

**ALLOCATION PROGRAM, ALLOCATION SYSTEM, AND ALLOCATION
PROGRAM RECORDING MEDIUM**

TECHNICAL FIELD

5 [0001] The present disclosure relates to an allocating program, an allocating system and an allocating program recording medium all relating to a unit reinforcing bar.

BACKGROUND ART

10 [0002] From the standpoint of a construction period, costs, and a quality stability, unit reinforcing bars each produced by assembling a plurality of reinforcing bar vertically and horizontally in a reticular pattern in advance at a factory are applied to the foundation of a
15 building. Multiple kinds of unit reinforcing bars are necessary in accordance with the shape of the foundation and the strength thereof. Hence, according to conventional technologies, in order to select the length and kind of each unit reinforcing bar for the foundation,
20 a person in charge responsible for design manually allocating various unit reinforcing bar from the drawing of the allocating pattern of the unit reinforcing bars for the foundation obtained by structural calculation. However, such an allocating work needs significant effort
25 and time. Hence, a design assisting program is disclosed

which is configured to execute an automatically allocating process of the unit reinforcing bar based on the foundation plan of a building (e.g., Patent Document 1).

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CITATION LIST

PATENT LITERATURES

[0003] Patent Document 1: JP 2010-33542A

10 SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] According to conventional design assisting programs, however, since a joint reinforcement for connecting the unit reinforcing bars with each other is checked up with a pattern that is registered in advance as a master, when there is no matching joint reinforcement, it is necessary for an operator to additionally register such a bar, thus not convenient.

20 [0005] Hence, an objective of the present disclosure is to provide an allocating program, an allocating system and an allocating program recording medium which do not need a master registration for a combination of a unit reinforcing bar with a joint reinforcement, and which can
25 automatically calculate and allocate a joint

reinforcement from the structure of a unit reinforcing bar and the layout of the unit reinforcing bar.

SOLUTION TO PROBLEM

5 [0006] In order to accomplish the above objective, an allocating program according to the present disclosure causes a computer to function as:

displaying means for displaying a foundation plan in a screen so as to overlap with a drawing grid
10 representing lines arranged at a certain pitch;

scale adjusting means for adjusting, in accordance with an instruction from an operator, the pitch between grid lines represented by the drawing grid displayed so as to overlap with the foundation plan;

15 applying unit deciding means for deciding a unit reinforcing bar to be applied in accordance with an instruction from the operator;

allocation range deciding means for deciding, as an allocation range of the unit reinforcing bar, a range
20 defined by at least two points specified by the operator among grid points each represented by an intersection of the drawing grid;

unit reinforcing bar automatically allocating means for allocating the unit reinforcing bar that forms
25 a foundation in accordance with the unit reinforcing bar

decided by the applying unit deciding means and with the allocation range decided by the allocation range deciding means; and

joint reinforcement automatically allocating
5 means for allocating a joint reinforcement to connect the allocated unit reinforcing bars with each other based on information on the unit reinforcing bars and on a layout thereof.

[0007] In this case, the allocating program according
10 to the present disclosure may further cause the computer to function as slab reinforcement allocating means for deciding, as an allocation range of a slab reinforcement, a range specified by the operator within a range represented by the drawing grid.

15 [0008] Moreover, the allocating program according to the present disclosure may further cause the computer to function as reinforcement bar allocating means for allocating a reinforcement bar based on a range of the unit reinforcing bar specified by the operator and on
20 information on the unit reinforcing bar.

[0009] Furthermore, the allocating program according to the present disclosure may further cause the computer to function as quantity surveying means for executing quantity survey for respective necessary amounts of the
25 unit reinforcing bar and the joint reinforcement in

accordance with an allocation results of the allocated unit reinforcing bar and of the joint reinforcement.

[0010] Still further, the allocating program according to the present disclosure may further causing the

5 computer to function as allocation result outputting means for displaying, in the screen, an allocation result relating to a selected position in accordance with an instruction from the operator.

[0011] Yet still further, the allocating program

10 according to the present disclosure may further cause the computer to function as marker adding means for displaying a marker at an arbitrary position on the screen.

[0012] Moreover, the allocating program according to

15 the present disclosure may further cause the computer to function as layout drawing outputting means for outputting data on a layout drawing in accordance with the allocation results of the unit reinforcing bar and of the joint reinforcement.

20 [0013] Furthermore, the allocating program according to the present disclosure may further cause the computer to function as applying unit selecting means for selecting the equal to or greater than one unit reinforcing bar to be applied in accordance with an instruction from the

25 operator, and for displaying, in the screen, the unit

reinforcing bar to be decided by the applying unit
deciding means so as to be selectable by the operator.

[0014] In this case, the applying unit selecting means
may be for selecting the unit reinforcing bar in

5 accordance with a building maker selected in accordance
with an instruction from the operator.

[0015] Moreover, the allocating program according to
the present disclosure may further cause the computer to
function as subsidiary material allocating means for
10 allocating a subsidiary material to be applied in
accordance with an instruction from the operator.

[0016] The displaying means may be for displaying
screens so as to be changed for each foundation plan to
be utilized in accordance with an instruction from the
15 operator.

[0017] Moreover, the allocating program according to
the present disclosure may further cause the computer to
function as comment inputting means for inputting and
displaying a comment at an arbitrary position on the
20 screen.

[0018] Furthermore, the allocating program according to
the present disclosure may further cause the computer to
function as allocation editing means for editing the
allocation of the unit reinforcing bar or of the joint

reinforcement in accordance with an instruction from the operator.

[0019] An allocating system according to the present disclosure includes the above-described displaying means, scale adjusting means, applying unit deciding means, allocation range deciding means, unit reinforcing bar automatically allocating means, and joint reinforcement automatically allocating means. Moreover, the allocating system according to the present disclosure may further include the above-described slab reinforcement allocating means, reinforcement bar allocating means, quantity surveying means, allocation result outputting means, marker adding means, layout drawing outputting means, applying unit selecting means, subsidiary material allocating means, comment inputting means, and allocation editing means.

[0020] An allocating program recording medium according to the present disclosure is a recording medium storing the above-described allocating program according to the present disclosure.

ADVANTAGEOUS EFFECTS OF INVENTION

[0021] The allocating program and allocating system of the present disclosure do not need a master registration for a combination of a unit reinforcing bar with a joint

reinforcement, and can automatically calculate and allocate a joint reinforcement from the structure of a unit reinforcing bar and the layout of the unit reinforcing bar. Hence, the joint reinforcement suitable
5 for each situation can be easily allocated.

BRIEF DESCRIPTION OF DRAWINGS

[0022] FIG. 1 is a structural diagram of an allocating system according to the present disclosure;

10 FIG.2 is a diagram illustrating an example foundation plan;

FIG.3 is a flowchart illustrating the steps of an allocating program according to the present disclosure;

15 FIG.4 is a diagram illustrating the work screen of a displaying step according to the present disclosure;

FIG.5 is a diagram illustrating the work screen of a scale adjusting step according to the present disclosure;

20 FIG.6 is a diagram illustrating the work screen of an allocation range deciding step according to the present disclosure;

FIG.7 is a flowchart illustrating an inputting step according to the present disclosure;

FIG.8 is a flowchart illustrating a joint reinforcement automatically allocating step according to the present disclosure;

FIG.9 is a side view illustrating a linear joint reinforcement;

FIG.10 is a perspective view illustrating a joint reinforcement in a shape along the connecting direction of unit reinforcing bars;

FIG.11 is a side view illustrating a Z-shaped joint reinforcement;

FIG.12 is a plan view (a) and a perspective view (b) illustrating a joint reinforcement when an anchorage length is not assured;

FIG.13 is a diagram illustrating the work screen of a reinforcement bar allocating step according to the present disclosure;

FIG.14 is a flowchart illustrating the reinforcement bar allocating step according to the present disclosure;

FIG.15 is a diagram illustrating the work screen of a slab reinforcement allocating step according to the present disclosure;

FIG.16 is a flowchart illustrating the slab reinforcement allocating step according to the present disclosure;

FIG.17 is a diagram illustrating the work screen of a subsidiary material adding step according to the present disclosure;

FIG.18 is a flowchart illustrating the
5 subsidiary material adding step according to the present disclosure;

FIG.19 is a diagram illustrating the work screen of an allocation editing step according to the present disclosure;

10 FIG.20 is a flowchart illustrating the allocation editing step according to the present disclosure;

FIG.21 is a diagram illustrating the work screen of an allocation result outputting step according to the
15 present disclosure;

FIG.22 is a diagram illustrating the work screen of a marker adding step according to the present disclosure;

FIG.23 is a diagram illustrating an example
20 layout drawing;

FIG.24 is a diagram illustrating the work screen of a screen changing step according to the present disclosure; and

FIG.25 is a diagram illustrating the work screen of a comment inputting step according to the present disclosure.

5 DESCRIPTION OF EMBODIMENTS

[0023] Embodiments of an allocating system 1 and an allocating program 2 applied to the allocating system 1 according to the present disclosure will be described below. In this specification, the allocating program 2
10 is so-called software. Moreover, the allocating system 1 means a computer in which such an allocating program 2 is installed, and hardware of such a computer like the peripheral device. FIG. 1 is a block diagram illustrating an exemplary electrical configuration of the
15 allocating system 1 in which the allocating program 2 of the present disclosure is installed.

[0024] The allocating system 1 is for an operator to allocate and execute quantity survey for unit reinforcing bars 5 and joint reinforcements 6 which form a foundation
20 based on a foundation plan 35 (see FIG. 2). A computer utilized as the allocating system 1 and the hardware like the peripheral device mainly includes, as illustrated in FIG. 1, a CPU 11, a ROM 12, a RAM 13, a storage device 14, an input device 16, a display device 17, an
25 interface, etc.

