Claims

1. A method for constructing a composite structural wall, the method comprises:

adjacently arranging a first pair of wall panels provided by a first pair of prefabricated construction modules, wherein each wall panel of the first pair of wall panels includes a first panel body having a first width, a first length, a first height, and a first surface defined by the first length and the first height wherein each of the first length and the first height has larger dimensions than the first width, and at least one first guide attached to the first panel body and protruding from the first surface, wherein adjacently arranging a first pair of wall panels includes overlapping the first guides of the first pair of wall panels in a direction defined by the first height to form a first channel in the direction for vertical stacking of a second pair of prefabricated construction modules;

inserting a first linking rod into the first channel;

dispensing a first grout or concrete into a first gap between the first pair of wall panels, wherein dispensing a first grout or concrete into a first gap includes dispensing the first grout or concrete into the first channel; and

curing the first grout or concrete to join the first pair of wall panels to form a first composite structural wall.

2. The method according to claim 1 further comprises:

vertically-stacking a second pair of adjacently arranged wall panels, provided by the second pair of prefabricated construction modules, on the first pair of wall panels, wherein each wall panel of the second pair of wall panels includes a second panel body having a second width, a second length a second height, and a second surface defined by the second length and the second height wherein the second length and the second height have larger dimensions than the second width, and at least one second guide attached to the second panel body and protruding from the second surface, wherein vertically-stacking a second pair of adjacently arranged wall panels on the first pair of wall panels includes overlapping the second guides of the second pair of wall panels in the direction to form a second channel in the direction;

inserting a vertical securement rod into the first and the second channel such that the vertical securement rod has opposite end portions at least partially inserted into the first and the second channel respectively;

dispensing a second grout or concrete into a second gap between the second pair of wall panels, wherein dispensing a second grout or concrete into a second gap includes dispensing the second grout or concrete into the second channel; and

curing the second grout or concrete to join the second pair of wall panels to form a second composite structural wall.

3. The method according to claim 2, further comprising:

inserting a second linking rod into the second channel.

4. The method according to claim 3, wherein the vertical securement rod is integral with the first and/or the second linking rod.

5. The method according to any of claims 2 to 4, wherein dispensing the first grout or concrete includes dispensing the first grout or concrete to a level below where the vertical securement rod is to be inserted to.

6. The method according to any one of claims 2 to 5,

wherein each wall panel of the first and the second pair of wall panels includes a top end portion attached to a ceiling slab and a bottom end portion attached to a floor slab,

the method further comprising:

inserting a plurality of backing rods between the ceiling slabs of the first pair of prefabricated construction modules and the floor slabs of the second pair of prefabricated construction modules to provide a third gap which intersects the first and the second channel,

wherein dispensing a second grout or concrete into a second gap includes dispensing the second grout or concrete into the third gap,

wherein curing the second grout or concrete to join the second pair of wall panels includes curing the second grout or concrete to join the second pair of prefabricated construction modules to the first pair of prefabricated construction modules.

7. The method according to claim 6,

wherein each floor slab of the second pair of prefabricated construction modules includes at least one floor slab guide attached to each respective floor slab and protruding from each respective floor slab,

wherein overlapping the second guides of the second pair of wall panels to form a second channel includes overlapping the floor slab guides of the second pair of prefabricated construction modules to provide the second channel.

8. The method according to any of claims 1 to 7, wherein the at least one first guide includes a wire attached to a reinforcement structure embedded in each wall panel.

9. The method according to any of claims 1 to 8, wherein the guide is selected from the group consisting of a steel wire loop, a steel wire rope, a high strength wire, a steel bar, a steel section and a J-connection loop.

10. A wall panel in a prefabricated construction module, the wall panel comprising:

a panel body having a first width, a first length, a first height, and a first surface defined by the first length and the first height, wherein each of the first length and the first height has larger dimensions than the first width; and

at least one guide attached to the panel body and protruding from the first surface, wherein the guide is adapted to overlap with an adjacent guide of an adjacently-arranged wall panel in a direction defined by the first height to provide a channel for receiving a linking rod therethrough, and wherein the wall panel is adapted to join to the adjacently-arranged wall panel by filling a gap, including the channel, between the wall panel and the adjacently-arranged wall panel, wherein the channel is formed in the direction for vertical stacking of a second pair of prefabricated construction modules.

