

[DESCRIPTION]

[TITLE OF INVENTION]

MAT SLAB DISMANTLING METHOD

[Technical Field]

5 [0001]

The present invention relates to a mat slab dismantling method.

Priority is claimed on Japanese Patent Application No. 2017-242010, filed on December 18, 2017 and Japanese Patent Application No. 2018-161518, filed on August 30, 2018, the contents of which are incorporated herein by reference.

10 [Background Art]

[0002]

In recent years, the number of cases of dismantling multistory buildings having a relatively young age have been increasing. As a result, there is a case where a mat slab adopted in a multistory building having a relatively young age may be dismantled.

15 The mat slab has a flat plate shape as a whole. Since the concrete of the mat slab is thick and has a large amount of reinforcement, there is a case where the concrete cannot be gripped by a normal crusher and may be dismantled by a giant breaker.

Additionally, in some cases, there is also a case where the mat slab may be explosively and partially dismantled using a special chemical agent, or may be
20 dismantled while partially hollowing out the mat slab with a large casing drill having a diameter of about 1500 mm.

Additionally, for example, there is also a case where the mat slab is dismantled by block-cutting the mat slab using a push-cutting type wire saw disclosed in Patent Document 1.

25 [Citation List]

[Patent Literature]

[0003]

[Patent Document 1]

Japanese Unexamined Patent Application, First Publication No. 2014-69529

5 [Summary of Invention]

[Technical Problem]

[0004]

However, the dismantling of the mat slab using the giant breaker has problems that large vibration, noise, and dust are generated.

10 In the method of explosively and partially dismantling the mat slab using the special chemical agent, effort is required for management and countermeasures against vibration, noise, and dust.

The method of dismantling the mat slab while partially hollowing out the mat slab with the large casing drill requires heavy equipment, increases the cost, and requires
15 effort for management.

In the method of block-cutting the mat slab, vibration, noise, and dust can be suppressed, for example, it is difficult to make a cut in a mat slab having a thickness of 2 m or more with a push-cutting type wire saw so as to penetrate the entire mat slab in the vertical direction.

20 [0005]

Therefore, an object of the present invention is to provide a mat slab dismantling method that can suppress vibration, noise, and dust and can easily dismantle a mat slab.

[Solution to Problem]

[0006]

25 In order to achieve the above object, a mat slab dismantling method according to

one aspect the present invention is a mat slab dismantling method for dismantling a mat slab including a cutting step of cutting a cutting region above an intermediate part of a mat slab in a vertical direction, the cutting step includes a groove forming step of forming a plurality of grooves extending from an upper end of the mat slab to the intermediate part of the mat slab in the vertical direction along an outer peripheral part of the cutting region, a core hole forming step of forming core holes having a diameter larger than a width dimension of each of the grooves at positions corresponding to two different points among the plurality of grooves to a depth reaching a bottom of the groove, a wire saw device installing step of installing a pulley in each of the two core holes, installing an intermediate portion in a longitudinal direction of a wire saw so as to surround the cutting region along the groove, winding the wire saw around the two pulleys, and pulling out both end portions of the wire saw in the longitudinal direction above the mat slab through the core holes, and a bottom cutting step of pulling the wire saw upward from both ends and moving the wire saw along the bottom of the cutting region to cut the cutting region.

[0007]

In the one aspect the present invention, in the cutting step, the cutting region above the intermediate part of the mat slab in the vertical direction is cut by the wire saw. For this reason, even if the mat slab has a large thickness, by cutting the mat slab stepwise in the vertical direction, vibration, noise, and dust can be suppressed as compared to a case where the mat slab is crushed by the giant breaker or the like.

Additionally, even if the mat slab is thick, it is not necessary to form cuts (grooves) in the entire vertical direction. Therefore, the mat slab can be easily dismantled without using a special device.

Additionally, since the mat slab is partially cut, it is easier to secure a work floor

than in a case where the entire mat slab is crushed by the giant breaker or the like, and safety during dismantling can be improved.

[0008]

Additionally, in the mat slab dismantling method according to the one aspect the present invention, a shape of the cutting region in plan view may be a rectangular shape, in the groove forming step, the groove may be formed at a position corresponding to an outer peripheral part of the rectangular shape, in the core hole forming step, the core holes may be formed at positions corresponding to both ends of a first side of four sides of the rectangular shape, and in the wire saw device installing step, the pulley may be installed in each of the two core holes, the intermediate portion in the longitudinal direction of the wire saw may be installed so as to surround the cutting region along the groove corresponding to three sides other than the first side among the four sides of the rectangular shape, the wire saw may be wound around the two pulleys, and both end portions of the wire saw in the longitudinal direction may be pulled out above the mat slab through the core holes.

