METHODS AND APPARATUS FOR CONSTRUCTING MULTI-STOREY BUILDINGS

Field of the Invention

The invention relates to methods and apparatus for constructing buildings, in particular buildings constructed using modular units.

Background of the Invention

In the construction industry modular buildings are becoming more popular due to their ability to be constructed on site in shorter timeframes than traditional multi-storey construction. Modular construction involves building and preparing a building module offsite in a factory before transporting and installing the module at an installation location. Despite the time saving benefits of modular construction techniques there is a constant pursuit to improve these methods of construction with the aim of achieving time savings and cost savings in the overall construction of the building.

It is in light of these pursuits for efficiencies in current the construction of modular buildings that the invention was conceived.

Summary of the Invention

The invention provides a method of constructing a modular multi-storey building including:

assembling first and second building modules in a vertical arrangement at an installation location to form a multi-storey building structure, wherein the building modules are fabricated offsite to the installation

location at a first location and comprise a base component for forming part of a floor and a façade wall, wherein the facade wall is attached to and supported by a connection extending along a side edge of the base component such that the connection bears the load of the façade wall at the side edge of the base component without any other load-bearing support, the connection being partially embedded along the side edge of the base component and having a bracket attached to the façade wall such that the façade wall extends vertically upward from the side edge the base component;

vertically supporting at least part of the second building module above the first building module using temporary support members between the first and second building modules;

installing a permanent support structure between the first and second building modules to vertically support the second building module above the first building module; and

removing the temporary support members.

By providing a method in which the temporary support members can be removed it is possible to salvage and reuse building materials, such as steel supports, that becomes redundant once permanent support structures are installed.

The term building module is intended to refer to a construction unit that is created off site, for example in a factory setting, and is transported on site to be assembled with other building modules to construct a multi-storey building. The building module could include a basic form comprising a base and a frame fixed to the base

that forms the ‘bones’ of walls and a ceiling. Alternatively, the building module may comprise a unit in an almost finished state including base, walls, ceiling and even fixtures. Further still, the building module may include a construction falling between the basic and the almost finished forms discussed above.

In an embodiment the method includes at least partially constructing the first building module at a first location before assembling the first and second building modules at the installation location. The temporary support members may be attached to the first building module at the first location. A bracket may be attached to one or more of the temporary support members. A wall structure may be

building module to the permanent support member.

In an embodiment a tripod-type temporary support member is attached to the first building module. In an embodiment the temporary support members are re-used.

Also described herein is a method of constructing a modular building including the steps of:

a) constructing first, second and third building modules;
b) mounting temporary support members to each of the first and second building modules;
c) installing the first building module into the modular building;
d) mounting the second building module to one or more of the temporary support members of the first building module so that at least part of the second building module is supported above the first building module;
e) mounting the third building module to one or more of the temporary support members of the second building module so that at least part of the third building module is supported above the second building module;
f) installing a permanent support member to permanently support the second building module above the first building module, and to permanently support the third building module above the second building module; and
g) removing the temporary support members from the first building module after step e).

Also described herein is a formwork assembly comprising: a first bracket having an elongate body, the elongate body having an attaching section to attach the

Claims:

1. A method of constructing a modular multi-storey building including:

assembling first and second building modules in a vertical arrangement at an installation location to form a multi-storey building structure, wherein the building modules are fabricated offsite to the installation location at a first location and comprise a base component for forming part of a floor and a façade wall, wherein the facade wall is attached to and supported by a connection extending along a side edge of the base component such that the connection bears the load of the façade wall at the side edge of the base component without any other load-bearing support, the connection being partially embedded along the side edge of the base component and having a bracket attached to the façade wall such that the façade wall extends vertically upward from the side edge of the base component;

vertically supporting at least part of the second building module above the first building module using temporary support members between the first and second building modules;

installing a permanent support structure between the first and second building modules to vertically support the second building module above the first building module; and

removing the temporary support members.

2. The method claimed in claim 1, including at least partially fabricating the first building module at the first location before assembling the first and second building modules at the installation location.

3. The method claimed in claim 2, including attaching the temporary support members to the first building module at the first location.

4. The method claimed in any one of the preceding claims, including attaching a bracket across an upper end of the temporary support members.

5. The method claimed in claim 4, including attaching the bracket to the second building module.

6. The method claimed in any one of the preceding claims, including installing the permanent support structure after the second building module has been assembled in a vertical arrangement above the first building module at the installation location.

7. The method claimed in claim 6, wherein installing the permanent support structure includes installing a prefabricated concrete component.

8. The method claimed in claim 6, wherein installing the permanent support structure includes creating a concrete component by the in-situ application of concrete.

9. The method claimed in any one of the preceding claims, including assembling a third building module above the second building module before the permanent support structure is connected to the first and second building modules.

10. The method claimed in claim 9, including assembling

the third building module above the second building module using temporary support members.

11. The method claimed in claim 1, including casting the base component of the second building module to include a steel beam at least partially embedded into the perimeter of the base of the second building module.

12. The method claimed in claim 11, including locating the steel beam of the base of the second building module on a locator on one or more of the temporary support members.

13. The method claimed in any one of the preceding claims, including pouring concrete to connect the first and/or second building module to the permanent support member.

14. The method claimed in any one of the preceding claims, wherein the temporary support member is a tripod-type temporary support member attached to the first building module.

15. The method claimed in any one of the preceding claims, including re-using the temporary support members for higher levels of the multi-storey building.

16. The method claimed in any one of the preceding claims, including aligning the second building module onto a locator on one or more of the temporary support members, which temporary support members are attached to the first building module.