCRIPTION

METHOD OF CONTROLLING WATER PRESSURE ON FLOOR IN FOUNDATION PIT FLOOR CONSTRUCTION OF DEEP FOUNDATION PIT AND STRUCTURE THEREOF

FIELD OF THE APPLICATION

The present invention relates to a blind ditch structure of a deep foundation pit (a deep working well) in a permeable stratum, in particular to a pump-down structure of controlling a water pressure on a floor of a deep foundation pit (a deep working well) in an intensely weathered permeable stratum.

BACKGROUND

With a rapid development of economy in China, the size and population of a city have grown dramatically, resulting in an increasing shortage on ground space resources. In order to relieve land resource shortage, traffic congestion, and other problems arising from the speedup of urbanization, structures expand towards underground space gradually, such as underground stations, underground parking, and subway tunnels. In order to meet the construction requirements of buildings and structures, it is necessary to expand an excavation depth and a scale of a deep foundation pit (a deep working well). However, as geological conditions of a deep stratum are extremely complex, during the construction of the deep foundation pit (the deep working well), and particularly, the construction in an intensely weathered permeable stratum, the construction difficulty of the deep foundation pit (the deep working well) is increased due to increase in hydraulic pressure; and in case of improper handling, water bursting in the deep foundation pit (the deep working well), and other problems will be caused. Therefore, higher requirements are put forward for the construction of the deep foundation pit (the deep working well) in an intensely weathered water-rich stratum, and other complex geological environments.

When the construction is implemented to a floor of the deep foundation pit (the deep working well), it is necessary to meet the requirements of the floor construction on environment, for example, preventing underground water bursting to reduce an influence on concrete placing. In the traditional dewatering method for the deep foundation pit (the deep working well), well-points dewatering is used for lowering an underground water level, which can meet the requirements of the floor construction of the common working well.

However, at the intensely weathered and strong permeable stratum with the high underwater water level, if the traditional well-points dewatering method is used, a dewatering range and a water discharge are not easy to control, resulting in increase in construction costs and construction time. Meanwhile, quickly lowering the underground water level will result in large seepage force, and the inestimable sedimentation of a surrounding soil layer will be caused, which pose impacts on the stability of surrounding buildings and even on the life health of people. Meanwhile, the higher requirements are put forward on dewatering from the intensely weathered and strong permeable stratum. As the anticipated effect is not easy to achieve in the traditional method, the risk of floor pouring is large, which results in safety accidents easily. In order to smoothly place the floor of the deep foundation pit (the deep working well) in the intensely weathered permeable stratum, while reducing the sedimentation of the surrounding soil layer and influences on ambient environment, there is an urgent need to invent a simple and reliable pump-down structure of controlling the water pressure on the floor of the deep

foundation pit (the deep working well) in the intensely weathered permeable stratum, which relieves construction risks and improves a construction quality.

BRIEF SUMMARY OF THE DISCLOSURE

In terms of the prior art, the present invention provides a pump-down structure of controlling a water pressure on a floor of a deep foundation pit in an intensely weathered permeable stratum, which solves problems of easy seepage in underground water during a floor construction of the deep foundation pit (a deep working well) in the intensely weathered permeable stratum, and a soil layer sedimentation arising from an excessive groundwater abstraction in a surrounding stratum.

In order to solve the above technical problems, the present invention provides a method of controlling a water pressure on a floor in a foundation pit floor construction of the deep foundation pit, in which a water conservancy channel with a blind ditch structure is used for controlling the water pressure on a foundation pit floor of the deep foundation pit in an intensely weathered permeable fracture zone stratum. The method includes the following steps:

Step 1, before a construction, determining a property of the permeable stratum and an underground water level based on geological data and hydrologic data within a construction range of the foundation pit, calculating a groundwater pressure, and developing dewatering requirements; determining the proportion of crushed stone and coarse sand in aggregate mixtures for backfilling blind ditch according to the underground water level and the dewatering requirements; setting an arrangement mode of the blind ditch, a groove height, and a slope ratio of a width at a groove bottom to a groove wall according to the underground water level and a pressure-bearing capacity of the foundation pit floor; and setting a thickness and a grade of cement of a concrete cushion according to the groundwater pressure and the property of the permeable stratum;

Step 2, completing a construction procedure of a foundation pit structure before the construction of foundation pit floor;

Step 3, completing the construction of the blind ditch with the following structure by mechanical equipment: the blind ditch consists of a plurality of annular grooves which are arranged concentrically and a plurality of radial grooves that are radially distributed in the center and pass through the annular grooves; after backfilling the aggregate mixture in the annular grooves and the radial grooves, inserting a plurality of vertical stainless steel drainage pipes along vertical direction in the blind ditch; and installing a hydraulic valve on each stainless steel drainage pipe, and then, laying the concrete cushion with the preset thickness and the preset strength;