With such a configuration, since the wire saw easily follows the outer peripheral part of the cutting region, the cutting region can be efficiently cut, and consumption of the wire saw can be suppressed.

[0009]

Additionally, in the mat slab dismantling method according to the one aspect the present invention, the groove forming step may be performed after the core hole forming step, and may include a first groove forming wire saw device installing step of installing the pulley at a first position at a bottom of each of the two core holes, disposing the wire saw at an upper end of a groove formation region of the mat slab where the groove is formed and along a position corresponding to a first edge on a first side in a width

direction of the groove, extending the wire saw downward from both ends in the longitudinal direction of the first edge through the two core holes, winding the wire saw around the pulleys, and extending the wire saw upward through the two core holes, and pulling out the wire saw above the mat slab; a first notch forming step of moving a

5 portion of the wire saw disposed along the first edge downward and forming a first notch along the first edge in the groove formation region while pulling a side of the wire saw that is pulled out above the mat slab upward from the pulleys; a second groove forming wire saw device installing step of installing the pulley at a second position closer to a second side in the width direction of the groove than the first position at the bottom of

10 each of the two core holes, disposing the wire saw at the upper end of the groove formation region and along a position corresponding to a second edge on the second side, extending the wire saw downward from both ends in the longitudinal direction of the second edge through the two core holes, winding the wire saw around the pulleys, and extending the wire saw upward through the two core holes, and pulling out the wire saw

15 above the mat slab; a second notch forming step of moving a portion of the wire saw disposed along the second edge downward and forming a second notch along the second edge in the groove formation region while pulling the side of the wire saw that is pulled out above the mat slab upward from the pulleys; a groove formation region cutting step of disposing the wire saw along a bottom of the first notch and moving the wire saw

20 toward a bottom of the second notch to cut the groove formation region from a lower side of the mat slab; and a groove formation region removing step of removing the groove formation region after the groove formation region cutting step.

With such a configuration, in the groove forming step, the wire saw is pushed down from the upper end of the mat slab to the height of the pulley using the wire saw

25 wound around the pulleys provided at the bottoms of the core holes. Accordingly, the

first notch and the second notch each having a depth reaching the bottoms of the core holes can be formed at a time.

In contrast, in a case where the first notch and the second notch are formed by a load cutter, if the depth of the groove is larger than the height dimension of the load cutter, it is necessary to form the groove for each height dimension of the load cutter. In this way, in the mat slab dismantling method according to the one aspect of the present invention, the groove having a desired depth can be divided for each height. Additionally, in a case where the groove is divided, the groove can be formed with a small number of divisions. Therefore, the construction period for the groove forming step can be shortened.

[Advantageous Effects of Invention]

[0010]

According to the present invention, vibration, noise, and dust can be suppressed, and the mat slab can be easily dismantled.

[Brief Description of Drawings]

[0011]

Fig. 1A is a plan view showing an example of a mat slab according to a first embodiment of the present invention.

Fig. 1B is a sectional view taken along line A-A of Fig. 1A.

Fig. 2 is a plan view showing a groove forming step, a first core hole forming step, and a second core hole forming step of a mat slab dismantling method according to the first embodiment.

Fig. 3 is a cross-sectional view showing a groove forming step of the mat slab dismantling method according to the first embodiment.

Fig. 4 is a plan view showing a wire saw device installing step of the mat slab

dismantling method according to the first embodiment.

Fig. 5 is a sectional view taken along line B-B of Fig. 4.

Fig. 6 is a plan view showing a bottom cutting step of the mat slab dismantling method according to the first embodiment.

5 Fig. 7 is a plan view showing a first core hole forming step and a second core hole forming step of a mat slab dismantling method according to a second embodiment.

Fig. 8 is a plan view showing a first groove forming wire saw device installing step and a first notch forming step of the mat slab dismantling method according to the second embodiment.

10 Fig. 9 is a sectional view showing the first groove forming wire saw device installing step and the first notch forming step of the mat slab dismantling method according to the second embodiment.

Fig. 10 is a plan view showing a second groove forming wire saw device installing step and a second notch forming step of the mat slab dismantling method
15 according to the second embodiment.

Fig. 11 is a plan view showing a groove formation region cutting step of the mat slab dismantling method according to the second embodiment.

Fig. 12 is a plan view showing the groove formation region cutting step, subsequent to Fig. 11, of the mat slab dismantling method according to the second
20 embodiment.

Fig. 13 is a diagram showing another form of the pulley of the wire saw device.

Fig. 14 is a diagram showing the wire saw device installing step and the bottom cutting step in a case where the shape of the cutting region in plan view is a trapezoidal shape.

