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Exploration of materiality in furniture design

Abstract

Materiality is of the material’s nature and informs not only the physicality but an archetypical embodiment of an object originating from materials’ true nature. What impression does the material convey? For example, the feeling of warmth and inviting from that of a wooden chair to the user while a plastic chair may feel cold and unattractive. Through the history of product design, many design philosophies and approaches have been developed into solutions translating materials into actual product. With this in mind, this research is to emphasize design methodology and circumspect design process with the idea of materiality. How does the use of materials in design process convey their presence within the finished product? How can designer combine 3D technology to enhance yet preserve the potential of natural material?

Introduction

The motivation for this project originated from completed 2013/14 URECA where 3D printing allowed the materialization of complex geometries and intricate organic forms that would be impossible to realize in another process. Through the use of liquid simulation software and 3D printing intricate artifacts were created. 3D printing posed limitation on the scale, structural and material complexity necessary for further designs.

Fig 1, 3d printed fluid sculpture

What makes the idea of materiality interesting is that it is not an absolute and can be challenged, transcending materiality through design. An example would be a furniture collection designed by Nendo (fig 2). A section of the bench has flipped up and turned into the backrest. By adding flipped, bent and wrapped details to metal sheets and rods, the ordinarily hard material gains new functionality and a light, flexible feel, as though the metal has become paper or cloth.

Fig 2, Nendo’s “Softer Than Steel” collection

The current project stems from the idea of materiality and is dependent on broader range of materials and how their inner essence could be harnessed through the use technology. Various methods of utilizing a bamboo, including some of its processed material like veneer, had been tested. This is considered for a kit of parts that could be assembled to form the variations for woven like structures – where natural materials like bamboo would be ‘3D printing-reinforced’ to give end product structural integrity yet fragile look of natural growth. The combination of traditional and 3D printing opens up all sorts of new aesthetic possibilities. Through the exploration of different process and fabrication methods a design solution was distilled and translated into a physical object.

Aim

To integrate the inherent characteristics of bamboo and through design, translate these qualities into a product that preserves its essentials

Methodology

Before proceeding to design with bamboo, there was a need to better understand the quality of bamboo, various experiments were made (fig 3), some of the examples are heat bending, weaving and steam bending. Other than raw bamboo, bamboo veneer was also experimented. Layering veneer creates plywood and rolling them creates a structure strong enough that could be viable for use in product design.

The consideration for the design (fig 4) was the translated through material, bamboo plywood and was narrowed down to the design of a bench. Utilizing strips of plywood to layer the seat horizontally creates a visual lightness while maintaining the strength and rigidity. The strip were also hand bent into curves creating the trapezoidal profile, the natural flexibility of the bamboo allows the manipulation of shapes without the extensive need for additional process like steam bending.

Fig 3, experiments done on raw bamboo and bamboo veneer

Fig 4, design for a bench using bamboo plywood

Fig. 3d printed fluid sculpture
Fig. 2, Nendo’s “Softer Than Steel” collection
Fig. 1, experiments done on raw bamboo and bamboo veneer
Fig. 4, design for a bench using bamboo plywood