

SEMI-PREFABRICATED STRUCTURAL ROAD AND METHOD FOR PAVING THE SAME

Technical Field

5

The present invention relates to a road structure and its paving method, more specifically to a road which is constructed by using fabricated elements in combination with cast-in-situ concrete, as well as its paving method. The present invention is especially suitable to garden residence areas, parking places, ferry terminals, etc. that require a very tight and strict construction period.

10

Background

Paving conventional roads requires a complicated construction procedure, a long construction period, a long time occupy of road surface, and also relies on large paving equipments. Concerning crowded places such as garden residence areas, parking places, ferry terminals and so on, it will negatively influence on the traffic and thus cause great inconvenience for people. Besides, the quality of various foundations is difficult to control, causing a non-uniform construction quality.

Summary of the Invention

20

To overcome the defects of conventional roads, the present invention provides a semi-prefabricated structural road, which merely needs a simple construction procedure and a short construction period, as well as its paving method.

25

The present invention provides a semi-prefabricated structural road, comprising a plurality of precast concrete blocks laid on a flat foundation and cast-in-situ concrete parts for connecting said plurality of precast concrete blocks with the foundation together. Exposed starter bars are provided in advance around said precast concrete blocks. Exposed starter bars provided on the connection joints of adjacent precast concrete blocks are connected with each other. Said cast-in-situ concrete parts are cast

at the connection joints between adjacent precast concrete blocks and the remaining regions of the foundation other than said precast concrete blocks.

Said precast concrete block is a rectangular, step-shaped structure, with a small thickness at the edge but a large thickness in the center thereof. The precast concrete block comprises a thick block body and a step face located around the whole or part of said block body. Said plurality of starter bars extend outwardly along the side of the block body in a level above the step face. Said cast-in-situ concrete parts are cast on the step face; in addition, the top surface of said cast-in-situ concrete parts is aligned with that of said block body.

Hoisting holes for convenient hoisting are provided at four corners on the top of said block body respectively.

Supporting rebars extending upwardly are provided in advance on said step face.

An isolation joint is provided between adjacent precast concrete blocks or between the precast concrete block and the adjacent cast-in-situ concrete part, and is filled with compressible fillers or sealant.

Sealing strips are provided between adjacent precast concrete blocks or between the precast concrete block and the adjacent cast-in-situ concrete part, and located on the top of the cast-in-situ concrete parts at the connections thereof.

Said precast concrete block and said cast-in-situ concrete part can be provided with a layer of mortar on the tops thereof, upon which paving bricks are laid.

The method for paving the semi-prefabricated structural road according to the present invention comprises the following steps:

Step A, laying precast concrete blocks on the surface of the road;

Step B, assembling the starter bars arranged around adjacent precast concrete blocks together at the construction site, and leaving a construction joint between adjacent precast concrete blocks;

Step C, casting concrete at the assembled region of said starter bars, in the construction joint and at other parts of the surface of the road to form cast-in-situ concrete parts, such that all the precast concrete blocks are connected together.

The above method can further comprise the following step: Step D, laying a layer of mortar on the tops of said precast concrete block and the cast-in-situ concrete parts, upon which paving bricks are laid.

The above method can further comprise the following step: Step E, providing a joint between adjacent precast concrete blocks or between the precast concrete block and the adjacent cast-in-situ concrete part, and filling compressible fillers or sealant therein.

As compared with the prior arts, the semi-prefabricated structural road according to the present invention comprises the following advantages:

1. The semi-prefabricated structural road according to the present invention can render a less dependency on large paving equipments during paving the road.

2. Precast concrete blocks of the road can be checked independently, so that it is convenient for quality control, which better ensures the quality of the construction project.

3. The semi-prefabricated structural road is of fast and convenient construction, simple operation and easy paving.

4. The semi-prefabricated structural road is constructed by using fabricated elements in combination with asphaltum concrete, which can be cooperated with each other and flexibly implemented during the construction.