25 [Description of Embodiments]

[0012]

(First Embodiment)

Hereinafter, a mat slab dismantling method according to a first embodiment of the present invention will be described with reference to Figs. 1 to 6.

5 A mat slab 1 shown in Fig. 1 is a concrete slab and is constructed as a foundation of, for example, a multistory building. In a method for dismantling the mat slab 1 according to the present embodiment, an upper portion 11 of the mat slab 1 is cut and removed, and a lower portion 12 of the mat slab 1 is crushed, dismantled, and removed.

10 In the present embodiment, a plurality of regions arranged in the horizontal direction in the upper portion 11 of the mat slab 1 are cut and removed, respectively. The plurality of regions to be cut in the upper portion 11 of the mat slab 1 are cutting regions 13.

[0013]

15 The plurality of cutting regions 13 have an oblong shape (rectangular shape) in plan view, and are cut to be substantially rectangular parallelepipeds. The cutting regions 13 adjacent to each other in the horizontal direction are disposed at intervals. For this reason, also in the upper portion 11 of the mat slab 1, a remaining portion 14 between the adjacent cutting regions 13 are crushed and dismantled after the plurality of
20 cutting regions 13 are cut and removed.

[0014]

In the method for dismantling the mat slab 1 according to the present embodiment, first, a cutting step of cutting the plurality of cutting regions 13 of the upper portion 11 of the mat slab 1 is performed, and thereafter, a crushing step of crushing the
25 remaining portion 14 between the cutting regions 13 of the upper portion 11 of the mat

slab 1 and crushing the lower portion 12 of the mat slab 1 is performed.

[0015]

In the cutting step, first, as shown in Fig. 2, a groove forming step of forming a groove 2 extending from an upper end of the mat slab 1 to an intermediate part in the vertical direction along the entire outer peripheral part of the cutting region 13 is performed.

In the groove forming step, the groove 2 is formed using a load cutter 3 as shown in Fig. 3. The width of the groove 2 to be formed is about 20 mm in which a wire saw 51 (refer to Figs. 4 and 5) can be disposed.

10 [0016]

In order to form the groove 2, first, a first groove 21 is formed by cutting a portion of the groove 2 on a first side in a width direction (a side separated from a cutting region 13) with the load cutter 3. Subsequently, a portion of the groove 2 on a second side in the width direction (a side closer to the cutting region 13 than the first groove 21) at a distance from the first groove 21 is cut by the load cutter 3 to form a second groove 22. A portion between the first groove 21 and the second groove 22 remains.

Then, the remaining portion 23 between the first groove 21 and the second groove 22 is removed. As a method of removing the remaining portion 23, for example, the remaining portion 23 may be broken and removed by driving a wedge into the groove 2, or the remaining portion 23 may be removed by being chipped with a chipping machine such as a hand breaker. Accordingly, the first groove 21 and the second groove 22 are continuous, and the groove 2 is formed.

In this way, the groove 2 shown in Fig. 2 is formed on the entire outer peripheral part of the cutting region 13. In the present embodiment, the groove 2 is formed so as to draw an oblong shape in plan view.

[0017]

A portion of the groove 2 along one short side of two short sides of the oblong shape in plan view is a first short side groove 24, a portion thereof along the other short side is a second short side groove 25, a portion thereof along one long side of two long sides is a first long side groove 26, and a portion thereof along the other long side is a second long side groove 27.

[0018]

Subsequently, two first corners 28A and 28B are disposed at both ends of the first short side groove 24 among the four corners of the oblong shape drawn by the groove 2. A first core hole forming step (core hole forming step) of forming a first core hole (core hole) 41A having a diameter larger than the width of the groove 2 and extending in the vertical direction at the first corner 28A, and a first core hole (core hole) 41B having a diameter larger than the width of the groove 2 and extending in the vertical direction at the first corner 28B is performed.

The first core holes 41A and 41B are formed such that bottoms 41a of the first core holes 41A and 41B and a bottom 2a of the groove 2 are substantially at the same height. The first core holes 41A and 41B communicate with the groove 2.

[0019]

Before and after the first core hole forming step, a second core hole forming step of forming second core holes 42A and 42B having a diameter have a width larger than the width of the groove 2 at two second corners 29A and 29B other than the two first corners 28A and 28B of the four corners of the oblong shape drawn by the groove 2 is also performed. The second core holes 42A and 42B have a diameter larger than the width of the groove 2 and extend in the vertical direction, similarly to the first core holes 41A and 41B.

The second core holes 42A and 42B are formed such that bottoms 42a of the second core holes 42A and 42B have substantially the same height as a bottom 2a of the groove 2. The second core holes 42A and 42B communicate with the groove 2.

In addition, the first core hole forming step and the second core hole forming
5 step may be performed before the groove forming step.