[0025] In this specification, the unit reinforcing bar
5 is manufactured by assembling multiple reinforcing bars
in a lenticular pattern in advance at a factory, and
mainly includes a main reinforcement 51, a web
5 reinforcement 52, a stirrup reinforcement 53, and a base
reinforcement, etc.

[0026] The CPU 11 is a central processing unit that
comprehensively controls the allocating system 1, and
executes various steps illustrated by a flowchart in FIG.
10 3 based on the allocating program 2. Information (data)
decided by the CPU 11 is stored in the RAM 13 and the
storage device 14 to be described later. The ROM 12 is a
nonvolatile memory that stores a BIOS, etc., to be
executed by the CPU 11. The RAM 13 is a volatile memory
15 that temporarily stores the launched allocating program
2, necessary information (data) for the various steps of
the allocating program 2 executed by the CPU 11, and the
information decided in the various steps, etc.

[0027] The interface connects, in a wired or wireless
20 scheme, the CPU 11, the ROM 12, the RAM 13, the storage
device 14, the input device 16, the display device 17,
and external devices, such as a scanner, a printer, and a
tablet device, with each other.

[0028] The storage device 14 means a rewritable
25 nonvolatile memory, such as a Hard Disk Drive (HDD) or a

Solid State Drive (SSD), and stores the allocating program 2 and a database 21, etc. Moreover, the information (data) necessary for the allocating program 2 and for the various steps of the allocating program 2
5 executed by the CPU 11, and the information decided in the various steps, etc., may be stored. Furthermore, although it is not illustrated in the figure, a basic software (an OS) like Windows, and interpreters, such as Java and JRuby, may be stored. Still further, the
10 storage device 14 may be built in a computer, or is located on an external server. When an external server is utilized, multiple operators may utilize the allocating program 2 through multiple PCs.

[0029] The allocating system 1 executes each step
15 illustrated by the flowchart in FIG. 3 in accordance with the allocating program 2. The details of each step will be described later.

[0030] The database 21 stores various pieces of information utilized by the allocating system 1 of the
20 present disclosure and by the allocating program 2. For example, regarding the unit reinforcing bar 5, identification information on the unit reinforcing bar 5, pieces of identification information on the main reinforcement 51, the web reinforcement 52, the stirrup
25 reinforcement 53, and the base reinforcement, etc., that

form the unit reinforcing bar, respective diameters, heights, and numbers are stored. In this specification, the height means the heights of the main reinforcement 51, the web reinforcement 52, the stirrup reinforcement 53, and the base reinforcement, etc., with reference to a position in the vertical direction called a ground level (Ground Level) decided for each unit reinforcing bar. In addition to those pieces of information, etc., the database 21 stores pieces of information relating to identification information on the joint reinforcement 6 and the diameter thereof, identification information on a reinforcement bar and the diameter thereof, identification information on a slab reinforcement and the diameter thereof, and identification information on a subsidiary material, and information including various numerical values applied to execute the quantity survey for the necessary quantity of the reinforcements for a foundation and other structures. Moreover, regarding information, etc., not registered in the database 21, the operator may read information, such as the reinforcing bar diameter of the unit reinforcing bar 5 to be applied and the height thereof, from the foundation plan 35, and may register in the database 21 in advance. Note that the database 21 may be exclusive for the allocating

program 2, or may be shared by the databases of other software programs.

[0031] In addition, since each building maker adopts the own standards, the diameters, etc., of reinforcing bars to be combined are decided in accordance with the specifications for each building maker. Hence, even if the cross-sectional shape of the foundation is consistent, when the building maker differs, the unit reinforcing bars 5 to be applied and the joint reinforcement 6 that should be adopted thereto may differ. Moreover, depending on the building maker, the unit reinforcing bar 5 that is normally applied may be fixed. Furthermore, even the same building maker may apply multiple kinds of specifications. As for such a building maker, it is possible to register, in the database 21 in advance, the unit reinforcing bar 5 that is normally applied and each specification of the building maker in association with each other. This enables an allocation by simply selecting the specification of the building maker without a selection of the unit reinforcing bar one by one, and prevents a mistake in selection.

[0032] Example input devices 16 are a keyboard and a mouse, and are to input an instruction of the operator in the allocating system 1. The display device 17 includes

a screen, and is to display and output a screen for work (will be referred to as a work screen 30 below) in the allocating system 1 and a work state, etc., in the work screen 30 in accordance with signals from the CPU 11, and
5 an example of such a device is a liquid crystal display.

[0033] Next, with reference to the flowchart in FIG. 3, each step for functionalizing the allocating system 1 of the present disclosure will be described. The allocating system 1 executes each step in accordance with the

10 allocating program 2. The allocating program 2 causes the computer of the allocating system to execute an applying unit selecting step S1, a displaying step S2, a scale adjusting step S3, an inputting step S4, and a layout drawing outputting step S6, etc. When the
15 allocating program 2 is launched, the CPU 11 starts executing each of those steps automatically or in accordance with an instruction from the operator. In each step, the work screen 30 (see FIG. 4) is displayed on the display device 17.

20 [0034] FIG.4 is a diagram illustrating an example work screen 30 displayed in the screen of the display device 17 in the allocating process. As illustrated in FIG. 4, the work screen 30 includes a menu area 31 provided at the right part of the screen, a drawing area 32 provided

at the left part of the screen, and a menu bar 33 provided at the upper part of the screen.

[0035] The menu area 31 is an area to display a plurality of operation buttons and radio buttons, and
5 check boxes, etc., relating to the allocation. By positioning a mouse pointer to an arbitrary operation button, etc., and giving an operation like clicking, the operator can select the function assigned to the operation button, and instruct the execution of such a
10 function.

[0036] The drawing area 32 is an area to display a drawing grid 321 that includes grid lines arranged in the vertical and horizontal direction at an equal pitch. Note that each intersection of the drawing grid 321 will
15 be referred to as a grid point 322 in this embodiment.

The CPU 11 sets an XY coordinate system that has the lower left corner of the work screen 30, the horizontal direction, and the vertical direction defined as an origin, an X-axis direction, and a Y-axis direction,
20 respectively, and manages each position on the work screen 30 using position information represented by coordinates. Hence, when the mouse pointer is positioned in the work screen 30 and is clicked, the CPU 11 can identify the specified grid point 322, etc., from the
25 position information.

[0037] The menu bar 33 is a bar to display a menu for selecting a stored file, outputting data, and utilizing a marker, etc.

[0038] [Applying Unit Selecting Step S1]

5 The applying unit selecting step S1 is a step that causes the computer to function as applying unit selecting means for selecting equal to or greater than one unit reinforcing bar 5 1 to be applied in accordance with an instruction from the operator, and for
10 displaying, in the screen, the unit reinforcing bar 5 to be decided by applying unit deciding means to be described later so as to be selectable by the operator. The database 21 of the allocating system registers, in advance, pieces of information relating to the structure
15 of the unit reinforcing bar, such as the diameters and heights of the main reinforcement 51 of the unit reinforcing bar 5 and the web reinforcement 52 thereof.

[0039] The operator selects equal to or greater than one unit reinforcing bar 5 to be applied for allocation
20 from the database 21 in accordance with the predetermined operation. The CPU 11 decides equal to or greater than one unit reinforcing bar 5 to be applied for allocation in accordance with an instruction from the operator.

Moreover, as illustrated in FIG. 4, the CPU 11 displays,
25 in the menu area 31, a radio button 310 enabling the

selection of the unit reinforcing bar 5 to be decided by the applying unit deciding means to be described later, and the unit reinforcing bar name. Hence, the operator can simply allocate the predetermined unit reinforcing bar 5 by simply selecting the radio button 310, it is unnecessary to input information on the unit reinforcing bar 5 at the time of allocation, and an error with respect to the input can be prevented.

[0040] Moreover, regarding the unit reinforcing bar 5, as described above, the specifications differ for each building maker, and the unit reinforcing bar 5 that is normally applied may be fixed. In such a case, the applying unit selecting step S1 may be to select the unit reinforcing bar 5 associated with the building maker and to display in the menu area 31 by the selection of the specifications of the building maker in accordance with an instruction from the operator. This causes the unit reinforcing bar 5 associated with the specifications of the building maker stored in database 21 to be selected by default, and thus it is unnecessary to select the unit reinforcing bar 5 one by one, and a mistake in selection can be prevented. Note that the association between the specifications of the building maker with the unit reinforcing bar 5 is registered in the database 21 in advance by the operator.

[0041] [Displaying Step S2]

The displaying step S2 is a step for causing the computer to function as the displaying means for displaying, in accordance with an instruction from the operator, the foundation plan 35 in the screen of the display device 17 so as to overlap with the drawing grid 321 that represents the lines arranged at a certain pitch. The foundation plan 35 applied for the allocating process will be described in advance. FIG.2 is a diagram illustrating an example foundation plan 35. The foundation plan 35 is a diagram that describes the layout and size of a foundation 36 of a building in detail. Vertical and horizontal module lines 351 to represent the basic dimension of the building are drawn on the foundation plan 35. This foundation plan 35 is given to the operator who decides the allocation of the unit reinforcing bars 5 in a form drawn on a piece of paper or in a form of image data, such as bitmap or PDF.