Step 4, after a strength of the concrete cushion meets requirements, connecting the upper ends of all stainless steel drainage pipes to an end of a pipeline, and the other end of the pipeline is connected to one end of a water pipe, and the other end of the water pipe is connected to a header tank;

Step 5, implementing the construction of the foundation pit floor, including inserting reinforced bars and pouring; during the construction of the foundation pit floor, controlling the water pressure on the floor by the hydraulic valve to avoid an excessively high local pressure; draining underground water drained from the stainless steel drainage pipes by the water pipe to reduce an influence of the underground water on the foundation pit floor; and during a drainage,

controlling the water pressure on the floor by the hydraulic valve, and preventing the sedimentation of the surrounding soil layer arising from the excessive groundwater abstraction, thereby ensuring the safety and stability of buildings around construction site.

Further, in the method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit, insertion positions of the plurality of vertical stainless steel drainage pipes are the junctions of the outermost annular grooves and the outermost radial grooves, respectively.

The lower ends of the stainless steel drainage pipes are inserted into the backfilled aggregate mixtures, and the upper end of each stainless steel drainage pipe passes through the concrete cushion and the foundation pit floor and is exposed on an upper surface of the foundation pit floor.

The water pressure acted on the foundation pit floor is controlled by the hydraulic valve, which not only can meet the requirements of the floor, but can also avoid the large-scale sedimentation of the surrounding soil layer arising from the excessive groundwater abstraction.

Meanwhile, the present invention further provides a pressure control structure which achieves the method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit, which includes the blind ditch at a bottom of the concrete cushion below the foundation pit floor and a plurality of stainless steel drainage pipes inserted into the blind ditch along a vertical direction; the blind ditch includes a plurality of annular grooves arranged concentrically and a plurality of radial grooves that are radially distributed in the center and pass through the annular grooves; both a cross section of each annular groove and a cross section of each radial groove show a trapezoid shape which is wide at a top and narrow at a bottom; the aggregate mixtures are backfilled in the annular grooves and the radial grooves; the lower end of each stainless steel drainage pipe is inserted into the backfilled aggregate mixtures, while the upper end of the stainless steel drainage pipe passes through the concrete cushion and the foundation pit floor and is exposed on the upper surface of the foundation pit floor; one hydraulic valve is installed on each stainless steel drainage pipe; and the upper ends of all stainless steel drainage pipes are connected to an end of a pipeline, and the other end of the pipeline is connected to one end of a water pipe, and the other end of the water pipe is connected to the header tank.

Further, in the pressure control structure, the annular grooves and the radial grooves are prearranged on a surface of an intensely weathered permeable fracture zone.

The size of the blind ditch has a height of 400 mm, a bottom width of 400 mm, and a slope ratio of the slot wall of 1: 0.3.

The insertion positions of the plurality of vertical stainless steel drainage pipes are the junctions of the outermost annular grooves and the outermost radial grooves, respectively.

A mass ratio of crushed stone and coarse sand in the aggregate mixtures is 2: 1; the concrete cushion is a C15 concrete layer with the thickness of 100 mm; and the spacing between the stainless steel drainage pipes is 2,500 mm.

Compared with the prior art, the present invention has the following beneficial effects:

By the water pressure control method and the structure thereof of the present invention, a problem of a pump-down at the floor of the deep foundation pit (the deep working well) in the

intensely weathered permeable stratum can be solved effectively; the water pressure at the floor can be controlled by the hydraulic valve, so that the water pressure meets the requirements of the floor construction and normal services, without leading to the large-scale sedimentation arising from the continuous dewatering in the surrounding stratum, thereby ensuring the safety and the stability of the surrounding buildings. The water pressure control structure of the present invention is simple in structure, has a simple construction process, and can achieve the pump-down effect and meet the requirements of control the sedimentation of the surrounding soil layer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-section schematic diagram illustrating a foundation pit (a working well) and a water pressure control structure thereof in the present invention;

FIG. 2 is a layout chart illustrating a blind ditch and stainless steel drainage pipes in the present invention;

FIG. 3 is a cross section schematic diagram illustrating a blind ditch in the present invention.

