CONCRETE SHAPING INSERT, METHOD FOR PRODUCING A CONCRETE SHAPING INSERT, AND METHOD FOR PRODUCING A CONCRETE COMPONENT

FULL DESCRIPTION

~~B Background~~ Technical Field

The invention relates to a concrete shaping insert, which is formed to be arranged in a formwork mold before a concreting process, comprising a first and second fixing element, between which at least one displacement body is arranged.

The invention also relates to a method of manufacturing a concrete shaping insert.

When producing concrete ceilings, in addition to reinforcement, displacement bodies are often arranged in the space surrounded by formwork mold. This has the advantage that concrete can be saved and lighter concrete ceilings can be produced.

Background

EP 1 568 827 A1 proposed to use displacement bodies, e.g. are formed as plastic balls, to be locked in latticework open on one side, and these modules then to be pressed into a first or second layer of concrete, which can already contain a first reinforcement mat. The semi-finished product produced in this way is then covered with concrete mass during later completion.

DE 20 2006 002 540 U1 discloses a module for the production of concrete parts, in particular semi-finished concrete products or concrete ceilings. The module has a plurality of displacers, preferably hollow plastic balls, plastic balls or plastic half-covers, arranged parallel to one another in a longitudinal direction, the plurality of displacement bodies arranged parallel to one another each being arranged captive in a latticework of bars. The module is intended to be pressed into a concrete layer, to be placed on a lower reinforcement or to be placed on a perforation plate. The module is intended to be pressed into a concrete layer, to be placed on a lower reinforcement or to be placed on a perforation plate. The latticework has a channel-like shape with a narrow channel base and a wide channel opening and can be stacked in a space-saving manner when the displacement bodies are not inserted.

EP 2 075 387 A1 discloses a module for the production of concrete parts, in particular semi-finished concrete products or relatively thin in-situ concrete ceilings, is known. The module has a plurality of displacer bodies which can be used and are arranged parallel to one another in a longitudinal direction, the plurality of displacement bodies that arranged parallel to one another being in each case captively arranged in a latticework of bars. Each displacement body is formed as an essentially flattened ellipsoid shape to rotation with at least two slightly flattened pole sides.

EP 3 045 605 A1 discloses a module for the production of concrete parts using the in-situ concrete process or in a precast plant is known, which comprises a row of several displacement bodies arranged parallel to one another in a horizontal longitudinal direction, which are held captive in a latticework of at least two individual, longitudinally extending lattices, the lattice surfaces of which are aligned transversely to the horizontal, wherein each of the grids has at least a first and a second longitudinal rod, which run parallel spaced apart in the longitudinal direction, and a plurality of spaced apart and transversely aligned transverse rods, which are each connected to the longitudinal rods. At least one of the displacement bodies has at least one first and at least one second threading device on its outside for each grille, which are formed and arranged in relation to one another in a manner that the two grids by receiving the first longitudinal bar in the first threading device and receiving the second longitudinal bar in the second threading device are at least positively and captively fixed between the first and second threading device and thereby hold all displacement bodies together.

The previously known concrete shaping inserts have the particular disadvantage that their production is very complex. This is particularly due to very complex two- or three-dimensional lattice works that are adapted to the size and shape of the displacement bodies to be used, which hold the displacement bodies and fixed them in their position relative to the remaining displacement bodies.

Summary

~~It is the object~~Embodiments of the present invention ~~to~~ provide a concrete shaping insert, which can be produced simply and stability, in particular partly directly on the construction site, and which can nevertheless be used particularly flexibly.

The disclosure~~object~~ is achieved by a concrete shaping insert, which is characterized in that the displacement body has an interstitial tube and that the first fixing element and the second fixing element are connected to one another with at least one connecting component which proceeds through the interstitial tube. In an aspect, there is a Concrete shaping insert, which is formed to be arranged in a formwork mold before a concreting process, comprising a first and second fixing element, between which at least one displacement body is arranged, characterized in that the displacement body has an interstitial tube and that the first and second fixing element are connected to one another with at least one connecting component, which proceeds through the interstitial tube.

A~~a~~ further ~~object~~ embodiment of the present invention is providing a method for producing a concrete shaping insert which can be used flexibly and which can be carried out easily.