[0042] The operator stores the image data on this foundation plan 35 in the storage device 14 of the allocating system 1 in advance. When, for example, the foundation plan 35 is a paper medium, such a medium may be read by a scanner, etc., may be converted into image data like bitmap, and may be stored in the storage device 14, etc., of the allocating system 1.

[0043] Next, the operator selects the stored image data on the foundation plan 35 and causes such data to be read in the allocating system 1. The CPU 11 stores the image data on the foundation plan 35 in the RAM 13, and
5 displays the foundation plan 35 so as to overlap with the drawing grid 321 in the drawing area 32. As illustrated in FIG. 4, by displaying the foundation plan 35 in the drawing area 32, the drawing grid 321 is displayed in a state so as to overlap with the foundation plan 35
10 displayed like a background. Note that the pitch of the drawing grid 321 represents a unitary dimension applied for allocation. The unitary dimension is registered in advance, and for example, in the case of a Japanese scaling module, such a pitch represents 910 mm, and in
15 the case of a meter module, such a pitch represents 1000 mm.

[0044] Note that the displaying means is also capable of enlarging or scaling down the size of the foundation plan 35 and that of the drawing grid 321 displayed in the
20 drawing area 32 or shifting the positions thereof with the position and ratio of the drawing grid 321 relative to the foundation plan 35 remaining unchanged in accordance with the operation of the operator to a key and a mouse, etc.

[0045] Note that depending on a building, as illustrated in part (a) and (b) in FIG. 24, the foundation plan 35 may be divided into plural pieces in accordance with the details of the foundation. In this case, the plurality of foundation plans 35 may be captured, and a work may be desired so as to change the foundation plan 35 in accordance with things to be input. Hence, the displaying means of the present disclosure may change and display a screen for each foundation plan 35 in accordance with an instruction from the operator. In this case, the CPU 11 displays, in the drawing area 32, the foundation plan 35 to be utilized in accordance with an instruction from the operator among the plurality of foundation plans 35 stored in the RAM 13 in the displaying step S2 so as to overlap with the drawing grid 321. The instruction from the operator may be given by a predetermined operation, such as selecting a screen number to be utilized by clicking a screen change button 311 of the menu area 31.

[0046] [Scale Adjusting Step S3]

The scale adjusting step S3 is a step for causing the computer to function as scale adjusting means for adjusting, in accordance with an instruction from the operator, the pitch between the grid lines represented by the drawing grid 321 that is displayed so as to overlap

with the foundation plan 35. Regarding the module lines 351 drawn on the foundation plan 35, in the case of Japanese scaling module, the pitch is represented by 910 mm, and in the case of meter module, the pitch is represented by 1000 mm. However, since the foundation plan 35 is represented by the image data, the pitch represented by the module lines 351 cannot be directly applied for arithmetic processing as it is. Hence, it is necessary for the operator to adjust the pitch between the grid lines which is the unitary dimension of the drawing area 32 so as to match the pitch between the module lines 351 which is the unitary dimension of the foundation plan 35, and to make the dimension on the drawing area 32 available in digital data by utilizing the pitch of the grid lines.

[0047] First, the operator specifies the position and pitch of the module line 351 on the foundation plan 35. The CPU 11 adjusts the position and pitch of the grid line on the drawing area 32 so as to match those of the module line 351 on the foundation plan 35 based on the specified position and pitch.

[0048] With reference to FIG. 4 and FIG. 5, a procedure of adjusting the drawing grid 321 will be described more specifically. FIG.4 is a diagram illustrating the drawing area 32 prior to the adjustment of the drawing

grid 321. As illustrated in part (a) in FIG. 5, first, the operator specifies arbitrary two intersections of the module lines 351 drawn on the foundation plan 35, e.g., a lower left corner LD and an upper right corner RU. How to specify is optional, but for example, a mouse pointer may be positioned to the lower left corner LD of the intersection of the module lines 351 drawn on the foundation plan 35 and clicked, and, the mouse pointer may be positioned to the upper right corner RU of the intersection of the module lines 351 and clicked. The CPU 11 causes a rectangular range identified by the lower left corner LD and the upper right corner RU drawn on the foundation plan 35 to match a rectangular range identified by the grid lines in the drawing area 32.

15 [0049] Moreover, for example, as illustrated in part (a) of FIG. 5, the CPU 11 displays a menu to input the number of the module lines 351 in the horizontal direction (X-direction) between an upper left corner LU and a lower right corner RD, and prompts the operator to

20 input such a number. When the operator inputs the number of the module lines 351, the CPU 11 automatically adjusts the pitches of the overall drawing grid 321 in such a way that the number input by the operator matches the number of the grid lines within the decided rectangular range.

25 Moreover, the CPU 11 causes the lower left corner LD of

the decided rectangular range to match a grid point 322a. Part (b) of FIG.5 (b) is a diagram illustrating the state of the drawing area 32 after the position of the grid line and that of the module line 351 are adjusted. Since the CPU 11 can match the module line 351 with the grid line as described above, the position of the unit reinforcing bar 5 and that of the joint reinforcement 6, etc., can be decided based on the grid point, and the length of the unit reinforcing bar 5 and that of the joint reinforcement 6, etc., can be decided from the distance between the grid points.

[0050] Note that according to the allocating system of the present disclosure, there may be a grid adjusting step for causing the computer to function as grid adjusting means for increasing the number of the grid lines at a position divided between the module lines 351. This enables a finer position input than the module pitch. For example, as illustrated in FIG. 5, a radio button 312 located at the upper right part of the menu area 31 is 1/1 by default, and the number of module lines 351 matches with the number of the grid lines. When the operator checks and selects, by a mouse pointer, etc., "1/2", "1/4" or "1/5" of the radio button 312, the CPU 11 increases the number of the grid lines to the position where the module line 351 is divided by 1/2, 1/4 or 1/5.

Moreover, the operator may want to shift the position of the grid line relative to the module line 351. The grid adjusting means may have a function to freely shift the relative position between the module line 351 and the grid line. In this case, when the operator selects the radio button 312 that is "free", and inputs a numeric value by what corresponds to the desired shifting, the CPU 11 shifts the relative position between the module line 351 and the grid line based on such a numeric value. Furthermore, the operator may want to shift the position of the grid line relative to the module line 351 in the x-direction or in the y-direction as a specific numeric value. In this case, when the operator inputs numeric values in a window 313 subsequent to "x:" or "y:", the CPU 11 shifts the position of the grid line in the x-direction or in the y-direction based on the input numeric value.

[0051] [Inputting Step S4]

The inputting step S4 includes an applying unit deciding step S41 for causing the computer to function as the applying unit deciding means in accordance with an instruction from the operator, and an allocation range deciding step S42 for causing such a computer to function as allocation range deciding means. Moreover, the inputting step S4 may further include a reinforcement bar

allocating step S45, a slab reinforcement allocating step S46, a subsidiary material adding step S47, a marker adding step, and an allocation editing step S48 which respectively cause the computer to function as

5 reinforcement bar allocating means, slab reinforcement allocating means, subsidiary adding means, marker adding means, and allocating editing means.

[0052] [Applying Unit Deciding Step S41]

The applying unit deciding step S41 is a step
10 for causing the computer to function as the applying unit deciding means for deciding the unit reinforcing bar 5 to be applied in accordance with an instruction from the operator.

[0053] The operator decides the unit reinforcing bar 5
15 to be applied for allocating by a predetermined operation. The operation to decide the unit reinforcing bar 5 is optional, but for example, as described with respect to the applying unit selecting step S1, regarding the selected unit reinforcing bar 5, the radio button 313
20 and the unit reinforcing bar name are displayed in the menu area 31. Hence, as illustrated in part (a) of FIG. 6, the operator positions the mouse cursor to the radio button that displays the desired unit reinforcing bar name to be applied, and clicks to decide. The CPU 11

decides the selected unit reinforcing bar 5 as the reinforcing bar to be applied in the allocation range.

[0054] [Allocation Range Deciding Step S42]

The allocation range deciding step S42 is a step
5 for causing the computer to function as the allocation range deciding means for deciding, as the allocation range, a range defined by at least two points specified by the operator among the grid points 322 represented by the respective intersections of the drawing grid 321.
10 Since the foundation plan 35 is drawn with reference to the module lines 351, in the foundation plan 35, the foundation is drawn on the module lines 351 or at a position that divides the pitch equally between the module lines 351. As described above, the grid line
15 overlaps with the module line 351, and the grid line can be placed at the position that divides the pitch equally between the module lines 351. Hence, the operator can precisely specify the allocation range overlapping with the foundation drawn in the foundation plan 35 by a
20 simple operation that is to specify the grid lines and the grid points 322.

[0055] More specifically, as illustrated in part (a) of FIG. 6, in the drawing area 32, the operator specifies the grid point at one end of a range where the foundation
25 is continuous as an allocation start point 40 while

viewing the foundation plan 35 displayed as the background, and specifies the grid point at the other end as an allocation end point 41. The CPU 11 decides the allocation range that is a line which has one end that is the allocation start point 40 and has the other end that is the allocation end point 41. Moreover, as illustrated in part (b) of FIG. 6, the CPU 11 displays a bar-shape line 42 representing the allocation range so as to overlap with the foundation plan 35 in the drawing area 32. This enables the operator to grasp the already-decided allocation range in one glance. Note that specifying the grid point 322 may be executed by a predetermined operation, such as to point out with the mouse pointer and to click. In this case, even if the position out of the grid point 322 is pointed out by the mouse pointer, the CPU 11 sets the grid point 322 closest to the position pointed out by the mouse pointer as the allocation start point 40 or the allocation end point 41. This enables the operator to specify the grid point 322 without a fine operation such as to precisely position the mouse pointer to the grid point 322.