5. The main body of the semi-prefabricated structural road, i.e., precast concrete blocks, are constructed at the prefabrication factory, so that the precast concrete block has a high strength of structure, thus improving the loading capacity of the road.

6. Compared with the conventional road construction, the construction procedure of the semi-prefabricated structural road has a little impact on site.

Brief Description of the Drawings

5

Fig. 1 is the plan view of the semi-prefabricated structural road according to the present invention;

Fig. 2 is the vertical sectional view of the semi-prefabricated structural road according to the present invention;

10

Fig. 3 schematically shows the structure of said precast concrete block;

Fig. 4 schematically shows the structure of longitudinal connections between adjacent precast concrete blocks;

15

Fig. 5 schematically shows the structure of longitudinal connections between said precast concrete blocks and the adjacent cast-in-situ concrete parts;

Fig. 6 schematically shows the structure of an isolation joint provided between adjacent precast concrete blocks;

20

Fig. 7 schematically shows the structure of an isolation joint provided between the precast concrete block and the cast-in-situ concrete parts;

Fig. 8 schematically shows the structure of an expansion joint arranged between adjacent precast concrete blocks; and

25

Fig. 9 schematically shows the structure of an expansion joint arranged between said precast concrete block and the cast-in-situ concrete parts.

Specific Embodiments of the Invention

In the following the embodiments of the present invention will be explained in detail with reference to the attached drawings.

As shown in Fig 1, the semi-prefabricated structural road according to the present invention mainly consists of a plurality of precast concrete blocks 1 laid on a flat foundation and cast-in-situ concrete parts 2. Said precast concrete blocks 1 are arranged along the horizontal and lateral directions of the foundation, and the cast-in-situ concrete parts 2 are cast at the remaining regions of the foundation, such as positions like the space between two adjacent precast concrete blocks 1, turnings of the road, the ends of the road, and so on, thus connecting the plurality of precast concrete blocks with the foundation together.

As shown in Fig. 3, said precast concrete block 1 is a rectangular, step-shaped structure, with a small thickness at the edge but a large thickness in the center thereof. The precast concrete block 1 comprises a thick block body 11 and a step face 12 located around said block body 11. The step face 12 may be arranged along four peripheral edges of the block body 11, or arranged merely along parts of the edges of the block body 11. A plurality of starter bars 31 extending outwardly along the horizontal direction are provided in advance on the side of the block body 11 upon which the step face 12 is arranged, and located above said step face 12. Moreover, four hoisting holes 13 are provided at four corners on the top of said block body 11 respectively, so that it is convenient to hoist the block to the construction site.

When the road is relatively broad, two or more precast concrete blocks 1 shall be arranged along the direction perpendicular to the extent of the road. As shown Fig. 4, the step faces 12 between adjacent precast concrete blocks 1 abut with each other, but leaving a construction joint 8 therebetween. Exposed starter bars 31 and outer rebars 21 across the step faces 12 of the two precast concrete blocks 1 are assembled together at the construction site, and the cast-in-situ concrete parts 2 are cast in the

construction joint 8 and on the step faces 12 at both sides thereof. In addition, the top surface of said cast-in-situ concrete part 2 is aligned with the top surface of said block body 11. Moreover, sealing strips 63 are provided on the top of the cast-in-situ concrete parts 2 at the longitudinal connections thereof.

5

When said precast concrete block 1 is connected to the cast-in-situ concrete part 2 along the longitudinal direction, as shown Fig. 5, the starter bars 31 of the step face 12 of the precast concrete block 1 are assembled to outer rebars 21, and the cast-in-situ concrete parts 2 are cast on the step faces 12 of the precast concrete blocks 1. In addition, the top surface of said cast-in-situ concrete part 2 is aligned with that of said block body 11. Sealing strips 63 are provided on the top of the cast-in-situ concrete parts 2 at the longitudinal connections thereof as well.

