

【DESCRIPTION】**【Invention Title】**

SILT CURTAIN FOR WATER QUALITY MANAGEMENT OF WATER
INTAKE FACILITY ADJACENT THERETO AND METHOD FOR CONSTRUCTING
5 THE SAME

【Technical Field】

The present invention relates to a silt curtain for
water quality management of a water intake facility adjacent
thereto and a method for constructing the same.

10 **【Background Art】**

FIG.1 is a photograph showing an example where floating
matters are generated in a dredge process on the coast. As
shown in FIG.1, floating pollutants generated in the dredge
and reclaiming processes give bad influences on surrounding
15 ecosystem, and moreover, if they are directly introduced into
a water intake facility adjacent thereto, they cause a
quality of water introduced into the water intake facility to
be deteriorated. For example, pollution caused by the
reclamation occurs when silt contained in sand floats during
20 the sand is poured into water, when silt floats as the sand
poured into the water disturbs a soft ground surface layer,
and when silt floats as the ground surface layer is disturbed
by the propeller wash of a moving ship. Accordingly, if there
is a water intake facility on an area adjacent to an area
25 where dredge and reclamation are carried out, an appropriate
plan for protecting the water intake facility from the
floating silt is needed.

So as to prevent the introduction of the floating silt
into the water intake facility, up to now, a silt curtain has
30 been generally installed around the water intake facility.
FIG.2 is a diagram showing a general floating type silt
curtain. As shown in FIG.2, the silt curtain is used to

prevent the occurrence of water pollution caused by the dispersion of silt generated during river or offshore construction. As shown in FIG.2, the general floating type silt curtain floats by a floatation log, and ballast chains
5 are fixed to the lower portion of a silt curtain fabric or screen to prevent the silt curtain fabric or screen from floating. Further, the floatation log is connected to anchors so as to minimize the movements thereof.

The installation of the silt curtain prevents pollution
10 sources generated from the outside from being introduced into a water intake facility adjacent to the silt curtain. General silt curtain is installed with the aim to prevent the polluted water inclusive of floating matters from flowing to the outside from a construction area. A main pollution source
15 is made by the pollution caused by the artificial work on a water surface, and fine particles moving on the bottom of water do not matter as the pollution source. Accordingly, a main aim of the silt curtain is to prevent the dispersion of pollution around the water surface.

20 However, it is very difficult to perform the maintenance of the general floating type silt curtain due to the seawater flows generated by currents and waves. That is, the silt curtain has to prevent floating matters from being introduced into a water intake facility adjacent thereto and at the same
25 time has to ensure a sufficient water flow area through which an amount of water required is introduced into the water intake facility. However, the existing silt curtains do not satisfy the above-mentioned conditions.

FIG.3 is a photograph showing a water intake facility on
30 the coast. The water intake facility as shown in FIG.3 should take the amount of water planned, and the water as raw water should be good in quality. However, it is hard to satisfy the

conditions of the water intake facility through the existing silt curtain.

The water intake facility has to ensure the amount of water planned and also has to improve the quality of water,
5 but prior art documents as will be described below fail to satisfy such conditions of the water intake facility.

A first prior art document, Korean Patent No.10-0485194 entitled 'method for constructing silt protector' is disclosed, but the first prior art document is focused only
10 on the prevention of the dispersion of floating matters. Further, anchor blocks do not have sufficient supporting forces, and the construction method has low stability against the waves and currents generated on the coast, thereby making it difficult to satisfy the conditions of a water intake
15 facility.

A second prior art document, Korean Patent No.10-0746852 entitled 'silt curtain capable of treating strong current' is disclosed, but according to the second prior art document, pollution sources are destroyed to flow out from a
20 construction area when a screen body is open. When a base material is closed, further, marine lives are attached to the base material, so that there is a possibility that the base material is not open upon the generation of strong wind, Typhoon. Further, the silt curtain is open two times a day
25 bidirectionally by currents, thereby making it hard to maintain the quality of water of a water intake facility.

A third prior art document, Korean Patent No.10-1202697 entitled 'silt protector structure' is disclosed, but according to the third prior art document, loss of bags and
30 overturn of the structure may be generated due to currents and waves. Further, many floating bodies are moved due to a

water pressure generated on a silt screen, thereby making it hard to stably maintain the screen.

A fourth prior art document, Korean Patent No.10-1328631 entitled 'silt curtain used upon aggregate collection by barge' is disclosed, but according to the fourth prior art document, the silt curtain is relatively weak to prevention of pollution sources generated from a lower portion thereof. Further, there is a possibility that weight members disposed on the bottom end of the silt curtain may be moved due to waves.