[0056] Moreover, when a plurality of linear foundations which is vent in an L-shape or in a U-shape but which is continuous, the operator can specify an arbitrary position of the foundation as the allocation start point

40, set the position of a vertex where the foundations
contact with each other or an intersection where those
intersect with each other as an allocation intermediate
point, and specify equal to or greater than three points
5 with an arbitrary position being as the allocation end
point 41. In this case, in order to cause the CPU 11 to
recognize that the specified point is an intermediate
point, a predetermined operation, such as to point out
the desired grid point 322 to be specified by the mouse
10 pointer with a predetermined key being depressed, and to
click, may be executed. The CPU 11 decides a line which
has one end that is the allocation start point 40 and has
the other end that is the intermediate point, and a line
which has one end that is the intermediate point and has
15 the other end that is the allocation end point 41 as the
allocation range, and displays the line 42 that
represents such allocation range so as to overlap with
the foundation plan 35.

[0057] Note that at a portion where the foundations
20 intersect with each other in a cross shape, a plurality
of layout patterns for the unit reinforcing bar that is
made continuous at the intersection portion where the
unit reinforcing bar divided occurs. In such a case, the
CPU 11 displays, for example, by a pop-up, which unit
25 reinforcing bar 5 is made continuous and in which

direction such a bar is made continuous, and allows the operator to select the unit reinforcing bar 5 that is made continuous. When the operator selects the unit reinforcing bar 5 that is made continuous, the CPU 11
5 decides the unit reinforcing bar 5 that is made continuous in accordance with the selection by the operator, and decides the allocation range based on the foregoing decision.

[0058] [Unit Reinforcing Bar Automatically Allocating
10 Step S43]

A unit reinforcing bar automatically allocating step S43 is a step for causing the computer to function as unit reinforcing bar automatically allocating means for allocating the unit reinforcing bars that form the
15 foundation in accordance with the unit reinforcing bars 5 decided by the applying unit deciding means and with the allocation range decided by the allocation range deciding means. In this specification, allocating the unit reinforcing bar means is for deciding the position of the
20 unit reinforcing bar and the length thereof. When the allocation range is decided, the CPU 11 executes, based on, for example, a flow illustrated in FIG. 7, the unit reinforcing bar automatically allocating step S43 in a real time manner. Note that the decided allocation range
25 includes not only the allocation range decided at the

last minute but also the allocation range decided previously.

[0059] More specifically, when the length of the unit reinforcing bar 5 in the allocation range is equal to or shorter than the predetermined maximum length, the CPU 11 does not divide the unit reinforcing bar 5 (S431). In this case, the maximum length means the maximum length of the unit reinforcing bar 5 decided in accordance with constraints, such as the performance of a production machine, the length of a raw material, and the length that a truck can carry. Such a maximum length is registered in the database 21 in advance. When the length of the unit reinforcing bar 5 in the allocation range exceeds the maximum length, the CPU 11 divides the allocation range so as to obtain the smallest number of divisions within a range where the length of the unit reinforcing bar 5 after such division does not exceed the maximum length (S432).

[0060] Moreover, since the foundation plan 35 represents the layout of the foundation of the building and the dimension thereof based on the vertical and horizontal module lines 351 which represents the basic dimension of the building, as for the unit reinforcing bar 5 applied to the foundation, it is convenient to apply a reference length based on such a basic dimension.

More specifically, in the case of Japanese scaling module, a length, such as 455 mm, 910 mm, 1820 mm or 2730mm, becomes the reference length. Hence, when the allocation range is divided, the CPU 11 sets the
5 reference length as the dividing length, and calculates a dividing combination that reduces the length out of the reference as much as possible (S433). Note that a dividing position will be referred to as a dividing point below.

10 [0061] Furthermore, when the position of the intersection where the foundations intersect with each other is taken as the dividing point, the strength of such a position decreases, and it is necessary to place the plurality of joint reinforcements 6 at the same
15 position, making a construction difficult. Accordingly, it is preferable that the dividing point should not overlap with the position of the intersection of the foundations as much as possible. Hence, the CPU 11 selects the un-overlapping combination when there is the
20 combination such that the diving point does not overlap with the intersection of the foundations (S434).

[0062] Still further, it is advantageous for costs and the versatility at the time of construction when the kinds of the unit reinforcing bar to be applied is as few
25 as possible. Hence, the CPU 11 selects and decides the

combination that has the minimum number of kinds of the unit reinforcing bar among the remaining combinations (S435). Note that when there are multiple combinations that have the minimum number of kinds of the unit reinforcing bar among the remaining combinations, the combination is randomly selected from the remaining combinations and decided. In this way, the CPU 11 decides the position of the unit reinforcing bar 5 and the length thereof, and completes the allocation.

10 [0063] [Joint reinforcement Automatically Allocating Step S44]

A joint reinforcement automatically allocating step S44 is a step for causing the computer to function as joint reinforcement automatically allocating means for allocating the joint reinforcement 6 to connect the allocated unit reinforcing bars 5 with each other based on information on the unit reinforcing bar 5 and on the layout thereof. In this specification, the information on the unit reinforcing bar 5 is information relating to the respective pieces of identification information on the main reinforcement 51, the web reinforcement 52, etc., that form the unit reinforcing bar 5, the respective diameters and heights, and is stored in the database 21 in advance as described above. When the unit reinforcing bar 5 is allocated by the unit reinforcing

bar automatically allocating means or allocation editing means to be described later, etc., the CPU 11 executes, based on, for example, a flow illustrated in FIG. 8, the joint reinforcement automatically allocating step S44 in a real time manner. The details of the joint reinforcement automatically allocating step S44 will be described with reference to FIG. 9 to FIG. 12.

[0064] [Center-portion Shape and Kind Deciding Step S441]

10 A center-portion shape and kind deciding step S441 is a step for deciding the center portion shape of the joint reinforcement 6 and the kind of the joint reinforcement 6. The CPU 11 decides the center portion shape of the joint reinforcement 6 in accordance with the layout of the unit reinforcing bars 5 to be connected, and decides the kind of the necessary joint reinforcement in accordance with the respective heights and numbers of the main reinforcements and of the web reinforcements that form the unit reinforcing bar 5. In this specification, the center portion shape means the shape of the center portion (in the vicinity of the connection portion between the unit reinforcing bars to be connected) of the joint reinforcement 6 in the horizontal direction. Moreover, height information on the unit reinforcing bar 5 means information on the respective

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heights of the main reinforcement and the web reinforcement that form the unit reinforcing bar 5 relative to the ground level.

[0065] The CPU 11 decides the center portion shape of the joint reinforcement 6 as the same angle as a connection angle θ between the unit reinforcing bars 5 to be connected by the joint reinforcement. More specifically, when, for example, the respective unit reinforcing bars 5A and 5B to be connected with each other by the joint reinforcement 6 are placed with respective layouts in the same direction (the angle at the connection portion is 180 degrees), as illustrated in FIG. 9, the CPU 11 decides that the center portion shape of the joint reinforcement 6 at the connection portion between the unit reinforcing bars 5A and 5B is a linear shape (180 degrees). In contrast, as illustrated in FIG. 10, when the respective unit reinforcing bars 5A and 5B to be connected are placed with respective layouts in the different directions (90 degrees in FIG. 10), the CPU 11 decides that the shape of the joint reinforcement 6 at the connection portion between the unit reinforcing bars 5A and 5B is a shape bent by the connection angle θ (90 degrees in FIG. 10) between the unit reinforcing bars 5A and 5B.

[0066] Moreover, the CPU 11 decides the kind of the joint reinforcement 6 necessary for connection in accordance with the information on the respective heights and numbers of the main reinforcement and the web reinforcement that form each of the unit reinforcing bars 5A and 5B to be connected by the joint reinforcement 6. More specifically, for example, a comparison is made as for whether the respective heights of the main reinforcements 51 of the unit reinforcing bars 5A and 5B to be connected are the same or not, and when such heights are the same, as illustrated in FIG. 9 and FIG. 10, the CPU 11 determines that the joint reinforcements 6 (will be referred to as a linear reinforcement below) by the same number as those of the main reinforcements 51 and the web reinforcements 52 are necessary for connection. Furthermore, when the respective heights of the main reinforcements 51 of the unit reinforcing bars 5A and 5B to be connected are different, as illustrated in FIG. 11, CPU 11 determines that not only the joint reinforcements 6 by the same number as those of the main reinforcements 51 and the web reinforcements 52 but also a joint reinforcement 6Z in a Z-shape along the difference in heights of the main reinforcements 51 in the vertical direction are necessary as illustrated in FIG. 11.

[0067] Note that the sequence of the decision of the center portion shape of the joint reinforcement 6 and the decision of the kind of the joint reinforcement 6 is optional. Moreover, the information on the unit reinforcing bar 5 and patterning in accordance with the layout may be stored in the allocating program 2 in advance, and the center portion shape of the joint reinforcement 6 and the kind of joint reinforcement 6 may be decided simultaneously based on such information, etc.