[0020]

Subsequently, as shown in Figs. 4 and 5, a wire saw device installing step of installing the wire saw 51 along the groove 2 so as to surround the cutting region 13 is performed.

10 In the present embodiment, the wire saw 51 of a draw cutting wire saw device 5 is installed around the cutting region 13. The sawing wire saw device 5 includes the wire saw 51, two pulleys 52 around which the wire saw 51 is wound, and a wire saw vertical movement mechanism 53 capable of pulling the wire saw 51 upward and pulling the wire saw 51 downward.

15 [0021]

The two pulleys 52 are disposed in directions in which rotation axes 52a (refer to Fig. 4) extend in the horizontal direction. The wire saw 51 wound around the pulleys 52 is disposed along a horizontal plane on one side of the pulley 52, and is disposed so as to extend in the vertical direction on the other side of the pulley 52.

20 The two pulleys 52 are supported by the wire saw vertical movement mechanism 53 or another member supported by the mat slab 1 so as to be disposed below the wire saw vertical movement mechanism 53, respectively.

In addition, the height of the two pulleys 52 with respect to the wire saw vertical movement mechanism 53 may be configured to be adjustable.

25 In the present embodiment, the two pulleys 52 are configured to be rotatable

around vertical axes 52b (refer to Fig. 5) that extend in the vertical direction.

The wire saw vertical movement mechanism 53 is disposed above the two pulleys 52.

[0022]

5 The wire saw 51 is wound around the two pulleys 52, and both end portions 51b and 51b of the wire saw 51 are connected to the wire saw vertical movement mechanism 53. The intermediate portion 51a in the longitudinal direction of the wire saw 51 is disposed on a side separated from the wire saw vertical movement mechanism 53 than the pulleys 52. Both end portions 51b and 51b in the longitudinal direction of the wire saw 51 are disposed on a side closer to the wire saw vertical movement mechanism 53 than the pulleys 52, and have a posture of extending in the vertical direction.

[0023]

 The wire saw vertical movement mechanism 53 is configured to pull up the wire saw 51 above each of the two pulleys 52. For this reason, if the wire saw vertical movement mechanism 53 pulls up the wire saw 51, the intermediate portion 51a in the longitudinal direction of the wire saw 51 is configured to move in a direction approaching the wire saw vertical movement mechanism 53 side.

[0024]

 In the wire saw device installing step, first, the wire saw vertical movement mechanism 53 of the sawing wire saw device 5 is disposed at a position adjacent to the two first core holes 41A and 41B outside the cutting region 13 of the mat slab 1. In the present embodiment, an anchor is installed outside the cutting region 13 of the mat slab 1, and the wire saw vertical movement mechanism 53 is fixed to the anchor.

Accordingly, the wire saw vertical movement mechanism 53 is fixed to the mat slab 1 via the anchor.

[0025]

In this case, one pulley 52 of the two pulleys 52 is disposed at the bottom 41a of the first core hole 41A of the two first core holes 41A and 41B, and the other pulley 52 is disposed at the bottom 41a of the first core hole 41B.

5 The wire saw 51 is disposed along the groove 2 so as to surround the cutting region 13, and is wound around the pulleys 52 such that both end portions 51b and 51b of the wire saw 51 are connected to the wire saw vertical movement mechanism 53.

 The wire saw 51 is disposed in a C-shape along the bottom of each of the first long side groove 26, the second short side groove 25, and the second long side groove 27
10 in the cutting region 13.

 When the wire saw 51 is disposed in the groove 2, the wire saw 51 is inserted to the bottom 2a of the groove 2 using the second core holes 42A and 42B having a diameter larger than the width of the groove 2.

[0026]

15 Subsequently, a bottom cutting step of cutting the cutting region 13 with the sawing wire saw device 5 is performed.

 In the bottom cutting step, first, the wire saw 51 is pulled up from both end portions 51b and 51b by the wire saw vertical movement mechanism 53. Next, as shown in Figs. 5 and 6, the intermediate portion 51a of the wire saw 51 surrounding the
20 cutting region 13 in a C-shape is moved in the horizontal direction to the wire saw vertical movement mechanism 53 side, and the bottom 13a (a boundary portion between the cutting region 13 and a portion therebelow) of the cutting region 13 is cut at the intermediate portion 51a of the wire saw 51. As described above, since the two pulleys 52 are configured to be rotatable around the vertical axes 52b, the pulleys 52 rotate
25 around the vertical axes 52b, following the movement of the wire saw 51.

The plurality of cutting regions 13 in the mat slab 1 are similarly cut, and the cut cutting regions 13 of the mat slab 1 are removed.

