

Study on Possibility of Utilizing Computational Design in Designing Detached Houses

Summary

Computational design, which uses calculation capability mainly for searching design solutions rather than improving work efficiency to generate a drawing, is increasingly used in architectural design in recent years. Computational design is expected to become one method that will affect the way architectural design is performed.

There is a dearth of literature on the possibility of utilizing computational design in designing detached houses analyzed from the perspective of professional architectural designers instead of technical perspective. This study is intended to evaluate, based on an experimental project to design and build a detached house "DECELL HOUSE" in Korea, the possibility of utilizing computational design in designing detached houses analyzed from the perspective of professional architectural designers, and thereby to promote small practices' use of computational design in designing detached houses. The three business perspectives employed in this study are 1) improvement of user satisfaction, 2) support for environmental design, and 3) improvement in construction efficiency.

The results of applying computational design in this project as well as findings of this study are as follows:

[1] This study first visualized and quantified user needs, and subsequently attempted but failed to create relation diagram representing in parametric design optimized distance among all rooms, and thereby to apply the diagram into the initial drawing. The space plan was not optimized. Computation design improved user satisfaction in this project. The author however faced a challenge in terms of design flexibility.

[2] This study designed using computational design a facade responsive to sunshine. The project suggested that computational design was highly likely to support environmental design, which was however not verified since the design failed to be actually used in this project. The author faced a challenge that the constructor found it difficult to accept facade design through computational design.

[3] This study attempted digital fabrication, which was namely to design and construct a roof structure using computational design. The project suggested that computational design was highly likely to improve construction efficiency, which was however not verified since the veneer roof structure designed failed to be actually used in this project. The author faced a challenge that the constructor found it difficult to accept digital fabrication, and that architectural components digitally fabricated were not compatible with existing ones.

Keywords

1. Detached Houses, 2. Computational Design, 3. Utilization possibility,
4. Business, 5. Parametric

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