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(54) Method for the production of slabs, tiles and structural elements

(57) A method for the production of a concrete element includes,

- a) providing a mould (10),
- b) introducing a number of piles (11, 12 and 13) of a cementitious mix into the mould (10),

- c) vibrating the mould (10) for a limited period such that the piles (11, 12 and 13) remain separated,
- d) introducing a coloured mix (14) into the spaces between the piles (11, 12 and 13), and
- e) effecting further vibration of the mould (10) to cause further flattening of the piles (11, 12 and 13).

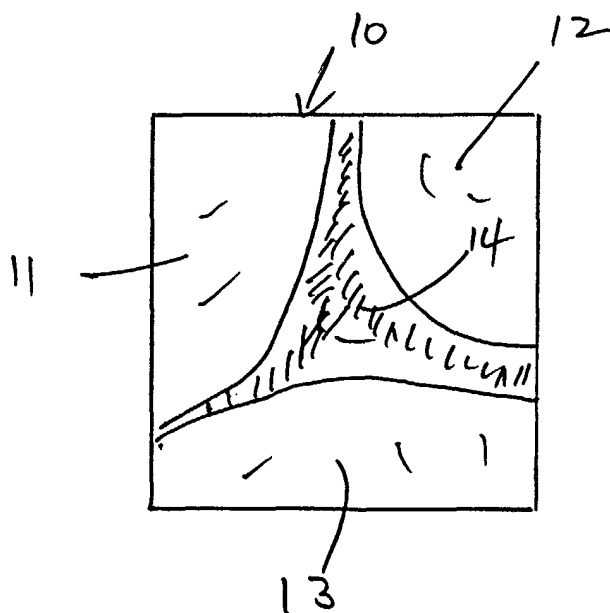


Figure 3

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Description

Field of the Invention

[0001] This invention relates to a method for the production of slabs, tiles and structural elements.

[0002] Concrete slabs and tiles are used for many purposes but have a generally uninteresting appearance. Patterns can be produced used slabs of different colours but, in general, the scope for providing aesthetic appeal to, for example, an array of concrete slabs used for laying a patio, is very limited. Structural elements made from concrete are also generally lacking in aesthetic appeal.

[0003] It is accordingly an object of the present invention to provide a method for the production of concrete slabs, tiles or structural elements which enable slabs, tiles or structural elements to be produced which are visually attractive and, in particular, can have an appearance which simulates that of marble.

Summary of the Invention

[0004] According to the present invention, there is provided a method for the production of a concrete slab, tile or structural element, which method includes,

- a) providing a mould,
- b) introducing a cementitious mix into the mould as a plurality of discrete piles,
- c) vibrating the mould for a limited period such that the piles remain separated,
- d) introducing a coloured mix into the spaces between the piles, and
- e) effecting further vibration of the mould.

[0005] As used herein, the term "coloured" mix refers to a mix which is of a colour which contrasts with that of the cementitious mix. Thus, if the cementitious mix is white, grey or of sandstone coloration, the coloured mix may be green, blue or red whereas, if the cementitious mix is black or very dark grey, the coloured mix may be white.

[0006] In addition, the coloured mix may be added in two or more portions of different colours. For example, a green mix may be introduced into the space between two piles of the vibrated cementitious mix, while a blue or red mix is introduced into another space.

[0007] The cementitious mix may comprise, for example, two parts by volume of stone, two parts by volume of sand or limestone dust and one part by volume of cement, with the addition of the required amount of water depending on the required consistency and/or setting time. An accelerating agent may be included in the mix if accelerated setting of the slab or tile is required. A plasticiser may also be added if required. This reduces the amount of water that is needed and produces a stronger product.

[0008] The coloured mix may comprise, for example, cement and a liquid cement dye, or it may comprise a mixture of sand and cement or stone and powder to which a colouring agent is added. The amount of coloured mix can be varied as required depending on the visual effect which the manufacturer wishes to produce.

[0009] In addition to introducing a coloured mix into the spaces between the piles, a limited amount of a liquid colorant may also be sprinkled randomly over the base of the mould before the cementitious mix is introduced into the mould.

[0010] The method of production may include, for example, placing a square or rectangular mould on a vibratory table, introducing, for example, three separate piles of the cementitious mix into the mould, two piles being located close to adjacent corners of the mould while the third pile is adjacent the opposite side of the mould, and operating the vibratory table for approximately two seconds to effect agitation of the mix to a limited extent and flattening of the three piles, but not sufficient to cause the three piles to merge with one another.

[0011] After the initial two-second period of vibration, the mould may be lifted from the table, if the table would tend to continue to vibrate, or left on the table if the vibratory drive mechanism is such that vibration of the mould terminates virtually immediately. A coloured mix is then introduced into the spaces between the three piles of cementitious mix and the mould placed back on the table (or the vibratory drive mechanism switched on again) for a maximum of about thirty seconds while further vibration is effected to cause spreading out of the coloured mix in the spaces between the three piles and further spreading of the three piles.