To separate the road from various inspection wells and prevent the road surface from being damaged due to uneven settlement of the inspection wells, an isolation joint should be provided. Fig. 6 shows an isolation joint provided between adjacent precast concrete blocks 1. In this case, the step faces 12 between two adjacent precast concrete blocks 1 abut with each other, but leaving a joint 5 of about 10mm therebetween. Exposed starter bars 31 are assembled at the construction site, and the cast-in-situ concrete parts 2 are cast on the step faces 12 at both sides thereof. In addition, the top surface of said cast-in-situ concrete part 2 is aligned with that of said block body 11. The joint 5 between two adjacent precast concrete blocks 1 and between the adjacent cast-in-situ concrete parts 2 at the tops thereof is filled with compressible fillers 61. Fig. 7 shows an isolation joint provided between the precast concrete block 1 and the cast-in-situ concrete part 2. In this case, the starter bars 31 of the step face 12 of said precast concrete block 1 are assembled to outer rebars 21, and the cast-in-situ concrete parts 2 are cast on the step faces 12 of the precast concrete blocks 1. In addition, the top surface of said cast-in-situ concrete part 2 is aligned with that of said block body 11. A joint 5 of about 10mm is left between the outer edge of said precast concrete block 1 and the cast-in-situ concrete part 2, which is filled with compressible fillers 61.

According to the current building codes, an expansion joint extending perpendicular to the extent

of the road should be arranged at regular intervals. Regarding the reinforced concrete roads, an expansion joint shall be arranged at intervals of 6m to 15m. Fig. 8 shows an expansion joint arranged between adjacent precast concrete blocks 1; in this case, the step faces 12 between two adjacent precast concrete blocks 1 abut with each other, but leaving a joint 5 of about 20mm, and two supporting rebars 32 extending upwardly are provided on said step face 12. Exposed starter bars 31, supporting rebars 32 and outer rebars 21 are assembled together at the construction site. The cast-in-situ concrete parts 2 are cast on the step faces 12 at both sides thereof. In addition, the top surface of said cast-in-situ concrete part 2 is aligned with that of said block body 11. The joint 5 between two adjacent precast concrete blocks 1 and between the adjacent cast-in-situ concrete parts 2 at the tops thereof are filled with sealant 62. Fig. 9 shows an expansion joint arranged between said precast concrete block 1 and the cast-in-situ concrete part 2. In this case, supporting rebars 32 extending upwardly are also provided on said step faces 12 of the precast concrete blocks 1 as well. Exposed starter bars 31, supporting rebars 32, outer rebars 21 and outside supporting rebars 32 are assembled together. The cast-in-situ concrete parts 2 are cast on the step faces 12. In addition, the top surface of said cast-in-situ concrete parts 2 is aligned with that of said block body 11. A joint 5 of about 20 mm is left between the outer edge of said precast concrete block 1 and the cast-in-situ concrete part 2, which is filled with sealant 62.

As shown in Fig. 2, said precast concrete block 1 and cast-in-situ concrete part 2 can be provided with a layer of mortar 71 on the top thereof, upon which paving bricks 72 are laid.

The method for paving the semi-prefabricated structural road according to the present invention comprises the following steps:

Step A, laying precast concrete blocks 1 on the surface of the road;

Step B, assembling the starter bars 31 arranged around adjacent precast concrete blocks 1 together at the construction site, and leaving a construction joint between adjacent precast concrete blocks 1;

Step C, casting concrete at the assembled region of said starter bars 31, in the construction joint and at other parts of the surface of the road to form cast-in-situ concrete parts 2, such that all the precast concrete blocks 1 are connected together.

Step D, laying a layer of mortar 71 on the tops of said precast concrete block 1 and the cast-in-situ

concrete parts 2, upon which paving bricks 72 are laid.