The embodiment ~~object~~ is achieved by a method, which is characterized in that at least one displacement body, which has an interstitial tube, in particular several displacement bodies, are arranged between a first fixing element and a second fixing element and that the first fixing element and the second fixing element are connected by means of a connecting component that proceeds through the interstitial tube.

The disclosure ~~invention~~ has a very special feature that a concrete shaping insert can be produced in a simple manner, with standard reinforcement parts that are advantageously available as the first and/or second fixing element, in particular simply and inexpensively, such as a simple reinforcing bar made of structural steel or a simple reinforcement bar Reinforcement mesh made of structural steel, can be used.

In particular, it is of particular advantage that the first fixing element and the second fixing element do not need to have a size or shape specially adapted for the displacement body to be used.

In particular, the present disclosure ~~invention~~ advantageously enables the required components to be delivered to the construction site in a space-saving manner and the concrete shaping insert to be produced on site by simply joining the components together, preferably without tools. It is particularly advantageous here, for example, if the first fixing element and the second fixing element are each formed as a simple reinforcing bar. Reinforcing bars of this type are available simply and inexpensively and can be transported in a space-saving manner.

In particular, the disclosure ~~invention~~ has the very special advantage that the space surrounding the displacement body, in particular the space surrounding the displacement body horizontally, can remain free and there is thus the possibility of using this space (in

Claims

1. Concrete shaping insert, which is formed to be arranged in a formwork mold before a concreting process, comprising a first and second fixing element, between which at least one displacement body is arranged, characterized in that the displacement body has an interstitial tube and that the first and second fixing element are connected to one another with at least one connecting component, which proceeds through the interstitial tube.

2. Concrete shaping insert according to claim 1, characterized in that the connecting component has a first connecting element for mechanical coupling to the first fixing element, the connecting component has a second connecting element for mechanical coupling to the second fixing element.

3. Concrete shaping insert according to claim 2, characterized in that the connecting component can be fixed to the first fixing element without tools by means of the first connecting element and/or in that the connecting component can be fixed to the second fixing element without tools by means of the second connecting element.

4. Concrete shaping insert according to claims 2 or 3, characterized in that the first connecting element is formed as a locking device and/or in that the second connecting element is formed as a locking device.

5. Concrete shaping insert according to one of claims 2 to 4, characterized in that the first connecting element has a hook, in particular an elastic locking hook and/or in that the second connecting element has a hook, in particular an elastic locking hook.

6. Concrete shaping insert according to claim 5, characterized in that the locking hook engages around a section of the first fixing element, in particular a rod-shaped section of the first fixing element.

7. Concrete shaping insert according to claims 5 or 6, characterized in that the locking hook has a receptacle for a rod-shaped section of the first fixing element and an insertion gap through it the rod-shaped section of the first fixing element can be inserted into the receptacle.

8. Concrete shaping insert according to claim 7, characterized in that the opening width of the insertion gap is smaller than the inner diameter of the receptacle.

~~9. Concrete shaping insert according to one of claims 2 to 8, characterized in that the connecting component can be fixed to the second fixing element without tools by means of the second connecting element.~~

~~10. Concrete shaping insert according to one of claims 2 to 9, characterized in that the second connecting element is formed as a locking device.~~

~~11. Concrete shaping insert according to one of claims 2 to 10, characterized in that the second connecting element has a hook, in particular an elastic locking hook.~~

~~12~~9. Concrete shaping insert according to ~~claim 10 or 11~~one of claims 2 to 8, characterized in that the second connecting element has an indentation for a rod-shaped section of the second fixing element.

~~13~~10. Concrete shaping insert according to claim ~~12~~9, characterized in that the second connecting element has a guide element, which is adjacent the indentation with a guide surface.

~~14~~11. Concrete shaping insert according to one of claims 2 to ~~13~~10, characterized in that the connecting component has an elongate web, wherein the first connecting element is arranged at one end of the web and the second connecting element is arranged at the other end of the web.

~~15~~12. Concrete shaping insert according to one of claims 2 to ~~14~~11, characterized in that the connecting component is formed in a manner that it can be fastened, in particular latching, initially to the first fixing element by means of the first connecting element, then it fastened by performing a pivoting movement, in particular latching can be connected to the second fixing element.