[0012] Reference to the placing of three piles of the cementitious mix in the table is given purely by way of example. The number of piles and their relative sizes will depend on the final visual effect which is required.

[0013] The mould is then filled with the cementitious mix to the required level, depending on the required thickness for the finished slab or tile, and vibrating effected again to effect consolidation of the mix within the mould. The mould is then removed from the table and the formed slab or tile is left until dry, for example, overnight (or for less time if an accelerating agent is employed) before the slab or tile is removed from the mould.

[0014] That side of the slab or tile which was lowermost in the mould will then be found to have a surface appearance which includes rippled or veined colour effects, simulating that of marble, of a colour or colours dependant on the colour(s) used for the coloured mix.

[0015] If a paving slab is being produced, it may have a thickness of 40 to 50 mm. whereas, if a tile is being produced, which will normally have an area substantially less than that of a paving slab, the thickness may be within the range of from 6 to 10 mm.

[0016] Although the invention has been developed in-

initially in relation to the production of slabs and tiles, concrete structural elements such as table tops and work tops may also be produced by the method of the present invention.

Brief Description of the Drawings

[0017]

Figures 1, 2 and 3 show different stages in the manufacture of a first form of paving slab, and

Figures 4, 5 and 6 show different stages in the manufacture of a second form of paving slab.

Description of the Preferred Embodiments

[0018] Figure 1 shows the addition of three piles 11, 12 and 13 of a cementitious mix into a mould 10 which is placed on a vibrating table and vibrated for two seconds to reach the condition shown in Figure 2, i.e. the three piles 11, 12 and 13 have been agitated so as to cause them to flatten out and to spread.

[0019] After the two seconds of vibration, the mould 10 is removed from the table and a coloured mix 14 is introduced into the mould 10 in the spaces between the three piles 11, 12 and 13. The mould 10 is then placed back on the table and vibrated again for a maximum of thirty seconds to obtain the condition shown in Figure 3, in which the three piles 11, 12 and 13 have spread further and the coloured mix 14 confined to the spaces left between the piles.

[0020] More than one coloured mix 14 may be used. For example, a green mix may be introduced into the space between two piles of the vibrated cementitious mix, while a blue or red mix is introduced into another space.

[0021] Figures 4 to 6 show the production of a second slab, which will have a somewhat different visual appearance as compared to the slab produced in accordance with Figures 1 to 3. Seven piles or mounds 21 to 27 of the cementitious mix are placed in the mould 10 which is then vibrated, as described above. Colouring 28 is then placed in the spaces between the flattened piles 21 to 27 and vibration of the mould then effected again.

[0022] A typical cementitious mix will comprise, for example, four parts by weight of stone, three parts by weight of sand or limestone dust and two parts by weight of cement, with the addition of the required amount of water depending on the required consistency and/or setting time. If the components of the mix are measured by volume, typical amounts by volume are two parts by volume of stone, two parts by volume of sand or limestone dust and one part by volume of cement.

[0023] An accelerating agent can be included in the mix if accelerated setting of the slab or tile is required. A plasticiser can also be added if required. This reduces

the amount of water that is needed and produces a stronger product.

[0024] The mould is then filled, in each case, to the required level, depending on the final thickness of the slab being produced, and vibrated again to effect consolidation of the mass within the mould, which can thereafter be left to stand overnight before removing the slab from the mould, the slab having a marble-like veined or rippled colour effect on what was its undersurface.

[0025] In order to provide a further degree of variation in the marble-like veined or rippled colour effect which is obtained, small amounts of a colorant material may be sprinkled randomly over the base of the mould before the piles or mounds of the cementitious mix are placed in the base of the mould.

[0026] The thickness of the mass within the mould will depend on the final purpose of the article which is being produced. Thus a slab will have a greater thickness than a tile.

[0027] In addition, of course, the configuration of the mould will be determined by the configuration of the article which is being produced. If the article is part of a table, for example, a table top or a support for a table top, the mould will be of a complementary configuration.

Claims

1. A method for the production of a concrete slab, tile or structural element, which method includes,
 - a) providing a mould,
 - b) introducing a cementitious mix into the mould as a plurality of discrete piles,
 - c) vibrating the mould for a limited period such that the piles remain separated,
 - d) introducing a coloured mix into the spaces between the piles, and
 - e) effecting further vibration of the mould.
2. A method as claimed in Claim 1, in which the coloured mix is added in two or more portions of different colours.
3. A method as claimed in either of the preceding claims, in which the cementitious mix comprises two parts by volume of stone, two parts by volume of sand or limestone dust and one part by volume of cement, with the addition of the required amount of water depending on the required consistency and/or setting time.
4. A method as claimed in any one of the preceding claims, in which the coloured mix comprises cement and a liquid cement dye.
5. A method as claimed in any one of Claims 1 to 3, in which the coloured mix comprises a mixture of sand

and cement or stone and powder to which a colouring agent is added.