【Disclosure】

【Technical Problem】

Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a silt curtain for water quality management of a water intake facility adjacent thereto and a method for constructing the same that are capable of at the same time satisfying a planned water intake amount condition and a water quality condition of the water intake facility located on the coast.

【Technical Solution】

To accomplish the above-mentioned object, according to a first aspect of the present invention, there is provided a silt curtain for water quality management of a water intake facility adjacent thereto, the silt curtain including: a plurality of piles inserted vertically into subsea ground to a give depth in such a manner as to be spaced apart from each other by a given distance; buoys adapted to connect the piles to each other in such a manner as to be moved in longitudinal directions of the piles according to a level of seawater; a silt screen fixedly connected to the piles in vertical directions to the piles in such a manner as to block floating

matters of seawater; and a weight located on the lower end of the silt screen to apply load to the silt screen, wherein a length of the silt screen is longer than a depth of mean low water spring MLWS, and through the movements of the buoys according to the level of seawater, a water flow section is formed above or under the silt screen on high tide, while the water flow section is being blocked on low tide.

According to the present invention, desirably, a top end of the silt screen is fixed to given positions of the piles so that the length of the silt screen is longer than the depth of the mean low water spring MLWS, a floating matter silt screen is disposed on the lower ends of the buoys in such a manner as to have a length lower than the length of the silt screen and to block fine floating matters attachedly moving along the surface of seawater, while the buoys are being not connected to the silt screen, and the water flow section is formed above the silt screen in such a manner as to be adjusted in width according to the movements of the buoys caused by the level of seawater.

According to the present invention, desirably, each pile is configured to have two sheet piles facing each other and a fixing ring slidable in an internal space formed by the sheet piles in upward and downward directions, so that the silt screen is connected to the fixing ring in such a manner as to be fixed to the sheet piles in a vertical direction to the sheet piles and slidable in longitudinal directions of the sheet piles, and the upper end of the silt screen is fixed to the buoys to allow the water flow section to be adjusted in width according to the movements of the buoys caused by the level of seawater.

According to the present invention, desirably, a first silt curtain where the water flow section is formed under the

silt screen and a second silt curtain where the water flow section is formed above the silt screen are continuously installed in a main current direction.

According to the present invention, desirably, if the
5 main current direction is horizontal or vertical to the coast, the longitudinal direction of the water flow section is horizontal to the main current direction, and if the main current direction is at an acute angle to the coast, the longitudinal direction of the water flow section is vertical
10 to the main current direction.

To accomplish the above-mentioned object, according to a second aspect of the present invention, there is provided a silt curtain facility for water quality management of a water intake facility adjacent thereto, the silt curtain facility
15 including: a blocking section disposed between the water intake facility and a pollution source to block floating matters from seawater and the pollution source; a water flow section formed of the silt curtain according to the first aspect of the present invention and disposed on the opposite
20 side to the blocking section with respect to the water intake facility to allow the seawater to be introduced thereinto on high tide; and a guide section protruding vertically from the end portion of the water flow section to guide the seawater introduced into the water flow section, wherein the blocking
25 section and the water flow section are formed to surround the water intake facility.

To accomplish the above-mentioned object, according to a third aspect of the present invention, there is provided a method for constructing a silt curtain having a plurality of
30 piles inserted vertically into subsea ground to a give depth in such a manner as to be spaced apart from each other by a given distance, buoys adapted to connect the piles to each

other in such a manner as to be moved in longitudinal directions of the piles according to a level of seawater, a silt screen fixedly connected to the piles in vertical directions to the piles in such a manner as to block floating matters of seawater, and a weight located on the lower end of the silt screen to apply load to the silt screen, the method including: the seawater flow modeling step of performing seawater flow modeling on a water intake facility and an area adjacent to a reclaimed section to collect current direction information and tide information; the floating matter dispersion analysis step of performing modeling for pollution sources and floating matters through the current direction information to analyze dispersion directions of the floating matters; the water flow section design step of determining the positions and directions of a blocking section silt curtain and a water flow section silt curtain on the basis of the current direction information and the floating matter dispersion directions; the water flow section width design step of determining a width of a water flow section on the basis of the tide information; the silt curtain verification step of verifying the silt curtain on the basis of the positions and directions of the blocking section silt curtain and the water flow section silt curtain and the width of the water flow section; and the silt curtain construction step of constructing the silt curtain on the basis of the verified positions and directions of the blocking section silt curtain and the water flow section silt curtain and the verified width of the water flow section.