[0027]

Subsequently, a crushing step of crushing and dismantling the remaining portion
5 of the mat slab 1 after the cutting region 13 has been removed is performed.

In the crushing step, the remaining portion 14 between the cutting regions 13 of the upper portion 11 of the mat slab 1 shown in Fig. 1 and the lower portion 12 of the mat slab 1 are crushed and dismantled by a crusher. In order to crush not the entire mat slab 1 but the remaining portion of the mat slab 1 after the cutting regions 13 have been
10 removed, a normal crusher can be used instead of a large crusher such as a giant breaker.

In this way, the mat slab 1 is dismantled.

[0028]

Next, the above-described operation and effects of the mat slab dismantling method according to the first embodiment will be described with reference to the
15 drawings.

In the mat slab dismantling method according to the above-described first embodiment, the cutting regions 13 above the intermediate part in the vertical direction in the thickness direction of the mat slab 1 are cut by the wire saw 51 in the cutting step. For this reason, even if the mat slab 1 has a large thickness, by cutting the mat slab 1
20 stepwise in the vertical direction, vibration, noise, and dust can be suppressed as compared to a case where the mat slab 1 is crushed by the giant breaker or the like.

Additionally, even if the mat slab 1 is thick (for example, about 150 cm to 500 cm), it is not necessary to form cuts (grooves) in the entire vertical direction. Therefore, the mat slab 1 can be easily dismantled without using a special device.

25 Additionally, since the mat slab 1 is partially cut, it is easier to secure a work

floor than in a case where the entire mat slab 1 is crushed by the giant breaker or the like, and safety during dismantling can be improved.

[0029]

(Second Embodiment)

5 Next, a second embodiment will be described with reference to the accompanying drawings. However, the same or similar members and portions as those in the above-described first embodiment are denoted by the same reference numerals, and description thereof will be omitted. A different configuration from that of the first embodiment will be described.

10 In a mat slab dismantling method according to the second embodiment, the groove forming step is different from the groove forming step of the mat slab dismantling method according to the first embodiment, and the groove forming step is performed after the first core hole forming step and the second core hole forming step.

 In the first core hole forming step and the second core hole forming step, as
15 shown in Fig. 7, before the groove 2 is formed, the first core holes 41A and 41B and the second core holes 42A and 42B similar to those of the first embodiment are formed.

[0030]

 In the groove forming step, the groove 2 is formed using the wire saw device 5 without using the load cutter 3 (refer to Fig. 2) as in the first embodiment. In forming
20 the groove 2, the first short side groove 24, the second short side groove 25, the first long side groove 26, and the second long side groove 27, which constitute the groove 2, are individually formed.

 Hereinafter, a method of forming the first short side groove 24 between the two first core holes 41A and 41B of the groove 2 will be described.

25 [0031]

First, as shown in Fig. 8, the pulleys 52 are installed at first positions 411A and 411B. The first positions 411A and 411B are located on the sides of the bottoms 41a of the two first core holes 41A and 41B separated from the cutting region 13.

The wire saw 51 is disposed at an upper end of the first short side groove formation region (groove formation region) 241 of the mat slab 1 where the first short side groove 24 is formed and along a position where a first edge 242 is formed on a side (one side in the width direction: a first side) of the first short side groove 24 spaced apart from the cutting region 13 at an interval.

As shown in Figs. 8 and 9, the wire saw 51 extends downward from both ends of the portion disposed along the first edge 242 through the two first core holes 41A and 41B, and is wound around the pulleys 52, respectively. The wire saw 51 wound around the two pulleys 52 extends upward through the first core holes 41A and 41B, respectively, are pulled out above the mat slab 1, and are connected to the wire saw vertical movement mechanism 53 (a first groove forming wire saw device installing step).

[0032]

Subsequently, the wire saw vertical movement mechanism 53 is driven to cut the mat slab 1 while moving a portion of the wire saw 51 disposed along the first edge 242 downward. In this way, a first notch 243 along the first edge 242 is formed in the first short side groove formation region 241 (first notch forming step).

[0033]

Subsequently, as shown in Fig. 10, the pulley 52 installed at the bottom 41a of the first core hole 41A is moved from a first position 411A to a second position 412A that is closer to the cutting region 13 than the first position 411A, and the pulley 52 installed at the bottom 41a of the first core hole 41B is moved from a first position 411B to a

second position 412B that is closer to the cutting region 13 than the first position 411B.

The wire saw 51 is disposed at an upper end of the first short side groove formation region 241 and along a position where a second edge 244 on a side (the other side in the width direction: a second side) close to the cutting region 13 of the first short side groove 24 is formed. The wire saw 51 extends downward from both ends of the portion disposed along the second edge 244 through the two first core holes 41A and 41B, and wound around the pulleys 52, respectively. The wire saw 51 wound around the two pulleys 52 extends upward through the first core holes 41A and 41B, respectively, are pulled out above the mat slab 1, and are connected to the wire saw vertical movement mechanism 53 (a second groove forming wire saw device installing step).