11. The wall panel according to claim 10 further comprising:

a reinforcement structure embedded in the panel body, wherein the guide is attached to the reinforcement structure.

12. The wall panel according to claim 11, wherein the reinforcement structure is any one selected from the group consisting of a plurality of steel bars, a plurality of corrugated pipes each adapted to receive a steel bar of a vertically stacked wall panel, a mesh of steel bars, a mesh of steel wires, and a plurality of steel bars each attached to a splice connector adapted to receive a steel bar of a vertically stacked wall panel.

13. The wall panel according to any one of claims 10 to 12, wherein the first surface is roughened.

14. The wall panel according to any of claims 10 to 13, wherein the guide is selected from the group consisting of a steel wire loop, a steel wire rope, a high strength wire, a steel bar, a steel section and a J-connection loop.

15. A prefabricated construction module comprising:

at least one wall panel according to any one of claims 10 to 14; and

a floor slab attached to a bottom end portion of the wall panel.

16. The prefabricated construction module according to claim 15, wherein the floor slab comprises a floor slab guide attached thereto and protruding therefrom, wherein the floor slab guide is adapted to form the channel.

17. A building structure comprising:

at least one first composite structural wall which comprises:

a first pair of wall panels, provided by a first pair of prefabricated construction modules, arranged adjacent to each other, wherein each wall panel of the first pair of wall panels includes a first panel body having a first width, a first length, a first height, and a first surface defined by the first length and the first height, wherein each of the first length and the first height has larger dimensions than the first width, and at least one first guide attached to the first panel body and protruding from the first surface, wherein the first guides of the first pair of wall panels overlap in a direction defined by the first height to provide a first channel formed in the direction for vertical stacking of a second pair of prefabricated construction modules;

a first linking rod disposed within the first channel; and

a first grouting or concrete disposed in a first gap, including the first channel, between the first pair of wall panels, wherein the first grouting or concrete joins the first pair of wall panels.

18. The building structure according to claim 17, further comprising:

at least one second composite structural wall which is vertically stacked on the first composite structural wall and comprises:

a second pair of wall panels, provided by the second pair of prefabricated construction modules, arranged adjacent to each other, wherein each wall panel of the second pair of wall panels includes a second panel body having a second width, a second length, a second height, and a second surface defined by the second length and the second height, wherein each of the second length and the second height has larger dimensions than the second width, and at least one second guide attached to the second panel body and protruding from the second surface, wherein the second guides of the second pair of wall panels overlap in the direction to provide a second channel formed in the direction;

a second linking rod disposed within the second channel;

a vertical securement rod having opposite end portions at least partially inserted into the first and the second channel respectively;

a second grouting or concrete disposed in a second gap, including the second channel, between the second pair of wall panels, wherein the second grouting or concrete joins the second pair of wall panels.

19. The building structure according to claim 18,

wherein each wall panel of the first and the second pair of wall panels includes a top end portion attached to a ceiling slab and a bottom end portion attached to a floor slab,

the building structure further comprising:

a plurality of backing rods interposed between ceiling slabs of the first pair of prefabricated construction modules and floor slabs of the second pair of prefabricated construction modules to provide a third gap,

wherein the second grout or concrete is further disposed in the third gap and joins the second pair of prefabricated construction modules to the first pair of prefabricated construction modules.

20. The building structure according to claim 19,

wherein each floor slab of the second pair of prefabricated construction modules includes at least one floor slab guide attached to each respective floor slab and protruding from each respective floor slab, and

wherein the floor slab guides of the second pair of prefabricated construction modules overlap to provide the second channel.

21. The building structure according to any of claims 18 to 20, wherein the vertical securement rod is integral with the first and/or the second linking rod.

22. The building structure according to any of claims 18 to 21 further comprising:

a reinforcement structure embedded in each of the first and the second panel body, wherein the first and the second guide is attached to the respective reinforcement structure.

23. The building structure according to claim 22, wherein the reinforcement structure is any one selected from the group consisting of a plurality of steel bars, a plurality of corrugated pipes each adapted to receive a steel bar of a vertically stacked wall panel, a mesh of steel bars, a mesh of steel wires, and a plurality of steel bars each attached to a splice connector adapted to receive a steel bar of a vertically stacked wall panel.

24. The building structure according to any of claims 17 to 23, where the guide is selected from the group consisting of a steel wire loop, a steel wire rope, a high strength wire, a steel bar, a steel section and a J-connection loop.