According to the present invention, desirably, at the water flow section design step, if the main current direction is horizontal or vertical to the coast, the longitudinal direction of the water flow section is horizontal to the main

current direction, and if the main current direction is at an acute angle to the coast, the longitudinal direction of the water flow section is vertical to the main current direction.

According to the present invention, desirably, at the
5 water flow section design step, the water flow section includes a first silt curtain where the water flow section is formed under the silt screen and a second silt curtain where the water flow section is formed above the silt screen, and the first silt curtain and the second silt curtain are
10 continuously installed in the main current direction.

【Advantageous Effects】

As mentioned above, the present invention has the following advantages.

Firstly, the present invention at the same time
15 satisfies a planned water intake amount condition and a water quality condition of the water intake facility located on the coast.

Secondly, the present invention is more rigid than the floating type silt curtain having difficulties in maintenance
20 due to currents and waves.

Thirdly, the present invention ensures an appropriate water flow sectional area capable of allowing an appropriate amount of water to be introduced into a water intake facility.

Fourthly, the present invention has the water flow
25 section silt curtain and the blocking section silt curtain having the same configurations as each other, so that the water flow section silt curtain and the blocking section silt curtain can be changed easily according to the current directions.

30 Lastly, the present invention prevents big movements of the weight like a ballast chain by means of the sheet piles, thereby keeping floating matters from being generated from

the subsea ground due to the movements of the weight caused by currents.

【Description of Drawings】

The following drawings herein illustrate preferred
5 embodiments of the present invention and serve to facilitate the general understanding of the scope of the present invention, together with the detailed description of the present invention. Therefore, the present invention is not limitedly interpreted only with the attached drawings.

10 FIG.1 is a photograph showing an example where floating matters are generated in a dredge process on the coast.

FIG.2 is a diagram showing a general floating type silt curtain.

15 FIG.3 is a photograph showing a water intake facility on the coast.

FIG.4 is a diagram showing a section design of a silt curtain for water quality management of a water intake facility adjacent to the silt curtain according to the present invention.

20 FIG.5 is a front view showing a blocking section silt curtain according to the present invention.

FIG.6 is a side view taken along the line A-A of the blocking section silt curtain according to the present invention.

25 FIG.7 is a horizontal sectional view showing a sheet pile according to the present invention.

FIG.8 is a horizontal sectional view showing a first variation example of the sheet pile according to the present invention.

30 FIG.9 is a horizontal sectional view showing a second variation example of the sheet pile according to the present invention.

FIG.10 is a front view showing a water flow section silt curtain on high tide according to the present invention.

FIG.11 is a side view taken along the line B-B of the water flow section silt curtain on high tide according to the present invention.

FIG.12 is a front view showing a water flow section silt curtain on low tide according to the present invention.

FIG.13 is a side view taken along the line B-B of the water flow section silt curtain on low tide according to the present invention.

FIG.14 is a front view showing a third variation example of the water flow section silt curtain on high tide according to the present invention.

FIG.15 is a side view taken along the line B-B of the water flow section silt curtain on high tide according to the third variation example of the present invention.

FIG.16 is a front view showing the water flow section silt curtain on low tide according to the third variation example of the present invention.

FIG.17 is a side view taken along the line B-B of the water flow section silt curtain on low tide according to the third variation example of the present invention.

FIG.18 is a front view showing a fourth variation example of the water flow section silt curtain on high tide according to the present invention.

FIG.19 is a side view taken along the line B-B of the water flow section silt curtain on high tide according to the fourth variation example of the present invention.

FIG.20 is a front view showing the water flow section silt curtain on low tide according to the fourth variation example of the present invention.

FIG.21 is a side view taken along the line B-B of the water flow section silt curtain on low tide according to the fourth variation example of the present invention.

FIG.22 is a side view showing double-installed water
5 flow section silt curtains according to the present invention.

FIG.23 is a diagram showing a water flow section silt curtain position when a current direction is horizontal to the coast according to the present invention.

FIG.24 is a diagram showing a water flow section silt
10 curtain position when a current direction is vertical to the coast according to the present invention.

FIGS.25 and 26 are diagrams showing a water flow section silt curtain position when a current direction is at an acute angle to the coast according to the present invention.

FIG.27 is a flowchart showing a method for constructing
15 a silt curtain according to the present invention.

FIG.28 is a graph showing a seawater flow modeling step in the method for constructing a silt curtain according to the present invention.

FIGS.29a and 29b are graphs showing a floating matter
20 dispersion analysis step in the method for constructing a silt curtain according to the present invention.