In the drawings:

1: underground diaphragm wall	2: stratum
3: foundation pit floor	4: concrete cushion
5: blind ditch	51: annular groove
52: radial groove	6: inserting reinforced bar
7: stainless steel drainage pipe	8: hydraulic valve
9: water pipe	10: aggregate mixture.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

In terms of a control to a water pressure during a foundation pit floor construction of a deep foundation pit (a deep working well) in an intensely weathered permeable fracture zone stratum of the present invention, a design thought is as follows: trapezoid grooves are arranged in a stratum 2 in the foundation pit surrounded by an underground diaphragm wall 1; after aggregate mixtures are backfilled, a concrete cushion is laid thereon, and stainless drainage pipes are inserted; and a hydraulic valve is arranged on each stainless drainage pipe. A blind ditch consisting of annular grooves and radial grooves which have trapezoid sections and are connected with each other forms a cut-through drainage channel, so that water can be controlled by the stainless steel drainage pipes and then, are drained during a construction of the foundation pit floor; aggregate mixtures are filled in the blind ditch to support a shape of the blind ditch, and prolong a service life of the blind ditch; and a layer of concrete cushion is covered at a top of the blind ditch to facilitate reinforced bar inserting and pouring the floor of the foundation pit (the working well). The stainless steel drainage pipes extending out of the blind ditch to be above the floor of the foundation pit (the working well), which are used for the drainage on the large water pressure at the bottom of the deep foundation pit (the deep working well) by the blind ditch. The water pressure on the floor of the deep foundation pit (the deep working well) is controlled by adjusting the hydraulic valve at each stainless steel drainage pipe, which is conductive to the floor pouring of the deep foundation pit (the deep working well) during the construction and a

control to the water pressure on the floor during works, thereby avoiding a soil layer sedimentation arising from excessive groundwater abstraction, reducing construction costs, and ensuring the safety of surrounding buildings. The present invention is simple in structure, and convenient for construction, and can meet the requirements of water resistance at the floor of the deep foundation pit (the deep working well) in the intensely weathered permeable fracture zone stratum, and prevent the sedimentation arising from a pump-down around construction site.

The present invention will be further explained with reference to drawings and embodiments, but the following embodiments are not intended to limit the present invention.

As shown in FIG. 1, the present invention provides a method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit. In the method, a water conservation channel with a blind ditch structure is used for controlling the water pressure at the foundation pit floor of the deep foundation pit in the intensely weathered permeable fracture zone stratum; a pressure control structure includes the blind ditch 5 at a bottom of the concrete cushion 4 below the foundation pit floor 3 and a plurality of stainless steel drainage pipes 7 inserted into the blind ditch 5 along vertical direction; the blind ditch 5 includes a plurality of annular grooves 51 arranged concentrically and a plurality of radial grooves 52 that are radially distributed in the center and pass through the annular grooves 51; the annular grooves 51 and the radial grooves 52 are prearranged on a surface of an intensely weathered permeable fracture zone; and both a cross section of each annular groove 51 and a cross section of each radial groove 52 show a trapezoid shape which is wide at a top and narrow at a bottom. In the embodiment, insertion positions of the plurality of vertical stainless steel drainage pipes 7 are the junctions of the outermost annular grooves 51 and the outermost radial grooves 52, respectively, as shown in FIG. 2. The aggregate mixtures 10 are backfilled in the annular grooves 51 and the radial grooves 52; the lower end of each stainless steel drainage pipe 7 is inserted into the backfilled aggregate mixtures 10, while the upper end of the stainless steel drainage pipe 7 passes through the concrete cushion 4 and the foundation pit floor 3 and is exposed on an upper surface of the foundation pit floor 3, that is, the stainless steel drainage pipes 7 extend out of the blind ditch to be above a surface of the foundation pit floor 3 by the concrete cushion 4 for collecting water flows in the blind ditch; and the spacing between the stainless steel drainage pipes 7 can be arranged reasonably according to drainage requirements, which is 2,500 mm as a reference. The hydraulic valve 8 is installed on each stainless steel drainage pipe 7; and the upper ends of all stainless steel drainage pipes 7 are collected and connected to one end of a pipeline, and the other end of the pipeline is connected to one end of a water pipe 9, and the other end of the water pipe 9 is connected to a header tank. During the construction of the foundation pit floor 3, the stainless steel drainage pipes 7 are blocked twice, and a blocking area and blocking sequence can be decided depending on a leakage condition.

In the embodiment, a distance between the grooves of the blind ditch can be set reasonably based on dewatering requirements; and a size of the blind ditch is as follows: a height is 400 mm, a bottom width is 400 mm, and a slope ratio of the slot wall is 1: 0.3, as shown in the FIG. 3. A mass ratio of crushed stone to coarse sands in the aggregate mixtures 10 is 2: 1; the concrete cushion 4 is a C15 concrete layer with a thickness of 100 mm, which can be used for cutting off the water flows to ensure the pouring and the normal works of the floor of the deep foundation pit (the deep working well).