6. A method as claimed in any one of the preceding claims, in which, in addition to introducing a coloured mix into the spaces between the piles, a limited amount of a colorant is sprinkled randomly over the base of the mould before the cementitious mix is introduced into the mould. 5 10
7. A method as claimed in any one of the preceding claims, which includes placing a square or rectangular mould on a vibratory table, introducing a number of separate piles of the cementitious mix into the mould, with two piles being located close to adjacent corners of the mould while another pile is adjacent the opposite side of the mould, and operating the vibratory table for approximately two seconds to effect agitation of the mix to a limited extent and flattening of the piles, but not sufficient to cause the piles to merge with one another. 15 20
8. A method as claimed in Claim 7, in which, after the initial two-second period of vibration, the mould is lifted from the table and a coloured mix is introduced into the spaces between the piles of cementitious mix and the mould placed back on the table for a maximum of about thirty seconds while further vibration is effected to cause spreading out of the coloured mix in the spaces between the piles and further spreading of the piles. 25 30
9. A method as claimed in Claim 8, in which the mould is then filled with the cementitious mix to the required level, depending on the required thickness for the finished product, and vibrating effected again to effect consolidation of the mix within the mould. 35
10. A method of making an aesthetically attractive concrete product substantially as hereinbefore described with reference to the accompanying drawings. 40
11. A concrete product made by the method claimed in any one of the preceding claims. 45

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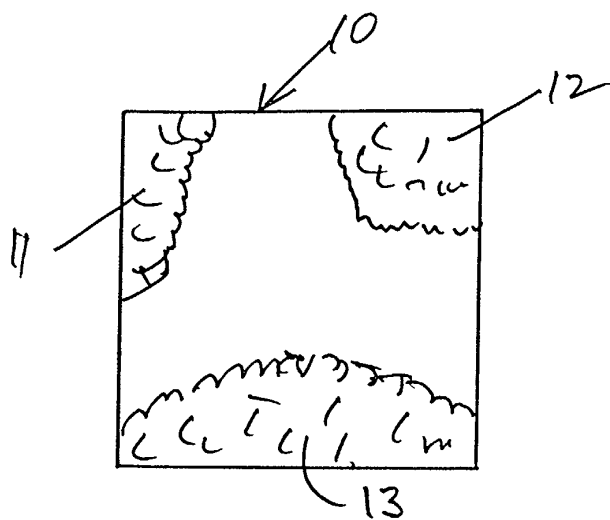


Figure 1

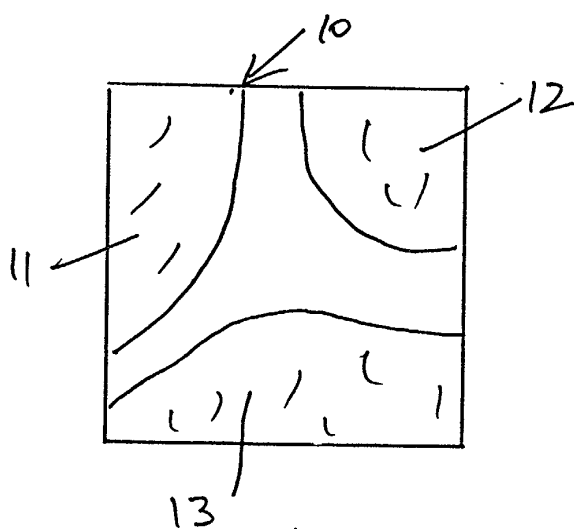


Figure 2

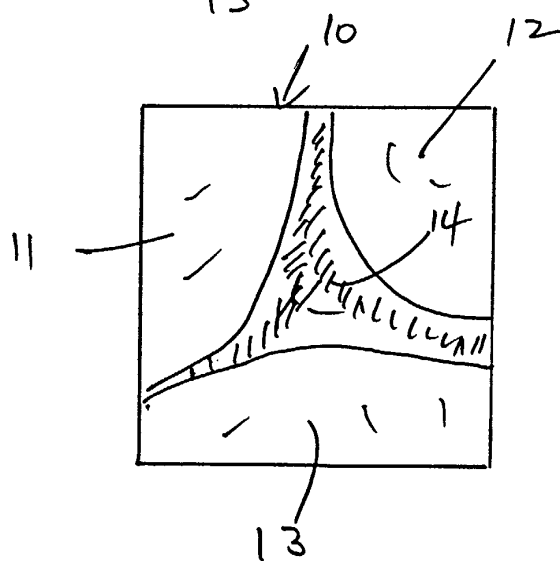


Figure 3