FIGS.30a and 30b are graphs showing silt curtain verification according to the present invention.

FIG.31 is a photograph showing an example of the silt
25 curtain construction according to the present invention.

FIGS.32 and 33 are flow velocity graphs showing guide section effects according to the present invention.

【Mode for Invention】

30 Hereinafter, an explanation on the present invention easily carried out by those skilled in the art will be in detail given with reference to the attached drawing. If it is

determined that the detailed explanation on the well known technology related to the present invention makes the scope of the present invention not clear, the explanation will be avoided for the brevity of the description.

5 The present invention is disclosed with reference to the attached drawings wherein the corresponding parts in the embodiments of the present invention are indicated by corresponding reference numerals. In the description, when it is said that one element is described as being "connected" or
10 "coupled" to the other element, one element may be directly connected or coupled to the other element, but it should be understood that another element may be present between the two elements. In the description, when it is said that one portion is described as "includes" any component, one element
15 further may include other components unless no specific description is suggested.

Silt curtain for water quality management of water intake facility adjacent thereto

20 FIG.4 is a diagram showing a section design for a silt curtain for water quality management of a water intake facility adjacent thereto according to the present invention. As shown in FIG.4, a silt curtain for water quality management of a water intake facility adjacent thereto
25 according to the present invention includes a blocking section silt curtain 100 and a water flow section silt curtain 101.

 According to the present invention, the blocking section silt curtain 100 prevents floating contaminants (hereinafter,
30 referred to as floating matters) caused by dredging and reclaiming on a floating matter generation area 20 from being introduced into a water intake facility 10. Unlike the

existing silt curtain, the blocking section silt curtain 100 according to the present invention includes the section for directly protecting the water intake facility 10 and a guide section 102 for maintaining a direction, velocity, and flow rate of the seawater introduced into the water flow section silt curtain 101.

According to the present invention, the water flow section silt curtain 101 serves to block some of the floating matters and to stably maintain the flow rate and velocity of the seawater in the water intake facility 10. Unlike the existing silt curtain, the water flow section silt curtain 101 according to the present invention is designed to have different water flow areas on low and high tide.

FIG.5 is a front view showing the blocking section silt curtain 100 according to the present invention, and FIG.6 is a side view taken along the line A-A of the blocking section silt curtain 100 according to the present invention. As shown in FIGS.5 and 6, the blocking section silt curtain 100 according to the present invention includes buoys 110, sheet piles 120, a silt screen 130, and a weight 140.

The buoys 110 floating on a sea surface by means of buoyancy are connected to an upper end of the silt screen 130 to apply the buoyancy to the silt screen 130. Further, the buoys 110 are connected to the sheet piles 120 to prevent the occurrence of their breakage or deviation caused by currents and waves.

Each sheet pile 120 includes two sheet type piles facing each other, and the silt screen 130 is located between the two sheet type piles in such a manner as to be fixed in movements in left and right directions and be movable (slidable) in upward and downward directions. FIG.7 is a horizontal sectional view showing each sheet pile 120

according to the present invention. As shown in FIG.7, the sheet pile 120 is configured to have two n-shaped sheet type piles facing each other, and the silt screen 130 is located between the two sheet type piles.

5 According to a first variation example of the sheet pile 120 according to the present invention, further, the silt screen 130 of the blocking section silt curtain 100 is fixed to the sheet pile 120 in every direction. FIG.8 is a horizontal sectional view showing a first variation example
10 of the sheet pile 120 according to the present invention. As shown in FIG.8, the sheet pile 120 is configured to have two n-shaped sheet type piles facing each other in such a manner as to place the silt screen 130 therebetween and to have connection ropes 160 connecting the two sheet type piles and
15 the silt curtain 130 in such a manner as to allow the silt screen 130 to be fixed to the sheet pile 120 in every direction.

 According to a second variation example of the sheet pile 120, furthermore, the silt screen 130 of the blocking
20 section silt curtain 100 is freely slidable along the sheet pile 120 in upward and downward directions and is fixed to the sheet pile 120 in left and right directions. FIG.9 is a horizontal sectional view showing a second variation example of the sheet pile 120 according to the present invention. As
25 shown in FIG.9, the sheet pile 120 is configured to have two n-shaped sheet type piles facing each other in such a manner as to place the silt screen 130 and a fixing ring 170 therebetween and to have a connection rope 160 connecting the fixing ring 170 and the silt curtain 130 in such a manner as
30 to allow the silt screen 130 to be freely slidable along the sheet pile 120 in upward and downward directions and to be fixed to the sheet pile 120 in left and right directions.