~~16. Concrete shaping insert according to one of claims 1 to 15, characterized in that the connecting component is formed as an injection molded part, plastic injection- molded part, a bent part, a bent sheet metal part or a bent wire part.~~

~~17. Concrete shaping insert according to one of claims 1 to 16, characterized in that the connecting component is made of one piece.~~

13. Concrete shaping insert according to one of claims 1 to 12, characterized in that the interstitial tube has a shape deviating from the circular shape in a cross-sectional plane

perpendicular to its longitudinal direction or that the interstitial tube is polygonal, in particular square in cross-section.

~~18~~14. Concrete shaping insert according to one of claims 1 to ~~17~~13, characterized in that the displacement body is composed of a first displacement body part and a second displacement body part.

~~19. Concrete shaping insert according to one of claims 1 to 18, characterized in that the interstitial tube has a shape deviating from the circular shape in a cross-sectional plane perpendicular to its longitudinal direction or that the interstitial tube is polygonal, in particular square in cross-section.~~

~~20~~15. Concrete shaping insert according to ~~one of claims 1 to 19~~Claim 14, characterized in that the first displacement body part has a first interstitial tube part and the second displacement body part has a second interstitial tube part, the first interstitial tube part and the second interstitial tube part together forming the interstitial tube.

~~21~~16. Concrete shaping insert according to claim ~~20~~15, characterized in that the first interstitial tube part has a first contact surface at the end, the second interstitial tube part has a second contact surface at the end, the first contact surface and the second contact surface in contact with one another and or in that there is a form-fit connection, in particular a tongue link, between the first interstitial tube part and the second interstitial tube part.

~~22. Concrete shaping insert according to claim 20 or 21, characterized in that there is a form-fit connection, in particular a tongue link, between the first interstitial tube part and the second interstitial tube part.~~

~~23~~17. Concrete shaping insert according to one of claims ~~18~~ 14 to ~~22~~16, characterized in that the first displacement body part has a first connection device and that the second displacement body part has a second connection device, the first connection device and the second connection device working together and connect the first displacement body part and the second Connect the displacement body part.

~~24~~18. Concrete shaping insert according to claim ~~23~~17, characterized in that the first connecting device and the second connecting device are formed identically and/or in that the first connecting device and the second connecting device each have at least one locking element.

~~25. Concrete shaping insert according to claim 23 or 24, characterized in that the first connecting device and the second connecting device each have at least one locking element.~~

~~26~~19. Concrete shaping insert according to one of claims ~~23~~ 14 to ~~25~~18, characterized in that the first displacement body part and the second displacement body part are each cover-shaped and can be connected or connected to one another by performing a connecting movement perpendicular to the plane of the cover opening by means of the connecting devices.

~~27~~20. Concrete shaping insert according to one of claims ~~18~~ 14 to ~~26~~19, characterized in that the first displacement body part and the second displacement body part have a different height.

~~28~~21. Concrete shaping insert according to one of claims 1 to ~~27~~20, characterized in that the displacement body has a plurality of protruding members on its outside, or that the displacement body has a plurality of protruding members on its outside, which, starting from the outside, have a height in the domain of 10 mm to 25 mm, in particular in the domain from 15 mm to 20 mm, in particular from 15 mm or from 20 mm.

~~29~~22. Concrete shaping insert according to one of claims 1 to ~~28~~21, characterized in that the displacement body has on its outside at least one first bearing element with a, in particular formed as a trough, receptacle for a portion of the first fixing element and/or that the displacement body on its outside at least has a second bearing element with a receptacle, in particular formed as a trough, for a section of the second fixing element.

~~30~~23. Concrete shaping insert according to one of claims 1 to ~~29~~22, characterized in that the displacement body is placed between the first fixing element and the second fixing element or that the displacement body is placed by means of the connecting component between the first fixing element and the second fixing element.

~~31~~24. Concrete shaping insert according to one of claims 1 to ~~30~~23, characterized in that the at least one connecting component in each case exerts a force directed towards the displacement body on the first fixing element and the second fixing element.

~~32~~25. Concrete shaping insert according to one of claims 1 to ~~31~~24, characterized in that the connecting component is a component that is separate from the displacement body and/or manufactured separately.