[0034]

Subsequently, the wire saw vertical movement mechanism 53 is driven to cut the mat slab 1 while moving a portion of the wire saw 51 disposed along the second edge 244 downward. In this way, a second notch 245 is formed in the first short side groove formation region 241 along the second edge 244 (second notch forming step).

[0035]

Subsequently, as shown in Fig. 11, the positions of the pulleys 52 are moved from the second positions 412A and 412B to the first positions 411A and 411B. In this case, the wire saw 51 is kept disposed along the bottom of the second notch 245. Accordingly, the wire saw 51 extends from both ends of the bottom of the second notch 245 to a side (first notch 243 side) separated from the cutting region 13 inside the first core holes 41A and 41B.

The wire saw vertical movement mechanism 53 is driven to move the wire saw 51 disposed along the bottom of the second notch 245 toward the bottom of the first

notch 243. As shown in Fig. 12, if the wire saw 51 moves to the bottom of the first notch 243, the bottom of the first short side groove formation region 241 is cut from the mat slab 1 (groove formation region cutting step). Accordingly, the first short side groove formation region 241 is cut from the mat slab 1.

- 5 The cut first short side groove formation region 241 is removed (groove formation region removing step). Accordingly, the first short side groove 24 is formed in the mat slab 1.

[0036]

- The second short side groove 25, the first long side groove 26, and the second
10 long side groove 27 are formed similarly to the first short side groove 24.

If the groove forming step is completed, the wire saw device installing step, the bottom cutting step, and the crushing step are performed similarly to the first embodiment.

[0037]

- 15 The mat slab dismantling method according to the second embodiment has the effects similar to the first embodiment.

- Additionally, in the mat slab dismantling method according to the second embodiment, in the groove forming step, the first notch 243 and the second notch 245 each having a depth reaching the bottoms of the core holes 41A, 41B, 42A, and 42B can
20 be formed at a time by pushing down the wire saw 51 from the upper end of the mat slab 1 to the height of the pulley 52, using the wire saw 51 wound around the pulleys 52 provided at the bottoms of the core holes 41A, 41B, 42A, and 42B.

- In contrast, in the groove forming step in the mat slab dismantling method according to the first embodiment, the load cutter 3 is used. Therefore, in a case where
25 the depth of the groove 2 is larger than the height dimension of the load cutter 3, the

groove 2 is formed for each height dimension of the load cutter 3.

In this way, in the mat slab dismantling method according to the second embodiment, the groove 2 having a desired depth can be divided for each height.

Additionally, in a case where the groove is divided, the groove 2 can be formed with a small number of divisions. Therefore, the construction period for the groove forming step can be shortened.

[0038]

Although the embodiments of the mat slab dismantling method according to the present invention have been described above, the present invention is not limited to the above embodiments, and can be appropriately changed without departing from the spirit of the present invention.

For example, in the above embodiments, the pulleys 52 are configured to be rotatable around the rotation axes 52a extending in the horizontal direction and rotatable around the vertical axes 52b (planarly rotatable). Instead of such pulleys 52, a

configuration shown in Fig. 13 may be used. In this configuration, a first pulley 55 rotatable around a rotation axis 55a extending in the horizontal direction and a second pulley 56 rotatable around a rotation axis 56a extending in the vertical direction are provided, and the wire saw 51 is wound around the first pulley 55 and the second pulley 56. With this configuration, since the direction of the wire saw 51 can easily follow the cutting direction, the cutting region 13 can be satisfactorily cut.

[0039]

Additionally, in the above-described embodiments, the cutting region 13 is set such that the shape thereof in plan view is the oblong shape, but may be set such that the shape thereof in plan view is a trapezoidal shape, as in a cutting region 13B shown in Fig.

14. In this case, first core holes 41C and 41D are formed at positions corresponding to

both ends of a long side groove 2Ba corresponding to a long side of the trapezoidal shape in the groove 2B. The intermediate portion 51a of the wire saw 51 may be wound around a short side groove 2Bb corresponding to a short side of the trapezoidal shape in the groove 2B and a pair of oblique side grooves 2Bc and 2Bd corresponding to a pair of oblique sides so as to cut a bottom 13Ba of the cutting region 13B similarly to the above
5 embodiments.

By doing so, since the wire saw 51 easily follows the outer peripheral part of the cutting region 13B, the cutting region 13B can be efficiently cut, and consumption of the wire saw 51 can be suppressed.