In addition to the sheet piles, of course, the present invention may include all kinds of piles providing similar effects to the effects of the sheet piles.

5 The silt screen 130 is configured to block the floating matters, and for example, it is made of a silt fabric. The silt screen 130 receives vertical upward forces from an upper end thereof through the buoyancy of the buoys 110 and receives vertical downward forces from a lower end thereof through the gravity of the weight 140, thereby maintaining
10 the blocking area thereof. A length h of the silt screen 130 of the blocking section silt screen 100 is the same as a depth of water (for example, highest astronomical tide HAT). If the length h of the silt screen 130 is the same as the HAT, the silt screen 130 can provide the blocking effects even if
15 the depth of water is lower than the HAT.

The weight 140 is located on the lower end of the silt screen 130 to apply a force corresponding to its self weight in the vertical downward direction to the silt screen 130. According to the present invention, as shown in FIG.5, the
20 weight 140 is formed of a ballast chain. The self weight applied from the weight 140 in the blocking section silt curtain 100 is larger than the buoyancy of the buoys 110.

According to the present invention, the water flow section silt curtain 101 serves to block some of the floating
25 matters and to stably maintain the flow rate and velocity of the seawater in the water intake facility 10. Unlike the existing silt curtain, the water flow section silt curtain 101 according to the present invention is designed to have different water flow areas on low and high tide.

30 FIG.10 is a front view showing a water flow section silt curtain on high tide according to the present invention, FIG.11 is a side view taken along the line B-B of the water

flow section silt curtain on high tide according to the present invention, FIG.12 is a front view showing a water flow section silt curtain on low tide according to the present invention, and FIG.13 is a side view taken along the line B-B of the water flow section silt curtain on low tide according to the present invention. As shown in FIGS.10 to 13, the water flow section silt curtain 101 according to the present invention has a silt screen 130 having a length h' shorter than a depth of water when compared with the blocking section silt curtain 100. Further, the length h' of the silt screen 130 of the water flow section silt curtain 101 according to the present invention is based upon MLWS (Mean Low Water Spring). If the length h' is based upon the MLWS, the silt screen 130 prevents the flow rate of water in a water intake section formed by the silt curtain from being reduced on low tide to stably supply a quantity of water that has to be supplied to the water intake facility 10 to the water intake facility 10.

As shown in FIGS.10 to 13, the water flow section silt curtain 101 according to the present invention has the silt screen 130 having the length h' shorter than a depth of water, so that a water flow section 150 is formed under the silt screen 130 by means of buoyancy on high tide and disappears on low tide because a sea level becomes low. According to the present invention, the buoyancy generated from buoys 110 on the water flow section silt curtain 101 is larger than the self weights of the silt screen 130 and the weight 140. If the water flow section 150 is formed under the silt screen 130, fine floating matters, which float and move high around the sea surface, are effectively blocked, and also, water is stably supplied to the water intake facility 10. In case of the water flow section silt curtain 101 according to the

present invention, the water flow section 150 disappears on low tide, so that the reduction in the flow rate of water in the water intake section formed by the silt curtain is prevented to stably supply a quantity of water that has to be
5 supplied to the water intake facility 10 to the water intake facility 10.

FIG.14 is a front view showing a third variation example of the water flow section silt curtain 101 on high tide according to the present invention, and FIG.15 is a side view
10 taken along the line B-B of the water flow section silt curtain 101 on high tide according to the third variation example of the present invention. FIG.16 is a front view showing the water flow section silt curtain 101 on low tide according to the third variation example of the present
15 invention, and FIG.17 is a side view taken along the line B-B of the water flow section silt curtain 101 on low tide according to the third variation example of the present invention. As shown in FIGS.14 to 17, the water flow section silt curtain 101 according to the third variation example of
20 the present invention is configured to allow the buoyancy generated from the buoys 110 to be smaller than the self weight of the weight 140 and larger than the self weight of the silt screen 130, so that while the weight 140 is being fixed to the ground, the silt screen 130 is unfolded by means
25 of the buoys 110. In case of the water flow section silt curtain 101 according to the third variation example of the present invention, the water flow section 150 is formed above the silt screen 130 on high tide and disappears on low tide because a sea level becomes low. According to the third
30 variation example of the present invention, that is, the water flow section 150 of the water flow section silt curtain 101 disappears on low tide, so that the reduction in the flow

rate of water in the water intake section formed by the silt curtain is prevented to stably supply a quantity of water that has to be supplied to the water intake facility 10 to the water intake facility 10. According to the third variation example of the present invention, further, the water flow section 150 of the water flow section silt curtain 101 is formed above the silt screen 130, floating matters, which float and move low around subsea ground, are effectively blocked, and also, water is stably supplied to the water intake facility 10.