As shown in the FIGs. 1 and 2, steps of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit by the above water pressure control structure are as follows:

At step 1, before the construction, a constructor should carry out a detailed study on geological data and hydrologic data within a construction range of the foundation pit (the working well), determine a property of a permeable stratum and an underground water level based on the geological data and the hydrologic data within the construction range of the foundation pit, calculate a groundwater pressure, and develop the dewatering requirements; a proportion of the crushed stone to the coarse sands in the aggregate mixtures 10 for backfilling the blind ditch is determined according to the underground water level and the dewatering requirements; an arrangement mode of the blind ditch 5, a groove height, and a slope ratio of a width at a groove bottom to a groove wall are set according to the underground water level and a pressure-bearing capacity of the foundation pit floor; and a thickness and a grade of cement of the concrete cushion 4 are set according to the groundwater pressure and the property of the permeable stratum.

At step 2, a construction procedure of a foundation pit structure before the construction of foundation pit floor 3 is completed;

At step 3, the construction of the blind ditch with the following structure is completed by mechanical equipment. In the embodiment, the blind ditch 5 consists of 4 annular grooves 51 which are arranged concentrically and 4 radial grooves 52 that are radially distributed in the center and run through the 4 annular grooves 51; and radii of the annular grooves 51 are 3 m, 6 m, 10 m, and 14 m sequentially from inside to outside. The radial grooves can be arranged at intervals of 90°. In case of an obvious seepage in an excavation process, the blind ditch extends to a position where the seepage occurs; and after the aggregate mixtures 10 are backfilled in the annular grooves 51 and the radial grooves 52, the 4 vertical stainless steel drainage pipes 7 are inserted into the blind ditch 5 along vertical direction. In the embodiment, the positions of the 4 vertical stainless steel drainage pipes 7 are the junctions of the outermost annular grooves 51 and the outermost radial grooves 52, respectively; and after the hydraulic valve 8 is installed on each stainless steel drainage pipe 7, the concrete cushion 4 with the preset thickness and the preset strength is laid.

At step 4, after the strength of the concrete cushion 4 meets requirements, the upper ends of all stainless steel drainage pipes 7 are connected to one end of a pipeline, the other end of the pipeline is connected to one end of the water pipe 9, and the other end of the water pipe 9 is connected to the header tank.

At step 5, the construction of the foundation pit floor 3 is implemented, including inserting reinforced bars 6 and pouring. It should be noted that the water pressure on the floor is controlled by the hydraulic valve 8 to avoid an excessively high local pressure during the construction of the foundation pit floor 3. The water pipe 9 collects underground water drained from the stainless steel drainage pipes 7, and drains it to the header tank, thereby reducing an influence of the underground water on the foundation pit floor, and especially, an influence of the intensely weathered permeable stratum on the concrete placing on the floor of the deep foundation pit (the deep working well); during the foundation pit floor construction, the water pressure is controlled by the hydraulic valve 8 to a smaller value with the influence on the foundation pit floor 3, which can supply a surrounding water source within sufficient time by reducing a pump output, and thus, the large-scale sedimentation of the surrounding soil layer arising from the excessive groundwater abstraction can be avoided on the basis of meeting the requirements of the floor under the water pressure on the foundation pit floor 3, thereby ensuring the safety and stability of buildings around construction site.

In conclusion, as the control structure for the water pressure on the floor in the foundation pit floor construction of the deep foundation pit has the blind ditch structure with the drainage pipes with the hydraulic valves, it is simple in structure and convenient for construction, and meets the requirements of the pump-down in the intensely weathered permeable stratum and the concrete placing on the floor of the deep foundation pit (the deep working well); and the pump output is reduced to reduce the sedimentation of the surrounding soil layer, thereby ensuring the construction effect and the construction safety.

Although it has been described with reference to the drawings, the present invention is still not limited to the above implementation. The above implementation is not construed as a limitation, but is merely illustrative. A person of ordinary skill in the art can further make several many variants under the reveal of the present invention without departing from the purpose of the present invention, and those variants should be included in the protection scope of the present invention.

CLAIMS

1. A method of controlling a water pressure on a floor in a foundation pit floor construction of a deep foundation pit, characterized in that, a water conservancy channel with a blind ditch structure is used for controlling the water pressure on a foundation pit floor of the deep foundation pit in an intensely weathered permeable fracture zone stratum, the method comprises the following steps:

Step 1, before a construction,

determining a property of the permeable stratum, and an underground water level based on geological data and hydrologic data within a construction range of the foundation pit, calculating groundwater pressure, and developing dewatering requirements;

determining a proportion of crushed stone to coarse sands in aggregate mixtures (10) for backfilling a blind ditch according to the underground water level and the dewatering requirements; setting an arrangement mode of the blind ditch (5), a groove height, and a slope ratio of a width at a groove bottom to a groove wall according to the underground water level and a pressure-bearing capacity of the foundation pit floor; and

setting a thickness and a grade of cement of a concrete cushion (4) according to the groundwater pressure and the property of the permeable stratum;