In the case of isolation joints or expansion joints are needed, the above method further comprises the following step: Step E. Providing a joint 5 between adjacent precast concrete blocks 1 or between
5 the precast concrete block 1 and the adjacent cast-in-situ concrete part 2, and filling compressible fillers 61 or sealant 62 therein.

It should be noted that the above-mentioned embodiment shows particularly preferred one but that this is not restricted thereto. Any amendments, equivalents or improvements made under the spirit and
10 principle of the present invention shall be included in the protection scope of the present invention.

Claims

1. A semi-prefabricated structural road, characterized in that, said road comprises a plurality of precast concrete blocks (1) laid on a flat foundation and cast-in-situ concrete parts (2) for connecting
5 said plurality of precast concrete blocks with the foundation together, wherein exposed starter bars (31) are provided in advance around said precast concrete blocks (1), and the exposed starter bars (31) provided on the connection joints of adjacent precast concrete blocks (1) are connected with each other, and wherein said cast-in-situ concrete parts (2) are cast at the connection joints between adjacent precast concrete blocks (1) and the remaining regions of the foundation other than the precast concrete
10 blocks (1).

2. The semi-prefabricated structural road according to claim 1, characterized in that, said precast concrete block (1) is a rectangular, step-shaped structure, with a small thickness at the edge but a large thickness in the center thereof, and comprises a thick block body (11) and a step face (12) located
15 around the whole or part of said block body (11), wherein said plurality of starter bars (31) extend outwardly along the side of the block body (11) in a level above the step face, and said cast-in-situ concrete parts (2) are cast on the step face (12), the top surface of said cast-in-situ concrete parts (2) being aligned with that of said block body (11).

20 3. The semi-prefabricated structural road according to claim 2, characterized in that, hoisting holes (13) for convenient hoisting are provided at four corners on the top of said block body (11) respectively.

4. The semi-prefabricated structural road according to claim 2, characterized in that, supporting rebars (32) extending upwardly are provided in advance on said step face (12).

25 5. The semi-prefabricated structural road according to any one of claims 1 to 4, characterized in that, an isolation joint (5) is provided between adjacent precast concrete blocks (1) or between the precast concrete block (1) and the adjacent cast-in-situ concrete part (2), and is filled with compressible fillers (61) or sealant (62).

6. The semi-prefabricated structural road according to any one of claims 1 to 4, characterized in that, sealing strips (63) are provided between adjacent precast concrete blocks (1) or between the precast concrete block (1) and the adjacent cast-in-situ concrete part (2), and located on the top of the cast-in-situ concrete parts (2) at the connections thereof.

5

7. The semi-prefabricated structural road according to any one of claims 1 to 4, characterized in that, said precast concrete block (1) and cast-in-situ concrete part (2) can be provided with a layer of mortar (71) on the top thereof, upon which paving bricks (72) are laid.

10

8. A method for paving the semi-prefabricated structural road according to claim 1, characterized in that, the method comprises the following steps:

Step A, laying precast concrete blocks (1) on the surface of the road;

Step B, assembling the starter bars (31) arranged around adjacent precast concrete blocks (1) together at the construction site, and leaving a construction joint between adjacent precast concrete blocks (1); and

15

Step C, casting concrete at the assembled region of said starter bars (31), in the construction joint and at other parts of the surface of the road to form cast-in-situ concrete parts (2), such that all the precast concrete blocks (1) are connected together.

20

9. The method for paving semi-prefabricated structural road according to claim 8, characterized in that, the method further comprises the following step:

Step D, laying a layer of mortar (71) on the tops of said precast concrete block (1) and the cast-in-situ concrete parts (2), upon which paving bricks (72) are laid.

25

10. The method for paving semi-prefabricated structural road according to claim 8 or 9, characterized in that, the method further comprises the following step:

Step E, providing a joint (5) between adjacent precast concrete blocks (1) or between the precast concrete block (1) and the adjacent cast-in-situ concrete part (2), and filling compressible fillers (61) or sealant (62) in the joint.