FIG.18 is a front view showing a fourth variation example of the water flow section silt curtain on high tide according to the present invention, and FIG.19 is a side view taken along the line B-B of the water flow section silt curtain on high tide according to the fourth variation example of the present invention. FIG.20 is a front view showing the water flow section silt curtain on low tide according to the fourth variation example of the present invention, and FIG.21 is a side view taken along the line B-B of the water flow section silt curtain on low tide according to the fourth variation example of the present invention. As shown in FIGS.18 to 21, the water flow section silt curtain 101 according to the fourth variation example of the present invention is configured to allow a floating matter silt screen 131 having a length lower than the length h' to be attached to the buoys 110, to allow an upper end of the silt screen 130 to be fixed to one side of the sheet pile 120 (a portion of the length h' from the ground), and to allow a lower end of the silt screen 130 to be connected to the weight 140 to receive the force corresponding to the self weight of the weight 140 from the lower portion of the silt screen 130. According to the fourth variation example of the

present invention, while the weight 140 is being fixed to the ground, the silt screen 130 is unfolded by means of the portion fixed to one side of the sheet pile 120. In case of

the water flow section silt curtain 101 according to the

5 fourth variation example of the present invention, the water flow section 150 is formed at top of the silt screen 130 on high tide and disappears on low tide because a sea level becomes low. According to the fourth variation example of the present invention, that is, the water flow section 150 of the
10 water flow section silt curtain 101 disappears on low tide, so that the reduction in the flow rate of water in the water intake section formed by the silt curtain is prevented to stably supply a quantity of water that has to be supplied to the water intake facility 10 to the water intake facility 10.

15 According to the fourth variation example of the present invention, further, even if the water flow section 150 of the water flow section silt curtain 101 is formed at top of the silt screen 130, the fine floating matters, which float and move high around sea surface, are effectively blocked by
20 means of the floating matter silt screen 131 located on top of the water flow section 150, that is, on the sea surface, and at the same time, floating matters, which float and move low around subsea ground, are effectively blocked by means of the silt screen 130, while water is being stably supplied to
25 the water intake facility 10.

According to the present invention, the water flow section silt curtain 101 according to the present invention in which the water flow section 150 is formed under the silt screen 130 and the water flow section silt curtain 101
30 according to the third and fourth variation examples of the present invention in which the water flow section 150 is formed at top of the silt screen 130 are double-installed.

FIG.22 is a side view showing double-installed water flow section silt curtains according to the present invention. As shown in FIG.22, if the water flow section silt curtains 101 are double installed to have the water flow sections 150 are formed above the silt screen 130 and on top of the silt screen 130, floating matters floating and moving low around subsea ground and fine floating matters floating and moving high around sea surface are completely blocked. Particularly, if the lengths of the silt screens 130 of the double-installed water flow section silt curtains 101 are longer than the length h' (which is longer than a depth of MLWS), the water flow sections 150 disappear on low tide, so that the discharge of the seawater from the water intake section around the water intake facility 10 is blocked to stably supply the seawater to the water intake facility 10.

According to the present invention, the length of the silt screen 130 can be post-changed by the rotation of the buoys 110 connected to the silt screen 130 on one side thereof or the length adjustment of the ropes connected to the weight 140 and the buoys 110. According to the present invention, the water flow section silt curtain 101 and the blocking section silt curtain 100 are freely varied according to the changes in current directions).

According to the present invention, if the flow rate of the current is increased, the length h' of the silt screen 130 is decreased by the additional force applied to the silt screen 130, and if the flow rate of the current is decreased or the current is formed in a negative direction (a direction where the seawater is drained from the water intake section), the length h' of the silt screen 130 is increased by the reduction of the force applied to the silt screen 130 or by

the application of the force to the opposite direction to the negative direction.

According to the present invention, the position of the water flow section silt curtain 101 can be selected according to current directions. FIG.23 is a diagram showing the position of the water flow section silt curtain 101 when a current direction is horizontal to the coast according to the present invention. As shown in FIG.23, when the current direction (indicated by a white arrow) is horizontal to the coast, the blocking section silt curtain 100 and the guide section 102 are determined in a vertical direction to the coast, and the water flow section silt curtain 101 is determined in a horizontal direction to the coast. Accordingly, seawater is introduced into the water intake facility 10 through the water flow section silt curtain 101 in a vertical direction (indicated by a black arrow) to the coast.