Step 2, completing a construction procedure of a foundation pit structure before the construction of foundation pit floor (3);

Step 3, completing the construction of the blind ditch with the following structure by mechanical equipment, wherein the blind ditch (5) consists of a plurality of annular grooves (51) which are arranged concentrically and a plurality of radial grooves (52) that are radially distributed in the center and pass through the annular grooves (51); after backfilling the aggregate mixtures (10) in the annular grooves (51) and the radial grooves (52), inserting a plurality of vertical stainless steel drainage pipes (7) along vertical direction in the blind ditch (5); and installing a hydraulic valve (8) on each stainless steel drainage pipe (7), and then, laying the concrete cushion (4) with the preset thickness and a preset strength;

Step 4, after the strength of the concrete cushion (4) meets requirements, connecting upper ends of all stainless steel drainage pipes (7) to one end of a pipeline, and the other end is connected to one end of a water pipe (9), and the other end of the water pipe (9) is connected to a header tank;

Step 5, implementing the construction of the foundation pit floor (3), comprising inserting reinforced bars (6) and pouring; during the construction of the foundation pit floor (3), controlling the water pressure on the floor by the hydraulic valve (8) to avoid an excessively high local pressure; draining underground water drained from the stainless steel drainage pipes (7) by the water pipe (9) to reduce an influence of the underground water on the foundation pit floor; and during a drainage, controlling the water pressure on the floor by the hydraulic valve (8), and preventing a sedimentation of a surrounding soil layer arising from excessive groundwater abstraction, thereby ensuring the safety and stability of buildings around construction site.

2. The method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit according to claim 1, characterized in that, insertion

positions of the plurality of vertical stainless steel drainage pipes (7) are the junctions of the outermost annular grooves (51) and the outermost radial grooves (52), respectively.

3. The method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit according to claim 1, characterized in that, lower ends of the stainless steel drainage pipes (7) are inserted into the backfilled aggregate mixtures (10), and the upper end of each stainless steel drainage pipe (7) passes through the concrete cushion (4) and the foundation pit floor (3) and is exposed on an upper surface of the foundation pit floor (3).

4. The method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit according to claim 1, characterized in that, the water pressure acted on the foundation pit floor (3) is controlled by the hydraulic valve (8), which not only can meet the requirements of the floor, but can also avoid the large sedimentation of the surrounding soil layer arising from the excessive groundwater abstraction.

5. A pressure control structure which achieves the method of controlling the water pressure on the floor in the foundation pit floor construction of the deep foundation pit in any one of claims 1-4, characterized in that, the pressure control structure comprises a blind ditch (5) at a bottom of the concrete cushion (4) below the foundation pit floor (3) and a plurality of stainless steel drainage pipes (7) inserted into the blind ditch (5) in a vertical direction; the blind ditch (5) comprises a plurality of annular grooves (51) arranged concentrically and a plurality of radial grooves (52) that are radially distributed in the center and pass through the annular grooves (51); both a cross section of each annular groove (51) and a cross section of each radial groove (52) show a trapezoid shape which is wide at a top and narrow at a bottom; the aggregate mixtures (10) are backfilled in the annular grooves (51) and the radial grooves (52); the lower end of each stainless steel drainage pipe (7) is inserted into the backfilled aggregate mixtures (10), while the upper end of the stainless steel drainage pipe (7) passes through the concrete cushion (4) and the foundation pit floor (3) and is exposed on the upper surface of the foundation pit floor (3); one hydraulic valve (8) is installed on each stainless steel drainage pipe (7); and the upper ends of all stainless steel drainage pipes (7) are connected to one end of a pipeline, and the other end is connected to one end of the water pipe (9), and the other end of the water pipe (9) is connected to the header tank.

6. The pressure control structure according to claim 5, characterized in that, the annular grooves (51) and the radial grooves (52) are prearranged on a surface of an intensely weathered permeable fracture zone.

7. The pressure control structure according to claim 5, characterized in that, a size of the blind ditch has a height of 400 mm, a bottom width of 400 mm, and a slope ratio of the slot wall of 1: 0.3.

8. The pressure control structure according to claim 5, characterized in that, the insertion positions of the plurality of vertical stainless steel drainage pipes (7) are the junctions of the outermost annular grooves (51) and the outermost radial grooves (52), respectively.

9. The pressure control structure according to claim 5, characterized in that, a mass ratio of the crushed stone to the coarse sands in the aggregate mixtures is 2: 1; the concrete cushion (4) is a C15 concrete layer with the thickness of 100 mm; and the spacing between the stainless steel drainage pipes (7) is 2,500 mm.