10 [0068] [Diameter Deciding Step S442]

A diameter deciding step S442 is a step for deciding the diameter of the joint reinforcement 6. The CPU 11 determines whether the diameter of respective reinforcing bars (e.g., the main reinforcements 51 and the web reinforcements 52 to be connected with each other) that form the respective unit reinforcing bars 5A and 5B to be connected is consistent or not. When determining that the diameter of the reinforcing bars to be connected is the same, the CPU 11 decides the diameter of the joint reinforcement 6 as the same diameter as the reinforcing bar (see part (a) in FIG. 9 (a) and part (a) in FIG. 10). In contrast, when determining that the diameters of the respective reinforcing bars of the unit reinforcing bars 5 to be connected are different, based on the registered specifications of the building maker,

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etc., the CPU 11 decides the diameter of the joint reinforcement 6 as the same diameter of the reinforcing bar of either one of the unit reinforcing bar 5A or the unit reinforcing bar 5B. For example, in part (b) of FIG. 9 (b) and part (b) of FIG. 10, the diameter of the joint reinforcement 6 is decided based on the larger reinforcing bar (the unit reinforcing bar 5B). The diameter of the joint reinforcement 6 is decided in this way for the main reinforcement 51 and for the web reinforcement 52, respectively.

[0069] [Anchorage Length Deciding Step S443]

An anchorage length deciding step S443 is a step for deciding the length of the joint reinforcement 6 that becomes the basis. The joint reinforcement 6 needs a length (will be referred to as an anchorage length below) called anchoring to ensure the strength by being overlapped with the main reinforcements 51 and the web reinforcements 52 of the respective unit reinforcing bars 5 to be connected. The anchorage length determines in advance based on the specifications of the building maker registered in the database 21, the diameter of the joint reinforcement 6 and the center portion shape of the joint reinforcement 6. Hence, the CPU 11 selects the anchorage length based on the diameter of the joint reinforcement 6 and the center portion thereof, and the specifications of

the building maker, etc., registered in the database 21, and decides the length of the joint reinforcement 6. The length of the joint reinforcement 6 is decided in this way for the main reinforcement 51 and for the web reinforcement 52, respectively.

[0070] [End-Portion-Side Shape Deciding Step]

An end-portion-side shape deciding step is a step for determining whether the anchorage length of the joint reinforcement 6 can be assured or not, and for deciding the shape of the joint reinforcement 6 at an end-portion side. Depending on the shape of the foundation, the respective lengths of the unit reinforcing bars 5 to be connected are short, and the anchorage length cannot be assured. For example, as illustrated in part (a) of FIG. 12, when a length d of a unit reinforcing bar 5D is shorter than an anchorage length $L1$ ($d < L1$), the anchorage length $L1$ cannot be assured. Hence, when the anchorage length $L1$ is insufficient, it is necessary to extend the joint reinforcement 6 up to a unit reinforcing bar 5E connected to the unit reinforcing bar 5D in order to ensure the anchorage length. Moreover, depending on the layout of the unit reinforcing bar, there is no unit reinforcing bar to ensure the anchorage length and the joint reinforcement 6 cannot be extended in the horizontal

direction. For example, as illustrated in part (a) of FIG. 12, when a length e of a unit reinforcing bar 5E is shorter than the anchorage length $L1$ ($e < L1$), the anchorage length $L1$ cannot be assured. Moreover, there is no more unit reinforcing bar to be connected in the horizontal direction for the unit reinforcing bar 5E. In this case, in order to ensure the anchorage length, it is necessary to bent the joint reinforcement 6 in the vertical direction (the lengthwise direction of the stirrup reinforcement 53) at the end portion of the unit reinforcing bar 5E to extend.

[0071] Hence, the CPU 11 compares the length of the unit reinforcing bar 5 to be connected with the anchorage length, and determines whether the length of the unit reinforcing bar 5 to be connected is equal to or longer than the anchorage length $L1$ or not (S444). When determining that the length of the unit reinforcing bar 5 to be connected is equal to or longer than the anchorage length $L1$, the CPU 11 ends the allocation of the joint reinforcement 6. In this case, the shape of the joint reinforcement 6 at the end-portion side becomes a linear shape. Moreover, when determining that the length of the unit reinforcing bar 5 to be connect is shorter than the anchorage length $L1$, the CPU 11 determines, from the respective layouts of the unit reinforcing bars 5,

whether there is the unit reinforcing bar 5 to be further connected to the end portion of the connected unit reinforcing bar 5 or not (S445). When determining that there is the unit reinforcing bar 5 to be further
5 connected to the connected unit reinforcing bar 5, the CPU 11 decides the shape of the joint reinforcement 6 at the end portion as a shape bent along the connection shape of the unit reinforcing bar 5 in the horizontal direction. Moreover, the CPU 11 returns the process to
10 the step S444 again, and determines whether the length of the unit reinforcing bar 5 to be connected in such a shape is equal to or longer than the anchorage length L1 or not.

[0072] Furthermore, when determining that there is no
15 unit reinforcing bar 5 to be further connected to the end portion of the connected unit reinforcing bar 5, the CPU 11 determines the shape of the joint reinforcement 6 at the end-portion side as a shape bent in the vertical direction (the lengthwise direction of the stirrup
20 reinforcement 53) along the end portion of the unit reinforcing bar 5, and ends the allocation of the joint reinforcement 6.

[0073] According to the joint reinforcement automatically allocating step S44, as described above, by
25 merely registering, as master, the structure of the unit

reinforcing bar 5 and the specifications of the building maker, and by specifying the position of the unit reinforcing bar 5, the shape, length, and number of the joint reinforcements 6 can be automatically calculated.

5 Hence, master registration relating to the combination of the unit reinforcing bar 5 with the joint reinforcement 6 in advance is unnecessary, and the joint reinforcement 6 suitable for the situation of the unit reinforcing bar 5 can be allocated.

10 [0074] [Reinforcement Bar Allocating Step S45]

The allocating program 2 according to the present disclosure may also accomplish the reinforcement bar allocating step S45 for causing the computer to function as reinforcement bar allocating means for
15 allocating a reinforcement bar based on the range of the unit reinforcing bar 5 specified by the operator and on the information on the unit reinforcing bar 5. The reinforcement bar is a reinforcing bar to reinforce an insufficiency when the strength is insufficient by the
20 unit reinforcing bar 5 alone.

[0075] When the operator wants to add a reinforcement bar, the reinforcement bar allocating step S45 is executed by a predetermined operation. Such a predetermined operation is not limited to any particular
25 operation, but for example, as illustrated in FIG. 13, a

radio button 314 in the menu area 31 may be checked, or a predetermined key of the keyboard may be operated. This causes the CPU 11 to start the reinforcement bar allocating step S45 in accordance with an instruction from the operator. The CPU 11 executes the reinforcement bar allocating step S45 based on, for example, a flow as illustrated in FIG. 14.

[0076] The operator specifies the diameter of the reinforcement bar to be added. How to specify the diameter of the reinforcement bar is not limited to any particular scheme, but for example, as illustrated in FIG. 13, a pull-down menu 315 in the menu area 31 may be operated and selected. This causes the CPU 11 to decide the diameter of the reinforcement bar to be add in accordance with the instruction from the operator (S451).

[0077] Next, the operator specifies, by a predetermined operation, the range of the unit reinforcing bars 5 where addition of the reinforcement is desired. For example, as illustrated in part (a) of FIG. 13, the operator specifies, as an allocation start point 70, the one end of the range where the unit reinforcing bars 5 are continuous while viewing the unit reinforcing bars 5 displayed in the drawing area 32, and specifies the other end as an allocation end point 71. Such a predetermined operation is not limited to any particular operation, but

for example, the grid points 322 that are desired to be the allocation start point 70 and the allocation end point 71, respectively, may be pointed out by the mouse pointer and clicked. This causes the CPU 11 to decide
5 the range of the unit reinforcing bars 5 where the reinforcement bar is added in accordance with an instruction from the operator (S452).

[0078] There are two cases in which the length of the reinforcement bar is set to be the same length as that of
10 the range of the unit reinforcing bars specified by the operator, and in which the length by what corresponds to the anchorage length is added to respective ends of the reinforcement bar. The CPU 11 determines whether the anchorage length is necessary in accordance with the
15 specifications of the building maker or not (S453). When the anchorage length is unnecessary, the CPU 11 sets the length of the reinforcement bar to be the same length as that of the range of the unit reinforcing bars 5 specified by the operator, and ends the reinforcement bar
20 allocating step S45.

[0079] When the anchorage length is necessary, the CPU 11 decides the length of the reinforcement bar in accordance with the diameter of the decided reinforcement bar (S454). The length of the anchorage length of the
25 reinforcement bar is decided in advance in accordance

with the specifications of the building maker registered
in the database 21 and the diameter of the reinforcement
bar. Hence, the CPU 11 selects the anchorage length in
accordance with the diameter of the reinforcement bar and
5 with the specifications of the building maker registered
in the database 21, and decides the length of the
reinforcement bar.

[0080] Moreover, when the reinforcement bar has the
anchorage length, the CPU 11 decides the shape of the end
10 portion of the reinforcement bar in accordance with the
layout of the unit reinforcing bar 5 and the length of
the anchorage length of the decided reinforcement bar.
More specifically, the CPU 11 determines whether there is
the unit reinforcing bar 5 to be further connected to the
15 unit reinforcing bar 5 to be reinforced from the layouts
of the unit reinforcing bars 5 (S455). When there is the
unit reinforcing bar 5 to be further connected to the
unit reinforcing bar 5 to be reinforced, the CPU 11
decides the shape of the end portion of the reinforcement
20 bar to be a shape along the unit reinforcing bar 5 to be
further connected in the horizontal direction (S456), and
ends the reinforcement bar allocating step S45.

Conversely, when there is no unit reinforcing bar 5 to be
further connected to the unit reinforcing bar 5 to be
25 reinforced, the CPU 11 decides that the length of the

reinforcement bar is up to the end portion of the unit reinforcing bar 5 to be reinforced (S457), and ends the reinforcement bar allocating step S45. Note that, depending on the specifications, when there is no unit reinforcing bar 5 to be further connected to the unit reinforcing bar 5 to be reinforced, the CPU 11 may decide that the shape of the end portion of the reinforcement bar is a shape bent in the vertical direction at the end portion of the unit reinforcing bar 5 to be reinforced.