~~33~~26. Concrete shaping insert according to one of claims 1 to ~~32~~25, characterized in that

a. the first fixing element has at least one rod, in particular a reinforcing rod, or characterized in that

b. the first fixing element has a rod, in particular a reinforcing bar, which is part of a reinforcement grid, or characterized in that

c. the first fixing element consists exclusively of a rod, in particular a reinforcing rod.

~~34~~27. Concrete shaping insert according to one of claims 1 to ~~33~~26, characterized in that

a. the second fixing element has at least one rod, in particular a reinforcing rod, or characterized in that

b. the second fixing element has a rod, in particular a reinforcing bar, which is part of a reinforcement grid, or characterized in that

c. the second fixing element consists exclusively of a rod, in particular a reinforcing rod.

~~35~~28. Concrete shaping insert according to one of claims 1 to ~~34~~27, characterized in that the first fixing element and second fixing element are arranged parallel to one another and/or that the first fixing element and second fixing element are arranged together in a symmetry plane of the at least one displacement body.

~~36. Concrete shaping insert according to one of claims 1 to 35, characterized in that~~

~~a. the concrete shaping insert is formed to be arranged in a formwork mold in addition to reinforcement prior to concreting, or characterized in that~~

~~b. the concrete shaping insert is formed to be arranged in a formwork mold between two reinforcement arrangements prior to concreting.~~

~~37~~29. Concrete shaping insert according to one of claims 1 to ~~36~~28, characterized in that a plurality of displacement bodies are present which have an interstitial tube, the first fixing element and the second fixing element being connected to one another with a connecting component each which proceed through the interstitial tubes.

~~38~~30. Concrete shaping insert according to claim ~~37~~29, characterized in that adjacent displacement bodies are connected directly to one another with a displacement body connector.

~~39~~31. Concrete component, in particular concrete ceiling, containing at least one concrete shaping insert according to one of claims 1 to ~~38~~30.

32. Positioning aid to be used when assembling a concrete shaping insert according to one of claims 1 to 31, whereby the positioning aid is formed and provided to temporarily hold at least one displacement body for an assembly process.

33. Positioning aid according to claim 32, characterized in that the positioning aid is formed to hold the displacement body in a manner that it stands upright and cannot accidentally tip over.

34. Positioning aid according to claim 32 or 33, characterized in that the positioning aid has recesses for receiving protruding parts of the displacement bodies.

35. Positioning aid according to claim 34, characterized in that the positioning aid is formed as a plate.

36, Positioning aid system which is produced by connecting a plurality of positioning aids according to one of claims 32 to 35 by means of a form-fit connection, in particular similarly to puzzle pieces.

~~40~~37. A method for producing a concrete shaping insert, in particular a concrete shaping insert according to one of claims 1 to ~~39~~36, characterized in that at least one displacement body, which has an interstitial tube, in particular several displacement bodies, are arranged between a first fixing element and a second fixing element and that the first fixing element and the second fixing element are connected by means of a connecting component which proceeds through the interstitial tubes.

~~41~~38. The method according to claim ~~40~~37, characterized in that the displacement body is fixed between the first fixing element and the second fixing element by means of the connecting component.

~~42~~39. The method according to claim ~~40~~ 37 or ~~41~~38, characterized in that the connecting component is first attached to the first fixing element, and the connecting component is then

inserted through an interstitial tube of the displacement body and that the connecting component is then attached to the first fixing element.

~~43~~40. The method according to any one of claims ~~40~~ 37 to ~~42~~39, characterized in that each displacement body is temporarily fixed on a positioning aid, in particular on a positioning aid according to one of claims 32 to 36, which holds the displacement body in a desired position.

~~44~~41. A method for producing a concrete component, in particular a concrete ceiling, characterized in that at least one concrete shaping insert is produced in a formwork mold according to the method of one of claims ~~40~~ 37 to ~~43~~40, or that at least one concrete shaping insert is produced outside a formwork mold ~~at least one concrete shaping insert~~ according to method of claims ~~38~~ 37 to 40~~or 39~~, which is then arranged ~~and in particular fastened,~~ in the formwork mold.

~~45~~42. The method according to claim ~~44~~41, characterized in that at least one reinforcement arrangement, in particular a reinforcement arrangement different from the first fixing element and/or the second fixing element, is arranged in the formwork mold.

~~46~~43. The method according to claim ~~44~~ 41 or ~~45~~42, characterized in that the formwork mold is filled with concrete in one or more steps.