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Modular Construction with 3d-Printed Designs

Zang wei*

Department of Civil Engineering, The University of Hong Kong, Hong Kong, China

***Corresponding Author:** Zang wei, Department of Civil Engineering, The University of Hong Kong, Hong Kong, China,
E-mail: wei@zg.edu.cn

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DESCRIPTION

Modular building includes constructing standardised building components in a factory off-site before assembling them on-site. Given that 70%-90% of their components are built at the factory and then moved to the construction site, modular homes are also a potential architectural trend. For some types of structures, the modular method is more effective than conventional construction. These consist of hospitals, lodgings, and typical residential buildings. The main benefits of modular construction are time savings and a quicker return on investment.

Because industrialized assembly may occur while the site is being prepared, modular building allows for a significant reduction in the overall time needed to create a structure. Modular construction systems come in appealing sizes, specs, and designs for both permanent and temporary structures [1]. For instance, a general contractor might provide modular residential building services for homes that are custom-made; a factory-designed and manufactured modular home provides the flexibility of high-quality construction at wholesale prices [2]. The following are some significant uses for both residential and commercial modular construction:

- Cashier booths
- Community health clinics
- College dormitories
- Diagnostic imaging centers
- Distribution centers
- Mobile office trailers

Advantages

Time saving: One that immediately comes to mind is the fact that modular construction enables some of the work to be produced in a factory while foundations and site work are simultaneously carried out on the site. The project stays on track which also shortens the building period while maintaining efficiency. A modular strategy has the ability to reduce the entire timetable.

Building design and construction are increasingly utilizing technology, such as 3D modelling and printing, BIM, and the Internet of Things [3]. Why, though, specifically 3D printed designs? It's not just about shortening labor hours and simplifying logistics; 3D models allow for a variety of textured, curved forms that are best managed by machines and also let architects design high-precision architectural models from the start. These designs are simple to reproduce in other parts of the world, resulting in a method of building that is sustainable, affordable, and stress-free for the general people [4]. In the last few years, 3D-printed architecture has gradually developed into a dependable kind of

housing, and we anticipate its real breakthrough in 2023. And really, it makes sense given all the advantages. It's a quick, easy, cost-effective, and clever method that reduces the possibility of mistakes while also gaining significant time savings [5].

Teams can build any shape they can imagine using 3D models while still maintaining production capabilities, which makes it easier to realize visions.

Principles

Balance: The equalization of the visual weight of elements is known as balance. Three types of balancing exist: symmetrical (one half reflects the other), asymmetrical (things that are different from one another balance one another), and radial (elements are spread out circularly from a central point)

Rhythm: Replication produces rhythm, and there are three rhythmic devices:

- Duplicate copies of the same form
- Alternating usage of two forms, and
- The gradual transformation of a form (for example large to small,)

Unity: When comparable, connected parts are combined, a pleasing aesthetic result is reduced that gives a piece of art a sense of unity, wholeness, or order.

In contrast to conventional building, modern methods of construction emphasize off-site construction processes including mass production and factory assembly. The method has been described as a strategy to create more homes of higher quality in a shorter amount of time.” The ability to generate an almost infinite variety of shapes is what most distinguishes 3D printing from other creation tools like modelling or three dimensional scanning.

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