Claims

1. A prefabricated construction module comprising:

a structural body; and

a groove integrally formed ~~longitudinally along a grooved surface of~~ in the structural body ~~and arranged~~ to receive a connection member for joining to another prefabricated construction module, the groove arranged longitudinally along a grooved surface of the structural body and extending at least partially through the structural body,

wherein a lateral cross-section of the groove comprises a first groove section and a second groove section, the first groove section formed between the grooved surface and the second groove section~~,~~;

wherein an outer end of the first groove section is aligned to the grooved surface and an inner end of the first groove section is aligned to a groove section interface adjoining the first and second groove sections;

wherein the first groove section has equal width between the inner and outer ends thereof;

wherein the width of the first groove section ~~being narrower~~is less than a width of the second groove section immediately adjacent to the groove section interface; and

wherein a depth of the first groove section is at least 5 mm.

2. The prefabricated construction module according to claim 1, wherein ~~a~~ the depth of the first groove section is ~~approximately equal to a depth of the second groove section~~at least 8 mm.

3. The prefabricated construction module according to claim 2, wherein the depth of the first groove section is at least 20 mm.

~~3~~4. The prefabricated construction module according to ~~claim 1 or 2~~any one of claims 1 to 3, wherein a centroid of the second groove section approximately coincides with a geometric centre of the structural body.

~~4. The prefabricated construction module according to claim 1, wherein a depth of the first groove section is less than half of a depth of the second groove section.~~

5. The prefabricated construction module according to any one of claims 1 to 4, wherein each groove section has a quadrilateral profile.

6. The prefabricated construction module according to any one of claims 1 to 5, comprising a plurality of the grooves formed adjacent to each other.

7. A construction structure comprising:

a first prefabricated construction module and a second prefabricated construction module arranged adjacent to each other, each prefabricated construction module comprising a structural body and a groove integrally formed in the structural body, the groove arranged longitudinally along a grooved surface of the respective structural body and extending at least partially through the structural body;

the prefabricated construction modules arranged such that the respective grooves face each other and a joint gap including the grooves is formed between the respective grooved surfaces;

a connection member inserted into the joint gap; and

a joint filler material filling the joint gap and joining the prefabricated construction modules together,

wherein for each prefabricated construction module, a lateral cross-section of the respective groove comprises a first groove section and a second groove section, the first groove section formed between the respective grooved surface and the second groove section~~,~~;

wherein an outer end of the first groove section is aligned to the grooved surface and an inner end of the first groove section is aligned to a groove section interface adjoining the first and second groove sections;

wherein the first groove section has equal width between the inner and outer ends thereof;

wherein the width of the first groove section ~~being narrower~~is less than a width of the second groove section immediately adjacent to the groove section interface; and

wherein a depth of the first groove section is at least 5 mm.

8. The construction structure according to claim 7, wherein ~~a~~ the depth of the first groove section is ~~approximately equal to a depth of the second groove section and is more than a depth of the joint gap~~at least 8 mm.

9. The construction structure according to claim ~~7~~8, wherein ~~a~~ the depth of the first groove section is ~~less than half of a depth of the second groove section and is less than a depth of the joint gap~~at least 20 mm.

10. The construction structure according to any one of claims 7 to 9, wherein the connection member comprises:

a plurality of longitudinal bars each extending through the respective second groove section; and

a set of lateral connector elements joining the longitudinal bars, the lateral connector elements extending across the joint gap.

11. The construction structure according to claim 10, wherein the set of lateral connector elements comprises multiple lateral connector elements disposed at discrete positions along the longitudinal bars.

12. The construction structure according to claim 11, wherein the lateral connector elements comprise one or more of reinforcement bars, loop elements, mesh, shear studs, and strip elements.

13. The construction structure according to claim 10, wherein the set of lateral connector elements comprises a single lateral connector element spanning along the longitudinal bars.

14. The construction structure according to claim 13, wherein the lateral connector element comprises a lattice girder element.

15. The construction structure according to any one of claims 7 to 14, wherein the joint filler material comprises grout, epoxy, or a combination thereof.

16. A method for constructing a construction structure, the method comprising:

providing a plurality of prefabricated construction modules, each prefabricated construction module comprising a structural body and a groove integrally formed in the respective structural body, the groove arranged longitudinally along a grooved surface of the respective structural body and extending at least partially through the respective structural body;

arranging a first pair of prefabricated construction modules adjacent to each other such that the respective grooves face each other and a first joint gap including the grooves is formed between the respective grooved surfaces;

inserting a first connection member into the first joint gap;

filling the first joint gap with a joint filler material to join the first pair of prefabricated construction modules together; and

curing the joint filler material to thereby construct the construction structure comprising the joined prefabricated construction modules,

wherein for each prefabricated construction module, a lateral cross-section of the respective groove comprising a first groove section and a second groove section, the first groove section formed between the respective grooved surface and the second groove section~~,~~;

wherein an outer end of the first groove section is aligned to the grooved surface and an inner end of the first groove section is aligned to a groove section interface adjoining the first and second groove sections;

wherein the first groove section has equal width between the inner and outer ends thereof;

wherein the width of the first groove section ~~being narrower~~is less than a width of the second groove section immediately adjacent to the groove section interface; and

wherein a depth of the first groove section is at least 5 mm.

17. The method according to claim 16, further comprising joining a second pair of prefabricated construction modules arranged relative to the first pair of prefabricated construction modules.

18. The method according to claim 17, further comprising arranging the second pair of prefabricated construction modules relative to the first pair of prefabricated construction modules, such that the first connection member extends at least partially into a second joint gap formed between the second pair of prefabricated construction modules.

19. The method according to claim 17, further comprising arranging the second pair of prefabricated construction modules relative to the first pair of prefabricated construction modules, such that a second connection member of the second pair of prefabricated construction modules extends at least partially into the first joint gap.

20. The method according to any one of claims 17 to 19, further comprising inserting a stacking connector into the first joint gap and a second joint gap formed between the second pair of prefabricated construction modules.