10 In addition, the shape of the cutting region 13 in plan view may be other than the rectangular shape.

[0040]

Additionally, in the above embodiments, a distance is provided between the adjacent cutting regions 13 in the upper portion 11 of the mat slab 1. However, the adjacent cutting regions 13 may be provided without a gap (the upper portion 11 of the
15 mat slab 1 may be continuously cut). In addition, in such a case, if a side of the cutting region 13 to be cut has already been cut, the wire saw 51 can be installed without forming the groove 2 on the already cut side. Additionally, in such a case, since the remaining portion 14 is not generated between the cutting regions 13 of the upper portion
20 11 of the mat slab 1, the step of crushing the remaining portion 14 can be omitted.

[0041]

Additionally, in the groove forming step of the above-described second embodiment, first, the first notch 243 along the first edge 242 is formed in the first short side groove formation region 241 by the wire saw 51. Subsequently, the second notch
25 245 is formed along the second edge 244 by the wire saw 51. Thereafter, the wire saw

51 is moved from the bottom of the second notch 245 to the bottom of the first notch 243 to cut the bottom of the first short side groove formation region 241. Accordingly, the first short side groove formation region 241 is cut from the mat slab 1.

In contrast, first, the first notch 243 along the first edge 242 is formed in the first short side groove formation region 241 by the wire saw 51. Subsequently, the wire saw 51 is moved from the bottom of the first notch 243 to the bottom position of the second notch 245 (not yet formed) to cut the bottom of the first short side groove formation region 241. Thereafter, the second notch 245 is formed by pulling the wire saw 51 upward along the second edge 244. Accordingly, the first short side groove formation region 241 may be cut from the mat slab 1.

[0042]

Additionally, the groove may be formed as follows. First, the first notch 243 along the first edge 242 is formed in the first short side groove formation region 241 by the wire saw 51, and subsequently the second notch 245 along the second edge 244 is formed by the wire saw 51. Thereafter, the wire saw 51 is pulled up from the second notch 245 and then inserted into the first notch 243 from above, and is disposed at the bottom of the first notch 243. Then, the bottom of the first short side groove formation region 241 is cut by moving the wire saw 51 disposed at the bottom of the first notch 243 from the bottom of the first notch 243 to the bottom of the second notch 245.

[0043]

Additionally, in the groove forming step of the second embodiment, the wire saw 51 is wound around the pulleys 52 installed at the bottom of the first core holes 41A and 41B when the first notch 243 and the second notch 245 are formed. However, the pulleys 52 may be disposed at the same height as the wire saw 51 and be lowered together with the wire saw 51 for cutting the mat slab 1.

[0044]

Additionally, the cutting step of the above embodiments is a step of cutting the cutting region above the intermediate part in the vertical direction of the mat slab 1.

However, also below the intermediate part in the vertical direction of the mat slab 1, the cutting may be performed as in the above cutting step.

[Industrial Applicability]

[0045]

According to the present invention, vibration, noise, and dust can be suppressed, and the mat slab can be easily dismantled.

10 [Reference Signs List]

[0046]

	1 mat slab
	2, 2B groove
	2a bottom
15	5 wire saw device
	13 cutting region
	41A, 41B, 41C, 41D first core hole (core hole)
	51 wire saw
	51a intermediate portion
20	51b end portion
	52 pulley

[CLAIMS]

What is claimed is:

[Claim 1]

A mat slab dismantling method for dismantling a mat slab, comprising:

5 a cutting step of cutting a cutting region above an intermediate part of a mat slab in a vertical direction,

wherein the cutting step includes

a groove forming step of forming a plurality of grooves extending from an upper end of the mat slab to the intermediate part of the mat slab in the vertical direction along
10 an outer peripheral part of the cutting region,

a core hole forming step of forming core holes having a diameter larger than a width dimension of each of the grooves at positions corresponding to two different points among the plurality of grooves to a depth reaching a bottom of the groove,

a wire saw device installing step of installing a pulley in each of the two core
15 holes, installing an intermediate portion in a longitudinal direction of a wire saw so as to surround the cutting region along the groove, winding the wire saw around the two pulleys, and pulling out both end portions of the wire saw in the longitudinal direction above the mat slab through the core holes, and

a bottom cutting step of pulling the wire saw upward from both ends and
20 moving the wire saw along the bottom of the cutting region to cut the cutting region, and

wherein the groove forming step is performed after the core hole forming step,
and

includes a first groove forming wire saw device installing step of installing the pulley at a first position at a bottom of each of the two core holes, disposing the wire saw
25 at an upper end of a groove formation region of the mat slab where the groove is formed

and along a position corresponding to a first edge on a first side in a width direction of the groove, extending the wire saw downward from both ends in the longitudinal direction of the first edge through the two core holes, winding the wire saw around the pulleys, and extending the wire saw upward through the two core holes, and pulling out
 5 the wire saw above the mat slab;

a first notch forming step of moving a portion of the wire saw disposed along the first edge downward and forming a first notch along the first edge in the groove formation region while pulling a side of the wire saw that is pulled out above the mat slab upward from the pulleys;