FIG.24 is a diagram showing the position of the water flow section silt curtain when a current direction is vertical to the coast according to the present invention. As shown in FIG.24, when the current direction (indicated by a white arrow) is vertical to the coast, the blocking section silt curtain 100 and the guide section 102 are determined in a horizontal direction to the coast, and the water flow section silt curtain 101 is determined in a vertical direction to the coast. Accordingly, seawater is introduced into the water intake facility 10 through the water flow section silt curtain 101 in a horizontal direction (indicated by a black arrow) to the coast.

FIGS.25 and 26 are diagrams showing the position of the water flow section silt curtain when a current direction is at an acute angle to the coast according to the present

invention. As shown in FIGS.25 and 26, when the current direction (indicated by a white arrow) is at an acute angle to the coast, the blocking section silt curtain 100 and the guide section 102 are determined in a vertical direction to the coast, and the water flow section silt curtain 101 is determined in the same direction as the current to introduce seawater into the water intake section. Accordingly, the seawater is introduced into the water intake facility 10 through the water flow section silt curtain 101 in a horizontal direction (indicated by a black arrow) to the coast.

Method for constructing silt curtain for water quality management of water intake facility adjacent to the silt curtain

FIG.27 is a flowchart showing a method for constructing a silt curtain according to the present invention. As shown in FIG.27, a method for constructing a silt curtain according to the present invention includes a seawater flow modeling step S10, a floating matter dispersion analysis step S11, a silt curtain and water flow section design step S12, and a silt curtain verification and construction step S13.

The seawater flow modeling step S10 is a step of performing seawater flow modeling for a water intake facility 10 and an area adjacent to a reclaimed section. At the step S10, a main current direction is checked, and information on HAT, mean low water spring MLWS, and so on is obtained. FIG.28 is a graph showing the seawater flow modeling step in the method for constructing a silt curtain according to the present invention. At the step S10, as shown in FIG.28, the main current direction is checked, tide information is extracted, and current velocity information is collected.

The floating matter dispersion analysis step S11 is a step of performing modeling for pollution sources and floating matters through the main current direction checked at the step S10 to analyze the dispersion directions of the floating matters. FIGS.29a and 29b are graphs showing floating matter dispersion analysis step in the method for constructing a silt curtain according to the present invention. As shown in FIGS.29a and 29b, the step S11 performs the floating matter dispersion analysis for the pollution sources on a single point A or a plurality of points B.

The silt curtain and water flow section design step S12 is a step of determining the positions and directions of a blocking section silt curtain and a water flow section silt curtain on the basis of the main current direction and the floating matter dispersion direction and of determining the size of a water flow section on the basis of the information on the mean low water spring MLWS.

The silt curtain verification and construction step S13 is a step of performing sand pouring modeling on the basis of the positions and directions of the blocking section silt curtain and the water flow section silt curtain and the size of the water flow section determined at the step S12, verifying the silt curtain, and constructing the verified silt curtain.

FIGS.30a and 30b are graphs showing silt curtain verification in the method for constructing a silt curtain according to the present invention. As shown in FIGS.30a and 30b, the silt curtain verification at the step S13 is performed through the floating matter dispersion analysis on a condition A where the silt screen is not installed and a condition B where the silt screen is installed. FIG.31 is a

photograph showing an example of the silt curtain construction according to the present invention. As shown in FIG.31, if the verification for the silt curtain is completed at the step S13, the construction of the silt curtain starts
5 by first building the sheet piles on designed positions.

Referring to the effects of the guide section 102, FIGS.32 and 33 are flow velocity graphs showing guide section effects according to the present invention. As the guide section 102 according to the present invention is provided,
10 as shown in FIG.32, the water flow is performed through the blocking section silt curtain 100 having the length L capable of blocking flow velocity interference of the intake and a wing structure of the guide section 102 having a length longer by 1.4 times than the length L, so that it is checked
15 that current breakage for outside sea occurs gently. Further, as shown in FIG.33, it is checked that the flows of the seawater generated in the inner channel are stabilized.

While the present invention has been described with reference to the particular illustrative embodiments, it is
20 not to be restricted by the embodiments but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

【CLAIMS】**【Claim 1】**

A silt curtain for water quality management of a water intake facility adjacent thereto, the silt curtain
5 comprising:

a plurality of piles inserted vertically into subsea ground to a give depth in such a manner as to be spaced apart from each other by a given distance;

10 buoys adapted to connect the piles to each other in such a manner as to be moved in longitudinal directions of the piles according to a level of seawater;

a silt screen fixedly connected to the piles in vertical directions to the piles in such a manner as to block floating matters of seawater; and

15 a weight located on the lower end of the silt screen to apply load to the silt screen,

wherein a length of the silt screen is longer than a depth of mean low water spring MLWS, and through the movements of the buoys according to the level of seawater, a
20 water flow section is formed above or under the silt screen on high tide, while the water flow section is being blocked on low tide.