10 [0081] As described above, according to the allocating program 2 of the present disclosure, by specifying the reinforced range at the position of the allocated unit reinforcing bar 5, the reinforcement bar can be automatically allocated in accordance with the unit reinforcing bar 5. Note that, as illustrated in part (a) of FIG. 13, the CPU 11 displays a bar-shape line 43 representing such allocation range in the vicinity of the unit reinforcing bar 5 to be reinforced in the drawing area 32. Hence, the operator can grasp the allocation range of the reinforcement bar in one glance.

[0082] [Slab Reinforcement Allocating Step S46]

The allocating program 2 according to the present disclosure may also accomplish the slab reinforcement allocating step S46 for causing the computer to function as the slab reinforcement allocating

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means for deciding, as the allocation range of the slab reinforcement, a range specified by the operator within the range represented by the drawing grid 321. The slab reinforcement is a reinforcing bar spread between the unit reinforcing bars 5 in a mat foundation.

[0083] Prior to executing the slab reinforcement allocating step S46, as illustrated in part (a) of FIG. 15, the operator opens a specification setting screen of the slab reinforcement by a predetermined operation, and sets the equal to or greater than one slab reinforcement to be applied in advance. The operation to open the setting window is not limited to any particular operation, but for example, as illustrated in part (b) of FIG. 15 (b), a setting button 316 may be prepared in the menu area 31, and may be clicked. Example setting details are information on the diameter of the slab reinforcement, the pitch when the slab reinforcement is applied, the presence or absence of a hook, and the length. When the operator sets the equal to or greater than one slab reinforcement to be applied, the CPU 11 stores the setting details in the RAM 13 and in the storage device 14, and as illustrated in part (b) of FIG. 15, displays the radio button of the slab reinforcement applied for the allocation and the slab reinforcement name in the menu area 31. Note that the slab

reinforcement to be allocated has a horizontal direction (the x-axis direction) and a vertical direction (the y-axis direction). Hence, radio buttons 316a and 316b of the slab reinforcement corresponding to the respective
5 directions and the slab reinforcement name are displayed in the menu area 31. This enables the operator to easily allocate the predetermined slab reinforcements in the vertical direction and in the horizontal direction by simply selecting the radio button. Accordingly, it is
10 unnecessary to input the information on the slab reinforcement at the time of allocation, and an error with respect to the input can be prevented.

[0084] Next, when the operator wants to allocate the slab reinforcement, the slab reinforcement allocating
15 step S46 is executed. In order to execute the slab reinforcement allocating step S46, for example, the radio button 316a or 316b in the menu area 31 may be checked, or a predetermined key of the keyboard may be operated. This causes the CPU 11 to start the slab reinforcement
20 allocating step S46 in accordance with an instruction from the operator. The CPU 11 executes, based on, for example, a flow as illustrated in FIG. 16, the slab reinforcement allocating step S46.

[0085] As for the set slab reinforcement, the radio
25 button 316 and the unit reinforcing bar name are

displayed in the menu area 31 as described above. The operator moves the mouse to the radio button of the slab reinforcement to be applied for allocation among the displayed slab reinforcements, and clicks to decide.

- 5 This causes the CPU 11 to decide, as the reinforcing bar applied for the allocation range, the selected slab reinforcement (S461).

[0086] Next, the operator specifies the range where the addition of the slab reinforcement is desired. More specifically, for example, as illustrated in part (b) of FIG. 15, the operator specifies vertices (e.g., a vertex 80 at the upper left side and a vertex 81 at the lower right side) on the diagonal line of the rectangular range where the allocation of the slab reinforcement is desired while viewing the foundation plan 35 displayed in the drawing area 32. How to specify is not limited to any particular operation, but for example, the upper left vertex 80 and the lower right vertex 81 may be clicked through the mouse pointer. This causes the CPU 11 to decide such a rectangular range as the range where the slab reinforcement is allocated in accordance with an instruction from the operator (S462).

[0087] Moreover, the CPU 11 automatically calculates the necessary number of the slab reinforcements and the necessary length of the slab reinforcement in accordance

with the information on the pitch, etc., of the decided slab reinforcement and the allocation range of the slab reinforcement and allocates those (S463).

[0088] As described above, according to the allocating
5 program 2 of the present disclosure, by specifying the range of the slab reinforcement, the slab reinforcement can be automatically allocated in accordance with the allocation range. Note that as illustrated in part (c) in FIG. 15, the CPU 11 displays, in the drawing area 32,
10 a rectangular range 44 representing the allocation range of the slab reinforcement in a manner changing the color thereof, etc. This enables the operator to grasp the allocation range of the slab reinforcement in one glance.

[0089] [Subsidiary Material Adding Step S47]

15 In a foundation construction, for example, there are necessary additional materials (will be referred to as a subsidiary material below) other than the reinforcing bars, such as a pile head reinforcing unit and a unit for making a hole for piping. Hence, the
20 allocating program 2 of the present disclosure may also accomplish the subsidiary material adding step S47 for causing the computer to function as the subsidiary material adding means for adding the subsidiary material to be utilized in accordance with an instruction from the
25 operator.

[0090] Next, when the operator wants to add the subsidiary material, the subsidiary material adding step S47 is executed. In order to execute the subsidiary material adding step S47, for example, as illustrated in part (b) of FIG. 17, for example, a radio button 317 in the menu area 31 may be checked, or a predetermined key of the keyboard may be operated. This causes the CPU 11 to start the subsidiary material adding step S47 in accordance with an instruction from the operator. The CPU 11 executes, based on, for example, a flow as illustrated in FIG. 18, the subsidiary material adding step S47.

[0091] When starting the subsidiary material adding step S47, the CPU 11 displays the menu of the subsidiary materials registered in the database 21 in the drawing screen 30 by, for example, a pop-up 302 as illustrated in part (a) of FIG. 17. The operator selects the desired subsidiary material to be added from the menu. This causes the CPU 11 to decide the subsidiary material in accordance with an instruction from the operator (S471). Moreover, the CPU 11 executes the quantity survey for the subsidiary materials in accordance with an instruction from the operator (S472). Furthermore, the CPU 11 displays information 45 on the decided subsidiary material in the drawing area 32 as illustrated in part

(b) of FIG. 17. This enables the operator to grasp the added subsidiary material in one glance.

[0092] [Allocation Editing Step S48]

Moreover, the operator may want to manually edit
5 the allocation of the unit reinforcing bar 5 and that of the joint reinforcement 6 automatically decided in the unit reinforcing bar automatically allocating step S43 and in the joint reinforcement automatically allocating step S44. Hence, the allocating program 2 of the present
10 disclosure may also accomplish the allocation editing step S48 for causing the computer to function as the allocation editing means for editing the allocation of the unit reinforcing bar 5 or that of the joint reinforcement 6 in accordance with an instruction from
15 the operator.

[0093] When the operator wants to edit the allocation of the unit reinforcing bar 5 and that of the joint reinforcement 6, the allocation editing step S48 is executed by a predetermined operation. Such a
20 predetermined operation is not limited to any particular operation, but for example, as illustrated in FIG. 19, a radio button 318 in the menu area 31 may be checked, or a predetermined key of the keyboard may be operated. This causes the CPU 11 to start the allocation editing step
25 S48 in accordance with an instruction from the operator.

The CPU 11 executes, based on, for example, a flow as illustrated in FIG. 20, the allocation editing step S48.

[0094] First, the operator specifies, by mouse, etc., the desired unit reinforcing bar 5 or joint reinforcement 6 to be edited. This causes the CPU 11 to decide the unit reinforcing bar 5 or the joint reinforcement 6 to be edited in accordance with an instruction from the operator (S481). Moreover, the CPU 11 displays editable details (will be referred to as edit details below) for the unit reinforcing bar 5 or the joint reinforcement 6 in the work screen 30 by a pop-up 303 as illustrated in part (a) of FIG. 19 and a triangular mark 55 representing the dividing point, etc., (S482). The edit details are not limited to any particular ones as far as those are relevant to the allocation of the unit reinforcing bar 5 and that of the joint reinforcement 6, but for example, those may include to delete the unit reinforcing bar 5, to change or delete the dividing point of the unit reinforcing bar 5, to manually divide the unit reinforcing bar 5, and to couple or delete the coupling of the equal to or greater than two joint reinforcements 6.

[0095] Next, the operator selects the desired item to be edited from the edit details displayed in the work screen. This causes the CPU 11 to execute editing for

the decided unit reinforcing bar 5 or for the joint reinforcement 6 (S483). For example, when it is desired so as to delete the unit reinforcing bar 5, the operator selects "delete" among the edit details in the pop-up

5 303. This causes the CPU 11 to delete the unit reinforcing bar 5 specified by the operator.

[0096] Moreover, when it is desired so as to change the dividing point of the unit reinforcing bar 5, the operator positions the mouse pointer to the triangular
10 mark 55 representing the dividing point of the unit reinforcing bar 5 in the drawing area 32, and changes such point by dragging such a mark to the position where the change is desired. As illustrated in part (b) of FIG. 19, this causes the CPU 11 to decide the allocation
15 range of the unit reinforcing bar 5 with the position specified by the operator being as the dividing point.