Patentansprüche

1. Ein Verfahren zur Steuerung des Wasserdrucks auf der Bodenplatte in der Baugrubenbodenplattenkonstruktion einer Tiefbaugrube, dadurch gekennzeichnet, dass ein Wasserschutzkanal mit Blinddrainage zur Steuerung des Wasserdrucks auf der Baugrubenbodenplatte einer Tiefbaugrube in einem stark verwitterten und durchlässigen Bruchzonenstratum verwendet wird, wobei das Verfahren die folgenden Schritte umfasst:

   Schritt I: Vor dem Bau:
   Bestimmen der Eigenschaften des durchlässigen Stratums und des unterirdischen Wasserstands basierend auf geologischen und hydrologischen Daten innerhalb eines Baubereichs der Baugrube, Berechnen des Grundwasserdrucks und Entwickeln von Entwässerungsanforderungen;
   Bestimmen des Anteils an Schotter und Grobsand im Sand-Stein-Gemisch (10) zum Rückfüllen der Blinddrainage entsprechend dem Grundwasserstand und den Entwässerungsanforderungen;
   Einstellen des Anordnungsmodus, der Grabenhöhe, der Grabenbodenbreite sowie der Grabenwandneigungsrate der Blinddrainage (5) gemäß dem unterirdischen Wasserstand und der Drucktragfähigkeit der Baugrubenbodenplatte;
   Bestimmen der Dicke einer Betonpolsterschicht (4) und des verwendeten Zementetiketts entsprechend den Maßen der Blinddrainage und der Eigenschaften des durchlässigen Stratums;

   Schritt II: Durchführen des Baus der Baugrubenstruktur, und zwar zunächst bis zu der Phase vor der Baugrubenbodenplatte (3);

   Schritt III: Vervollständigung der Blinddrainageaufbau mit folgender Struktur unter Verwendung mechanischer Vorrichtungen: die Blinddrainage (5) weist mehrere konzentrisch angeordnete Kreisgraben (51) und mehrere radial von der Mitte ausstrahlende und durch die Kreisgraben durchgehende Radialgraben (52) auf; nach dem Rückfüllen mit Sand-Stein-Gemisch (11) in die Kreisgraben (51) und die Radialgraben (52) wird eine Anzahl vertikaler Drainagerohre (7) aus rostfreiem Stahl in vertikaler Richtung in die Blinddrainage (5) eingeführt und ein Hydraulikventil (8) an jedem Drainagerohr (7) aus rostfreiem Stahl angebracht.

Dann wird die Betonpolsterschicht (4) mit voreingestellter Dicke und Stärke ausgelegt;

Schritt IV: Nachdem die Festigkeit der Betonpolsterschicht (4) die Anforderungen erfüllt, werden die oberen Enden aller Drainagerohre (7) aus rostfreiem Stahl über eine Rohrleitung mit dem einen Ende einer Wasserleitung (9) verbunden, und das andere Ende der Wasserleitung (9) ist mit einem Wassersammeltank verbunden;

Schritt V: Ausführen des Baus der Baugrubenbodenplatte (3), umfassend das Einbringen von Bewehrungsstäben (6) und das Gießen; während des Baus der Baugrubenbodenplatte (3) Steuern des Wasserdrucks auf der Bodenplatte durch das Hydraulikventil (8), um einen übermäßig hohen lokalen Druck zu vermeiden; Ablassen von unterirdischem Wasser, das von den Drainagerohren (7) aus rostfreiem Stahl abgelassen wird, durch die Wasserleitung (9), um einen Einfluss des unterirdischen Wassers auf den Baugrubenbodenplatte zu verringern; und während der Entwässerung Steuern des Wasserdrucks auf der Bodenplatte durch das Hydraulikventil (8), um eine Sedimentation der umgebenden Bodenschicht zu vermeiden, die durch übermäßige Grundwasserentnahme entsteht könnte, und somit die Sicherheit und Stabilität von Gebäuden rund um die Baustelle zu gewährleisten.

2. Das Verfahren zur Steuerung des Wasserdrucks auf der Bodenplatte in der Baugrubenbodenplattenkonstruktion einer Tiefbaugrube nach Anspruch 1, dadurch gekennzeichnet, dass die Einführungspositionen der vertikalen Drainagerohre (7) aus rostfreiem Stahl jeweils die Verbindungsstellen des äußersten Kreisgrabens (51) und der Radialgraben (52).

