Latex Formwork
Concrete wall panel construction method, Cambridge, MA, USA

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Project data
Context
Materials, products and construction technologies
Client
School project
Background
Academic research

Summary and appraisal by the jury
The research project by a Massachusetts Institute of Technology (MIT) doctoral candidate investigates a new construction method for creating concrete panels in Cambridge. The faceted formwork consists of two elements: a sub-structure and a lining, with the former made of a flexible wire mesh tracing the panel's basic geometry and the latter made of a latex sheet determining the panel's final form. The proposed method aims to reduce the weight of concrete molds and thus the amount of material used in construction. Additionally, the formwork is both reusable and recyclable. Furthermore, the research of Ephemeral Concrete explores potential applications of the proposed method — leading to modular facades with a unique and strong architectural expression.

The jury commends the exploratory nature of the project. Particularly appreciated is the author's intention to establish a dialog between the workshop and the design atelier — a process investigating forms of mutual relationships between the production of full-scale prototypes and the design of architectural propositions by means of drawings and digital models. A form of knowledge production is here explored that merges academic and practical work.

Further authors

Sustainability concept
Progress: A sustainable approach when compared to previous formwork methods. After researching various formworks, three different methods were chosen to visualize the possibility: rigid mold, faceted mold, and fabric mold. The traditional way to make a thin concrete panel is to manufacture a rigid mold. With this approach, the product is exactly the same design; however, after using that mold, the material of the mold is not reusable. The material of the faceted mold is reusable, similar to the rigid mold. The only difference is the faceted mold takes a mesh of the digital model instead of the precise shape of the surface. The fabric mold is usually used for making a mold shape, because the shape is determined by the structural mass of the concrete.

New method: Creating a concrete panel using a hybrid of faceted mold and fabric mold. The structure of the mold is made of fish wire following the faceted mesh lines and the surface of the mold is a latex sheet. This is a very lightweight and reusable formwork. However, this new formwork is very easy to make and is reusable.

New connection: An interesting part of this new casting method is the gap between the shape of physical model and the digital model. Since the mold allows concrete a little freedom, the surface of the concrete panel has a unique pattern, which is fun to see.

A sustainable fish market: The fish market needs a lot of water to maintain the facility; therefore, this project introduces seawater directly from the sea to cover the usage of the water. Maintaining the temperature of cold storage facilities uses a tremendous amount of energy. This project places cold storage below sea level to keep the temperature low.

People: The fish market is not just a commercial building. This project suggests this industrial program and the public program are mixed in one building to create a diverse interaction.

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