【Claim 2】

The silt curtain according to claim 1, wherein an upper
25 end of the silt screen is fixed to given positions of the piles so that the length of the silt screen is longer than the depth of the mean low water spring MLWS, a floating matter silt screen is disposed on lower ends of the buoys in such a manner as to have a length lower than the length of
30 the silt screen and to block fine floating matters attachedly moving along the surface of seawater, while the buoys are being not connected to the silt screen, and the water flow

section is formed above the silt screen in such a manner as to be adjusted in width according to the movements of the buoys caused by the level of seawater.

【Claim 3】

5 The silt curtain according to claim 1, wherein each pile is configured to have two sheet piles facing each other and a fixing ring slidable in an internal space formed by the sheet piles in upward and downward directions, so that the silt screen is connected to the fixing ring in such a manner as to
10 be fixed to the sheet piles in vertical directions to the sheet piles and slidable in longitudinal directions of the sheet piles, and the upper end of the silt screen is fixed to the buoys to allow the water flow section to be adjusted in width according to the movements of the buoys caused by the
15 level of seawater.

【Claim 4】

 The silt curtain according to claim 1, wherein a first silt curtain where the water flow section is formed under the silt screen and a second silt curtain where the water flow
20 section is formed above the silt screen are continuously installed in a main current direction.

【Claim 5】

 The silt curtain according to claim 1, wherein if the main current direction is horizontal or vertical to the coast,
25 the longitudinal direction of the water flow section is horizontal to the main current direction, and if the main current direction is at an acute angle to the coast, the longitudinal direction of the water flow section is vertical to the main current direction.

30 **【Claim 6】**

A silt curtain facility for water quality management of a water intake facility adjacent thereto, the silt curtain facility comprising:

5 a blocking section disposed between the water intake facility and a pollution source to block floating matters from seawater and the pollution source;

10 a water flow section formed of the silt curtain according to claim 1 and disposed on the opposite side to the blocking section with respect to the water intake facility to allow the seawater to be introduced thereinto on high tide; and

a guide section protruding vertically from the end portion of the water flow section to guide the seawater introduced into the water flow section,

15 wherein the blocking section and the water flow section are formed to surround the water intake facility.

【Claim 7】

20 A method for constructing a silt curtain having a plurality of piles inserted vertically into subsea ground to a give depth in such a manner as to be spaced apart from each other by a given distance, buoys adapted to connect the piles to each other in such a manner as to be moved in longitudinal directions of the piles according to a level of seawater, a silt screen fixedly connected to the piles in vertical
25 directions to the piles in such a manner as to block floating matters of seawater, and a weight located on the lower end of the silt screen to apply load to the silt screen, the method comprising:

30 the seawater flow modeling step of performing seawater flow modeling on a water intake facility and an area adjacent to a reclaimed section to collect current direction information and tide information;

the floating matter dispersion analysis step of performing modeling for pollution sources and floating matters through the current direction information to analyze dispersion directions of the floating matters;

5 the water flow section design step of determining the positions and directions of a blocking section silt curtain and a water flow section silt curtain on the basis of the current direction information and the floating matter dispersion directions;

10 the water flow section width design step of determining a width of a water flow section on the basis of the tide information;

the silt curtain verification step of verifying the silt curtain on the basis of the positions and directions of the
15 blocking section silt curtain and the water flow section silt curtain and the width of the water flow section; and

the silt curtain construction step of constructing the silt curtain on the basis of the verified positions and directions of the blocking section silt curtain and the water
20 flow section silt curtain and the verified width of the water flow section.

【Claim 8】

The method according to claim 7, wherein at the water flow section design step, if the main current direction is
25 horizontal or vertical to the coast, the longitudinal direction of the water flow section is horizontal to the main current direction, and if the main current direction is at an acute angle to the coast, the longitudinal direction of the water flow section is vertical to the main current direction.

30 **【Claim 9】**

The method according to claim 7, wherein at the water flow section design step, the water flow section comprises a

first silt curtain where the water flow section is formed under the silt screen and a second silt curtain where the water flow section is formed above the silt screen, and the first silt curtain and the second silt curtain are

5 continuously installed in the main current direction.