3. Das Verfahren zur Steuerung des Wasserdrucks auf der Bodenplatte in der Baugrubenbodenplattenkonstruktion einer Tiefbaugrube nach Anspruch 1, dadurch gekennzeichnet, die unteren Enden der Drainagerohre (7) aus rostfreiem Stahl in das Sand-Stein-Gemisch (10) eingeführt werden und die oberen Ende der Drainagerohre (7) aus rostfreiem Stahl durch die Betonpolsterschicht (4) und die Baugrubenbodenplatte (3) geführt und oberhalb der Oberfläche der Baugrubenbodenplatte (3) freigelegt werden.

4. Das Verfahren zur Steuerung des Wasserdrucks auf der Bodenplatte in der Baugrubenbodenplattenkonstruktion einer Tiefbaugrube nach Anspruch 1, dadurch gekennzeichnet, dadurch gekennzeichnet, dass der auf die Baugrubenbodenplatte (3) wirkende Wasserdruck durch das Hydraulikventil (8) gesteuert wird, wodurch nicht nur die Anforderungen an die Bodenplatte erfüllt werden können, sondern auch das Auftreten großer Sedimentationen der umgebenden Bodenschicht durch übermäßige Grundwasserentnahme vermieden werden kann.

5. Eine Drucksteuerungsstruktur unter Anwendung des Verfahrens zur Steuerung des Wasserdrucks auf der Bodenplatte in der Baugrubenbodenplattenkonstruktion einer Tiefbaugrube nach einem der Ansprüche 1–4 erreicht, dadurch gekennzeichnet, dass die Drucksteuerungsstruktur eine Blinddrainage (5) an der unteren Seite einer Betonpolsterschicht (4) unterhalb der Baugrubenbodenplatte (3) und eine Vielzahl von Drainagerohren (7) aus rostfreiem Stahl umfasst, die in vertikaler Richtung in den Blinddrainage (5) eingepflanzt sind. Die Blinddrainage (5) umfasst mehrere konzentrisch angeordnete Kreisgraben (51) und mehrere radial von der Mitte ausstrahlende und durch die Kreisgraben durchgehende Radialgraben (52), wobei sowohl der Querschnitt der Kreisgraben (51) als auch der Querschnitt der Radialgraben (52) eine Trapezform mit breiterer Oberseite und schmalerer Bodenseite aufweisen. Die Kreisgraben (51) und die Radialgraben (52) werden mit Sand-Stein-Gemisch (10) befüllt, wobei die unteren Enden der Drainagerohre (7) aus rostfreiem Stahl in das Sand-Stein-Gemisch (10) eingeführt werden und die oberen Ende der Drainagerohre (7) aus rostfreiem Stahl durch die Betonpolsterschicht (4) und die Baugrubenbodenplatte (3) geführt und oberhalb der Oberfläche der Baugrubenbodenplatte (3) freigelegt werden. An jedem Drainagerohr (7) aus rostfreiem Stahl ist ein Hydraulikventil (8) angebracht, wobei die oberen Enden aller Drainagerohre (7) aus rostfreiem Stahl über eine Rohrleitung mit dem einen Ende einer Wasserleitung (9) verbunden sind, und das andere Ende der Wasserleitung (9) mit einem Wassersammeltank verbunden ist.

6. Die Drucksteuerungsstruktur nach Anspruch 5, dadurch gekennzeichnet, dass die Kreisgraben (51) und die Radialgraben (52) auf einer Oberfläche eines stark verwitterten durchlässigen Bruchzonenstratums vorab angeordnet sind.

7. Die Drucksteuerungsstruktur nach Anspruch 5, dadurch gekennzeichnet, dass das

Format der Blinddrainage eine Höhe von 400 mm, eine Bodenbreite von 400 mm und eine Grabenwandneigungsrate von 1:0,3 aufweist.

8. Die Drucksteuerungsstruktur nach Anspruch 5, dadurch gekennzeichnet, dass die Einführungspositionen der vertikalen Drainagerohre (7) aus rostfreiem Stahl jeweils die Verbindungsstellen des äußersten Kreisgrabens (51) und der Radialgraben (52) sind.

9. Die Drucksteuerungsstruktur nach Anspruch 5, dadurch gekennzeichnet, dass das Massenverhältnis des Schotters zu dem Grobsand in dem Sand-Stein-Gemisch 2:1 beträgt, das Betonpolsterschicht (4) eine C15-Betonschicht mit einer Dicke von 100 mm ist, und dass der Abstand zwischen den Drainagerohren (7) aus rostfreiem Stahl 2500 mm beträgt.