[0097] Furthermore, when it is desired so as to delete the dividing point of the unit reinforcing bar 5, the operator positions the mouse pointer to the mark
20 representing the desired dividing point to be deleted, and selects "delete" among the edit details displayed in the work screen, or moves the dividing point to an end of the unit reinforcing bar 5. This causes the CPU 11 to delete the dividing point.

[0098] Still further, when it is desired so as to divide the unit reinforcing bar 5, the operator selects "manually divide" among the edit details in the pop-up 303, positions the mouse pointer to the desired position to be divided on the unit reinforcing bar 5, and clicks so as to specify the position. This causes the CPU 11 to divide the unit reinforcing bar 5 at the specified position by the operator.

[0099] Yet still further, when it is desired so as to couple the equal to or greater than two joint reinforcements 6, the operator selects "couple" among the edit details in the pop-up 303, and specifies the desired joint reinforcements 6 to be coupled by a predetermined operation, such as positioning the mouse pointer and clicking such reinforcements. This causes the CPU 11 to couple the specified joint reinforcements 6 by the operator in such a way that the respective portions having the overlapping positions with each other are made as a single portion. At this time, the CPU 11 stores pieces of information on the joint reinforcements 6 before coupling in the RAM 13 or in the storage device 14 for cancelling the coupling to be described later.

[0100] Moreover, the operator can cancel the coupling of the coupled joint reinforcements 6. When it is desired so as to cancel the coupling, the operator

selects "cancel coupling" among the edit details in the pop-up 303, and specifies the desired joint reinforcements 6 to cancel the coupling by a predetermined operation, such as positioning the mouse pointer, and clicking such reinforcements. This causes the CPU 11 to put back the coupling of the joint reinforcements 6 specified by the operator to the two joint reinforcement 6 as originally presented.

[0101] Furthermore, as illustrated in part (c) of FIG.

10 19, the CPU 11 may display a pop-up 304, etc., to let the operator to confirm whether the editing is to be fixed before deciding the respective edit details. When the operator clicks a predetermined button 304a to fix the edit details, the CPU 11 executes such edit details.

15 [0102] As described above, the allocating system 1 of the present disclosure is configured to not only automatically allocate the unit reinforcing bar 5, etc., but also thereafter enable the operator to edit as appropriate, and thus the operation effort by the operator can be reduced, and the intent of the operator can be reflected. Note that when the allocation range of the unit reinforcing bar 5 is changed, the process progresses to the joint reinforcement allocating step S44 again, and the CPU 11 automatically calculates and
20 allocate the joint reinforcement 6 to connect the
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allocated unit reinforcing bars 5 with each other in accordance with information on the changed unit reinforcing bar 5 and the layout thereof.

[0103] Note that the allocation editing step may cause the computer to function as the allocation editing means for editing the allocation of the reinforcement bar and that of the slab reinforcement in accordance with an instruction from the operator.

[0104] [Quantity Surveying Step]

10 A quantity surveying step is a step for causing the computer to function as quantity surveying means for executing quantity survey for the necessary amount of the unit reinforcing bar 5 and that of the joint reinforcement 6 in accordance with the allocation result of the unit reinforcing bar 5 and that of the joint reinforcement 6. As described above, when the allocation of the unit reinforcing bars 5 and that of the joint reinforcement 6 to connect such unit reinforcing bars 5 are fixed, the CPU 11 executes quantity survey for the quantity of the unit reinforcing bar 5 and that of the joint reinforcement 6 for each kind thereof in accordance with pieces of information on the decided unit reinforcing bar 5 and on the joint reinforcement 6.

Moreover, when the operator manually changes the results of the automatic allocation, the CPU 11 executes quantity

survey for the quantity of the unit reinforcing bar 5 and that of the joint reinforcement 6 for each kind thereof after such a change.

[0105] The quantity of the unit reinforcing bar 5 and
5 that of the joint reinforcement 6 necessary to form the foundation can be surveyed in a real-time manner while the input of the allocation range of the unit reinforcing bar 5 is being repeated.

[0106] Moreover, the quantity surveying means can also
10 execute quantity survey for the necessary amount of the above-described reinforcement bar, slab reinforcement and subsidiary material in accordance with the allocation results. As described above, when the allocations of the reinforcement bar, the slab reinforcement and the
15 subsidiary material are fixed, the CPU 11 executes quantity survey for the respective quantities of the reinforcement bar, slab reinforcement, and subsidiary material for each kind thereof in accordance with pieces of information on the decided reinforcement bar, slab
20 reinforcement, and subsidiary material. Moreover, when the operator manually changes the results of the automatic allocations, the CPU 11 executes quantity survey for the quantities of the reinforcement bar, slab reinforcement, and subsidiary material for each kind
25 thereof after such a change.

[0107] Furthermore, the quantity surveying means can output itemizations of the quantity survey results (the resultant quantities of the unit reinforcing bar 5, joint reinforcement 6, reinforcement bar, slab reinforcement, and subsidiary material for each kind thereof) as data in accordance with an instruction from the operator. The output data may be printed by a printer, and the like, through an interface as the itemizations, and may be displayed in the screen of a terminal, such as a computer or a tablet, in a file format like PDF.

[0108] [Allocation Result Outputting Step]

Moreover, confirmation of the allocated reinforcing bars, such as the unit reinforcing bar 5, the joint reinforcement 6, the reinforcement bar, and the slab reinforcement by a list, etc., one by one needs reviewing of several screens by several times, becoming a cause of decreasing the workability of the operator. Hence, the allocating program 2 of the present disclosure may also accomplish an allocation result outputting step for causing the computer to function as allocation result outputting means for displaying, in a screen, the allocation results in accordance with an instruction from the operator.

[0109] When the operator wants to display the allocation results on a screen, the allocation result

outputting step is executed by a predetermined operation. Such a predetermined operation is not limited to any particular operation, but for example, a radio button in the menu area 31 may be checked, or a predetermined key
5 of the keyboard may be operated. This causes the CPU 11 to display, by a pop-up 305, etc., the allocation results (the quantity survey results) as illustrated in FIG. 21 on the work screen 30 based on pieces of information on the allocated unit reinforcing bar 5, joint reinforcement
10 6, reinforcement bar, and slab reinforcement, etc., in accordance with an instruction from the operator. This enables the operator to easily grasp the allocation results without changing the screen.

[0110] [Marker Adding Step]

15 The operator may want to draw a marker in the screen as a check-up for instructions and precautions in the drawing. Hence, the allocating program 2 of the present disclosure may also accomplish a marker adding step for causing the computer to function as marker
20 adding means for display a marker at an arbitrary position on the display.

[0111] When the operator wants to draw a marker in the screen, the marker adding step is executed by a predetermined operation. Such a predetermined operation
25 to execute the marker adding step is not limited to any

particular operation, but for example, as illustrated in part (a) of FIG. 22, an execute button 331 may be prepared in the menu bar 33, and may be clicked. This causes the CPU 11 to start the marker adding step in accordance with an instruction from the operator.

[0112] When starting the marker adding step, as illustrated in part (a) of FIG. 22, the CPU 11 displays the colors of the marker registered in the database 21 and a radio button 331a of such a color. The operator selects, from the menu, the radio button of the desired color of the marker to be drawn. This causes the CPU 11 to decide the color of the marker in accordance with an instruction from the operator.

[0113] Next, the operator specifies a range of the drawing area 32 where the marker is desired so as to be drawn by a predetermined operation. An example such operation is to drag the range where the marker is desired so as to be drawn by mouse while a predetermined key of the keyboard is being depressed. When the operator specifies the range where the marker is desired so as to be drawn, the CPU 11 displays, as illustrated in part (b) of FIG. 22, the decided color of the marker in a specified range 46.

[0114] [Layout Drawing Outputting Step]

Moreover, as for allocation for the foundation, it is necessary to not only simply execute quantity survey for the unit reinforcing bar 5 and the joint reinforcement 6, etc., to be delivered but also to let a person who carries out a foundation construction (will be referred to as a foundation constructor) to specifically know where the reinforcing bars are to be applied. Hence, the allocating program 2 of the present disclosure may also accomplish a layout drawing outputting step for causing the computer to function as layout drawing outputting means for outputting data on the layout drawing in accordance with the allocation results of the unit reinforcing bar 5, joint reinforcement 6, reinforcement bar, slab reinforcement, and subsidiary material, etc. The layout drawing is a drawing representing, for example, at which positions of the foundation the reinforcing bars are applied, and as illustrated in FIG. 23, such a drawing includes categories that are (a) standing-upright, (b) reinforcement bar, (c) slab reinforcement (horizontal) and (d) slab reinforcement (vertical), etc. The layout drawing outputting means of the present disclosure can output the layout drawing in such a manner as to be divided for each of such categories.

[0115] When the operator wants to output the layout drawing, the layout drawing outputting step is executed by a predetermined operation. Such a predetermined operation to execute the layout drawing outputting step is not limited to any particular operation, but for example, an execute button may be prepared in the main menu of the other window, and may be clicked. This causes the CPU 11 to start the layout drawing outputting step in accordance with an instruction from the operator.

10 [0116] When starting the layout drawing outputting step, the CPU 11 displays the categories of the layout drawing in the screen. The operator selects the desired layout drawing to be output among such categories. This causes the CPU 11 to output the data on the layout drawing in accordance with an instruction from the operator. The output data may be printed by a printer, etc., through an interface as the layout drawing, or may be displayed in the screen of the computer or tablet, etc., of the foundation constructor in a file format like PDF.

20 [0117] [Comment Inputting Step]

Moreover, the operator may want to write, on the layout drawing, sentences for communications with the foundation constructor by the layout drawing. Hence, the allocating program 2 of the present disclosure may also

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accomplish a comment inputting step for causing the computer to function as comment inputting means for inputting comments at arbitrary positions on the screen, and displaying those in a particular layout drawing.

