

Material Design Integration

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Abstract

The goal of an integrative building design studio is for students to develop and prove the capacity to integrate different technical and possibly legal and financial considerations into their architectural projects. In this context, it is most important for the students to learn how to maintain a clear conceptual strategy that can serve as a 'pièce de résistance' against the multitude of different pressures, providing a larger framework for design decisions. This presentation discusses a series of projects where this 'pièce de résistance' was based on the design potentials of advanced pre-cast concrete construction. Tectonic concerns, with a focus on structure, construction, and materiality were foregrounded in the studio. Meanwhile, other aspects such as program and building form were intentionally pushed to the background, offering a design methodology where the architectural form and expression emerges from working through the possibilities of the material and construction processes.

Throughout the 20th and 21st century concrete has been the main material used in construction.¹ Although the use of this material dates back to ancient Rome, it is also a material that has time and time again been adopted and transformed by new technological innovations. Over the last decades, there were extensive improvements in many aspects of concrete technology, such as new mixtures or improvements in reinforcement, which allow for concrete to be stronger, more durable, highly insulating, or even ductile. And the reduction of the cement content, through the use of reactive industrial by-

products, such as fly ash or silica fume, provide sizable reduction of the embodied energy in concrete construction.² To create a framework that allows for material speculations in studio, the students were given very specific parameters for the typology of the building and a focused on prefabrication. Initial excises asked the students to carefully document construction processes in a series of case studies as well as design task to translate an existing joint, at the scale of furniture, into two cement cast pieces. The results of the exercise were then used by the students to develop a building strategy that is constructed 'from the inside out', contextualizing the program and the site through the constructive system and formal language that emerged from the translation of their initial studies into a more robust architectural project.

Keywords: Integrative-Buidling-Design-Studio, Concrete, Fabrication, Construction, Pedagogy

Notes or References:

1 Peck, Martin. "Building Material and Products". Modern Concrete Construction Manual : Structural Design, Material Properties, Sustainability. DETAIL Manual. München: DETAIL, 2014. 22

2 For an abbreviated overview of the recent development of high-performance concrete mix design in relationship to architecture see Peck, Martin. 2017. Modern concrete construction manual: structural design, material properties, sustainability. Peck, Martin. "Building Material and Products". Modern Concrete Construction Manual : Structural Design, Material Properties, Sustainability. DETAIL Manual. München: DETAIL, 2014. 36-41