FIGURES

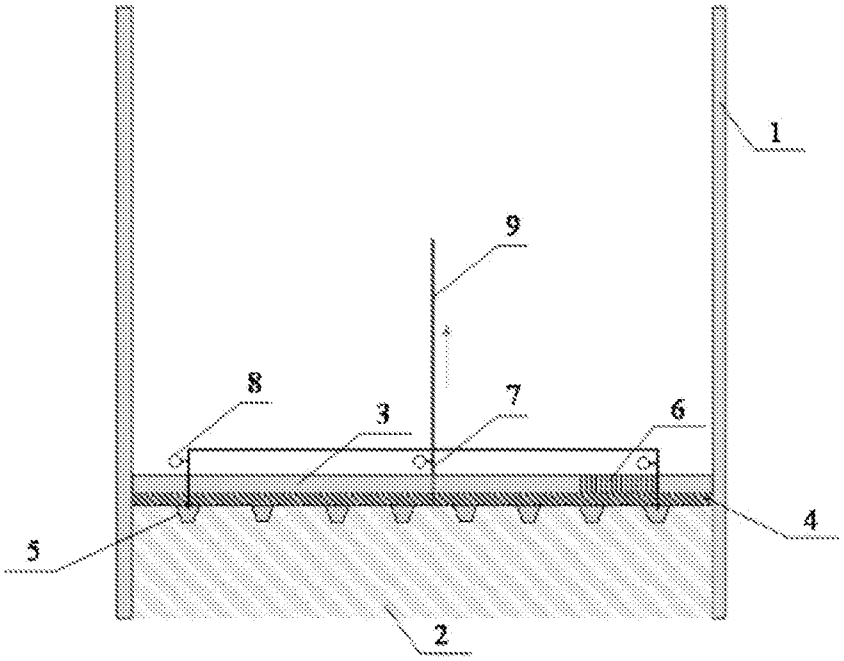

Fig1

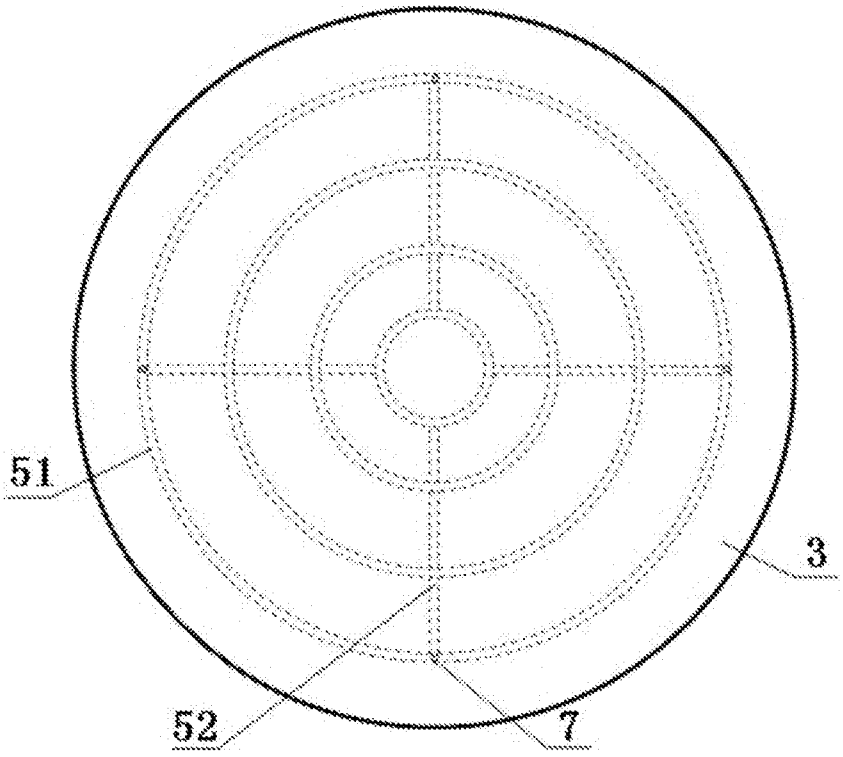

FIG.2

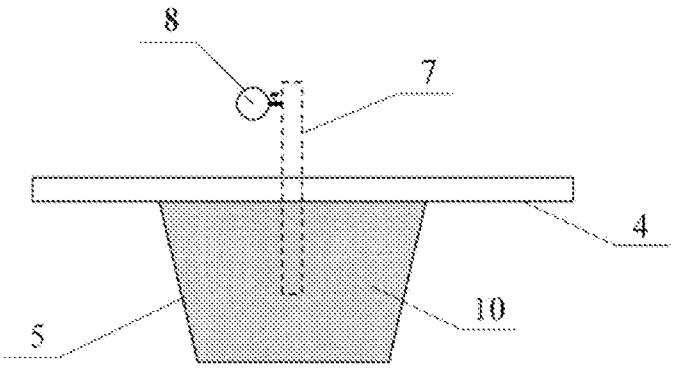

Fig3