5 [0118] When the operator wants to input comments, the comment inputting step is executed by a predetermined operation with a position where input is desired being specified. Such a predetermined operation to execute the comment inputting step is not limited to any particular
10 operation, but for example, as illustrated in part (a) of FIG. 25, an execute button 332 may be prepared in the menu bar 33, and may be clicked. This causes the CPU 11 to start the comment inputting step in accordance with an instruction from the operator.

15 [0119] When starting the comment inputting step, as illustrated in part (a) of FIG. 25, the CPU 11 displays the categories of the layout drawing to which comments are input by, for example, a pop-up 306 on the work screen 30. The operator selects the layout drawing that
20 the input of the comments is desired among the categories. This causes the CPU 11 to display, as illustrated in part (b) of FIG. 25, a form 307 to input comments by pop-up, etc. The operator inputs comments in the form 307. This causes the CPU 11 to display, as
25 illustrated in part (c) of FIG. 25, comments 47 at the

position specified by the operator. Moreover, the CPU 11 associates the comments with the layout drawing selected by the operator. Accordingly, when the layout drawing outputting means outputs the data on the layout drawing, 5 the CPU 11 outputs in such a way that the comments are displayed in the layout drawing selected by the operator.

[0120] [Data Storing Step]

Pieces of data like the allocation results created through the above-described steps are not only to 10 output a list and the layout drawing, but also may be desired so as to be utilized in conjunction with a production instructing system utilized to instruct productions at a factory where reinforcing bars like the unit reinforcing bars 5 are manufactured. Hence, the 15 allocating program 2 of the present disclosure may also accomplish a data storing step for causing the computer to function as data storing means for automatically storing the pieces of data, such as the allocation results, in the database 21. When the above-described 20 respective steps end, the CPU 11 automatically stores the pieces of data, such as the allocation results created at such times, in the database 21. The allocation data stored in this manner can be utilized as manufacturing data and the like, for the production instructing system.

[0121] An allocating program recording medium of the present disclosure records the allocating program 2 of the present disclosure. Each of the above-described steps are executed by a computer and hardware like a peripheral device thereof, and the like. Hence, the allocating system may be accomplished by reading the recording medium that records the allocating program 2 and by executing each of the above-described steps. The recording medium is not limited to any particular medium as far as it records the allocating program of the present disclosure in a computer-readable manner. For example, recording disks like optical disks, such as a CD, a DVD or a BD, a magnetic disk, and a magneto-optical disk are applicable. Moreover, a hard disk drive (an HDD) or a rewritable and non-volatile memory like a solid state drive (SSD) is also applicable.

[0122] As described above, the allocating system of the present disclosure mainly includes:

displaying means for displaying a foundation plan 35 in a screen so as to overlap with a drawing grid representing lines arranged at a certain pitch;

scale adjusting means for adjusting, in accordance with an instruction from an operator, the pitch of grid lines represented by the drawing grid displayed so as to overlap with the foundation plan 35;

applying unit deciding means for deciding a unit reinforcing bar to be applied in accordance with an instruction from the operator;

allocation range deciding means for deciding, as
5 an allocation range of the unit reinforcing bar, a range defined by at least two points specified by the operators among grid points each represented by an intersection of the drawing grid;

unit reinforcing bar automatically allocating
10 means for allocating the unit reinforcing bar that forms a foundation in accordance with the unit reinforcing bar decided by the applying unit deciding means and with the allocation range decided by the allocation range deciding means; and

15 joint reinforcement automatically allocating means for allocating a joint reinforcement to connect the allocated unit reinforcing bars with each other in accordance with information on the unit reinforcing bars and layout thereof.

20 [0123] Moreover, as described above, the allocating system of the present disclosure may further include slab reinforcement allocating means for deciding, as an allocation range of a slab reinforcement, a range specified by the operator within a range represented by
25 the drawing grid, reinforcement bar allocating means for

allocating a reinforcement bar in accordance with a range
of the unit reinforcing bar specified by the operator and
with information on the unit reinforcing bar, quantity
surveying means for executing quantity survey for
5 respective necessary amounts of the unit reinforcing bar
and the joint reinforcement in accordance with the
allocated unit reinforcing bar and with an allocation
result of the joint reinforcement, allocation result
outputting means for displaying, in the screen, an
10 allocation result relating to a selected position in
accordance with an instruction from the operator, marker
adding means for displaying a marker at an arbitrary
position on the screen, layout drawing outputting means
for outputting data on a layout drawing in accordance
15 with the allocation results of the unit reinforcing bar
and the joint reinforcement, applying unit selecting
means for selecting the equal to or greater than one unit
reinforcing bar to be applied in accordance with an
instruction from the operator, and for displaying, in the
20 screen, the unit reinforcing bar to be decided by the
applying unit deciding means so as to be selectable by
the operator, subsidiary material allocating means for
allocating a subsidiary material to be applied in
accordance with an instruction from the operator, comment
25 inputting means for inputting and displaying a comment at

an arbitrary position on the screen, allocation editing means for editing the allocation of the unit reinforcing bar or of the joint reinforcement in accordance with an instruction from the operator, and data storing means for
 5 automatically storing data on the allocation result, etc., in the database 21, etc.

[0124] The function of each means is accomplished by causing a computer or hardware like a peripheral device thereof to execute each of the above-described step
 10 according to the allocating program 2.

REFERENCE SIGNS LIST

	[0125]	1	Allocating system
		2	Allocating program
15		5	Unit reinforcing bar
		6	Joint reinforcement
		11	CPU
		12	ROM
		13	RAM
20		14	Storage device
		16	Input device
		17	Display device
		21	Database
		30	Work screen
25		31	Menu area

	32	Drawing area
	33	Menu bar
	35	Foundation plan
	51	Main reinforcement
5	52	Web reinforcement
	53	Stirrup reinforcement
	321	Drawing grid
	322	Grid point
	351	Module line
10		

CLAIMS

1. An allocating program causing a computer to function as:

5 displaying means for displaying a foundation plan in a screen so as to overlap with a drawing grid representing lines arranged at a certain pitch;

 scale adjusting means for adjusting, in accordance with an instruction from an operator, the pitch between
10 grid lines represented by the drawing grid displayed so as to overlap with the foundation plan;

 applying unit deciding means for deciding a unit reinforcing bar to be applied in accordance with an instruction from the operator;

15 allocation range deciding means for deciding, as an allocation range of the unit reinforcing bar, a range defined by at least two points specified by the operator among grid points each represented by an intersection of the drawing grid;

20 unit reinforcing bar automatically allocating means for allocating the unit reinforcing bar that forms a foundation in accordance with the unit reinforcing bar decided by the applying unit deciding means and with the allocation range decided by the allocation range deciding
25 means; and

joint reinforcement automatically allocating means
for allocating a joint reinforcement to connect the
allocated unit reinforcing bars with each other based on
information on the unit reinforcing bars and on a layout
5 thereof.

2. The allocating program according to claim 1,
further causing the computer to function as slab
reinforcement allocating means for deciding, as an
10 allocation range of a slab reinforcement, a range
specified by the operator within a range represented by
the drawing grid.

3. The allocating program according to claim 1,
15 further causing the computer to function as reinforcement
bar allocating means for allocating a reinforcement bar
based on a range of the unit reinforcing bar specified by
the operator and on information on the unit reinforcing
bar.

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4. The allocating program according to claim 1,
further causing the computer to function as quantity
surveying means for executing quantity survey for
respective necessary amounts of the unit reinforcing bar
25 and the joint reinforcement in accordance with an

allocation results of the allocated unit reinforcing bar and of the joint reinforcement.

5 5. The allocating program according to claim 1,
further causing the computer to function as allocation
result outputting means for displaying, in the screen, an
allocation result relating to a selected position in
accordance with an instruction from the operator.

10 6. The allocating program according to claim 1,
further causing the computer to function as marker adding
means for displaying a marker at an arbitrary position on
the screen.

15 7. The allocating program according to claim 1,
further causing the computer to function as layout
drawing outputting means for outputting data on a layout
drawing in accordance with the allocation results of the
unit reinforcing bar and of the joint reinforcement.

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 8. The allocating program according to claim 1,
further causing the computer to function as applying unit
selecting means for selecting the equal to or greater
than one unit reinforcing bar to be applied in accordance
25 with an instruction from the operator, and for

displaying, in the screen, the unit reinforcing bar to be decided by the applying unit deciding means so as to be selectable by the operator.

5 9. The allocating program according to claim 8, wherein the applying unit selecting means is for selecting the unit reinforcing bar in accordance with a building maker selected in accordance with an instruction from the operator.

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 10. The allocating program according to claim 1, further causing the computer to function as subsidiary material allocating means for allocating a subsidiary material to be applied in accordance with an instruction
15 from the operator.

 11. The allocating program according to claim 1, wherein the displaying means is for displaying screens so as to be changed for each foundation plan to be utilized
20 in accordance with an instruction from the operator.

 12. The allocating program according to claim 1, further causing the computer to function as comment inputting means for inputting and displaying a comment at
25 an arbitrary position on the screen.

13. The allocating program according to claim 1,
further causing the computer to function as allocation
editing means for editing the allocation of the unit
5 reinforcing bar or of the joint reinforcement in
accordance with an instruction from the operator.

14. An allocating system comprising the respective
means as set forth in any one of claims 1 to 13.
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15. An allocating program recording medium that is a
recording medium storing the allocating program as set
forth in any one of claims 1 to 13.