10 a second groove forming wire saw device installing step of installing the pulley at a second position closer to a second side in the width direction of the groove than the first position at the bottom of each of the two core holes, disposing the wire saw at the upper end of the groove formation region and along a position corresponding to a second edge on the second side, extending the wire saw downward from both ends in the
 15 longitudinal direction of the second edge through the two core holes, winding the wire saw around the pulleys, and extending the wire saw upward through the two core holes, and pulling out the wire saw above the mat slab;

a second notch forming step of moving a portion of the wire saw disposed along the second edge downward and forming a second notch along the second edge in the
 20 groove formation region while pulling the side of the wire saw that is pulled out above the mat slab upward from the pulleys;

a groove formation region cutting step of disposing the wire saw along a bottom of the second notch and moving the wire saw toward a bottom of the first notch to cut the groove formation region from a lower side of the mat slab; and

25 a groove formation region removing step of removing the groove formation

region after the groove formation region cutting step.

[Claim 2]

A mat slab dismantling method for dismantling a mat slab, comprising:

5 a cutting step of cutting a cutting region above an intermediate part of a mat slab in a vertical direction,

wherein the cutting step includes

a groove forming step of forming a plurality of grooves extending from an upper end of the mat slab to the intermediate part of the mat slab in the vertical direction along
10 an outer peripheral part of the cutting region,

a core hole forming step of forming core holes having a diameter larger than a width dimension of each of the grooves at positions corresponding to two different points among the plurality of grooves to a depth reaching a bottom of the groove,

a wire saw device installing step of installing a pulley in each of the two core
15 holes, installing an intermediate portion in a longitudinal direction of a wire saw so as to surround the cutting region along the groove, winding the wire saw around the two pulleys, and pulling out both end portions of the wire saw in the longitudinal direction above the mat slab through the core holes, and

a bottom cutting step of pulling the wire saw upward from both ends and
20 moving the wire saw along the bottom of the cutting region to cut the cutting region, wherein a shape of the cutting region in plan view is a rectangular shape,

wherein in the groove forming step, the groove is formed at a position corresponding to an outer peripheral part of the rectangular shape,

wherein in the core hole forming step, the core holes are formed at positions
25 corresponding to both ends of a first side of four sides of the rectangular shape, and

wherein in the wire saw device installing step, the pulley is installed in each of the two core holes, the intermediate portion in the longitudinal direction of the wire saw is installed so as to surround the cutting region along the groove corresponding to three sides other than the first side among the four sides of the rectangular shape, the wire saw
5 is wound around the two pulleys, and both end portions of the wire saw in the longitudinal direction are pulled out above the mat slab through the core holes, and

wherein the groove forming step is performed after the core hole forming step,
and

includes

10 a first groove forming wire saw device installing step of installing the pulley at a first position at a bottom of each of the two core holes, disposing the wire saw at an upper end of a groove formation region of the mat slab where the groove is formed and along a position corresponding to a first edge on a first side in a width direction of the groove, extending the wire saw downward from both ends in the longitudinal direction of
15 the first edge through the two core holes, winding the wire saw around the pulleys, and extending the wire saw upward through the two core holes, and pulling out the wire saw above the mat slab;

a first notch forming step of moving a portion of the wire saw disposed along the first edge downward and forming a first notch along the first edge in the groove
20 formation region while pulling a side of the wire saw that is pulled out above the mat slab upward from the pulleys;

a second groove forming wire saw device installing step of installing the pulley at a second position closer to a second side in the width direction of the groove than the first position at the bottom of each of the two core holes, disposing the wire saw at the
25 upper end of the groove formation region and along a position corresponding to a second

edge on the second side, extending the wire saw downward from both ends in the longitudinal direction of the second edge through the two core holes, winding the wire saw around the pulleys, and extending the wire saw upward through the two core holes, and pulling out the wire saw above the mat slab;

- 5 a second notch forming step of moving a portion of the wire saw disposed along the second edge downward and forming a second notch along the second edge in the groove formation region while pulling the side of the wire saw that is pulled out above the mat slab upward from the pulleys;

- a groove formation region cutting step of disposing the wire saw along a bottom
10 of the second notch and moving the wire saw toward a bottom of the first notch to cut the groove formation region from a lower side of the mat slab; and

 a groove formation region removing step of removing the groove formation region after the groove formation region cutting step.

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