

The Usage of Technology and Manufacturing in the Service of Design

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Abstract: In this paper the system for advanced technology for furniture design and manufacturing is described. The polymer is adopted to specify the product models. The material allows simultaneous access to the design. Computer integrated technology can vary the design model and process planning. With the help of technology the design may obtain a wider selection in width and depth. The paper made a further analysis on the basis of three furniture design cases, so as to show the application of technology and manufacturing in the service of design.

Introduction

Computer technology has brought about dramatic change in the way objects and buildings are designed and assembled, opening up a range of forms and fabrication methods once unimaginable. The technology is necessary to the process and it's important to the outcome of products and aesthetic ends. Manufacturing meets material and machine with transcendent results in the show cases.

Supernatural Chair with Polymer Technology

There are many chairs on the market that did pioneer polymer technology. But there still a missing link, a chance to produce a chair has the visual stability of four legged stacking chair, but with something organic, a more liquid for that reflects the material. All these are the ideas before the design that inspired the designer [1].

As we know, the technology provided us with new possibilities for both design and commercialization. With the advent of injecting gas into certain sections of products, the material can be removed to make lighter, or in a way like bones make them stronger. The technology also offered other options that enhanced the sensual aspects of the chair by giving it internal strength and a more smooth surface quality and ability to hold color. What's beautiful about the chair is that it has two different densities in the same chair. There is a higher concentration of glass in the central core and less glass in the skin. The glass will cause some variation in the color. So the skin was created with less glass in it, about 40% in the core to percent in the skin so as to control on material density internally and one externally.

The chair comes in two versions, one with perforations and another with solid back. The intention of the perforations is to add a polysensorial effect from the chairs when light passes through to create shadows that enrich space and provide unexpected layers of beauty to architectural surface. (See Fig.1) the chair uses advanced techniques in polymer technology and a manufacturing to achieve a soft skin with strong core and a lightweight structure with strength and stability, in an affordable, commercially viable, stacking chair. The holes in the back of the chair designed to look like pinholes in a stretched balloon, work aesthetic double duty by throwing a shadow pattern with the light sifts through.



Figure 1: polymer chair

Advanced Polymer Cantilever Chair

In the chair's design over the years little change had been taken placed on chair. The most important reasons lay in the materials. The steel tubes at the heart of the materials and it is easy to get and ease to use. It's cheap and works well. However, in the last five to seven years, there's been huge development in plastic technology. The reason for working in plastics is that most cantilevered chairs have a welded structure when they are seated. Welding more steel under the seat is heavy and takes time, which means more weight and assembly time. The industrial designers are started to look at bikes and other high-performance items and found the plastics were taking the place of metals and alloys. After consulting with some plastics engineers, they began to find materials that might come up with the structural principles, and the beauty of less components of the chair.

(See Fig.2) the advanced polymer cantilever chair by PearsoLloyd for Fritz Hansen utilizes the latest in plastics technology improves the function and performance of a classic silhouette. (See Fig.3) the PearsonLloyd feels that hand-carving models is a critical part of the design process that brings humanity and improves aesthetics; but they also value the technology of programs to create the CAD build for their Cantilever Chair.



Figure 2: The advanced polymer cantilever chair

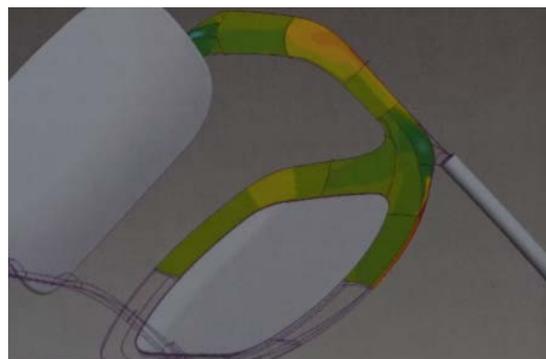


Figure3: CAD model

Through the research, it is easy to point out that using plastic lends some fundamental ergonomics benefits to the chair. When you weld the seat, the dynamic qualities of the cantilever can be killed. This if the major advantage over a four-legged chair. When you sit in a regular chair, you get a shock loading into the spine because the back legs don't bend. By using plastic, we could maximize the dynamic quality of the chair. When sit on the cantilevered chair, the front legs bend to reduce shock loading. So the seat platform was designed in such a way that it flexes progressively. So, as for the front of the chair, it needs maximum stiffness, there is no flex; in the back, there's more. The seat platform responds to the movement according to the user. That's the

reason why there is no need for a cushion. Because you have a flexible, supportive structure that responds like a human being stands, by shifting weight from one leg to another [2].

The plastic also has other advantage. It has a long life and it's possible to recycle. The material is one of the most important elements should be taken into consideration in the manufacturing. The plastic itself is used primarily in office furniture, but also for automotive parts and other components where high performance is required. Made with high glass fiber content, the resulting material is stronger than aluminum, with the added benefit of greater flexibility, yet has a high-tensile capacity.

The Inspiration and Application of Fabricated Fiberglass

We often get inspiration by seeing how the fabricated fiberglass was made and how to make structures that both thin and strong. The designers always took the material from its manufacturing environment and applied it to the design world. The borrowing of materials from one arena and using them in another is also common in design area.

In this case, the designer Norguet used computer graphics to conceive the chair after seeing some of the possibilities offered by fiberglass. The idea was to work out an organic form that could be reassuring and cocoon like, and also to optimize the material so we could make it as thin as possible. In this case, he wanted to use a minimum of matter to create a maximum of aesthetic. He then brought the design to the car manufacturer, which made prototype that went to the furniture manufacturer.

(See Fig.4) Preliminary sketchers show the unique curvilinear shape, with arm supports cut out of, rather than added onto, the fundamental form.

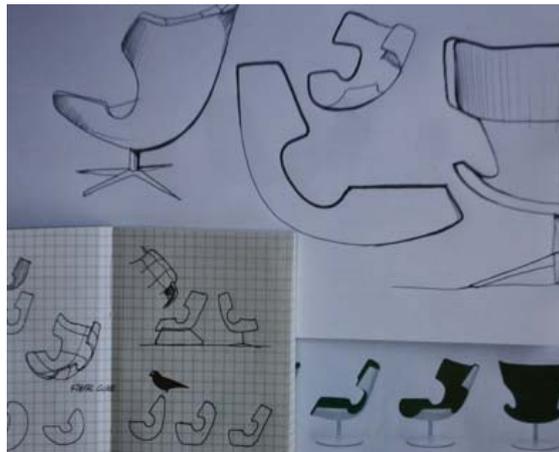


Figure 4: Preliminary sketches

Of course, the chair is quite concrete and applicable in a wide variety of real-life settings. (See Fig.5) using a resin material called LAB (liquid adhesive bond), the manufacturer uses a milling machine to make a form that will be used to shape the fiberglass- a kind of mold for the mold. (See Fig.6) the LAB has been milled down to what looks almost like an inside-out version of the chair.



Figure 5: Milling machine



Figure 6: Inside-out version of chair

The manufacturing process offered its own challenges, especially the goal is to make the most slender profile possible, and still have the chair be strong enough to support someone. As the exterior of the chair is made of white fiberglass that can be painted any color. Foam is injected onto the fiberglass shell and then upholstered. The feet were replaced with a stand and circular base. The resulting shape hearkens both to the past and the future. From the aesthetics, it reminds the design of 60's, but the material and manufacturing make it futuristic [3].

Conclusion

The technology and manufacturing process assist the creation, modification, analysis and optimize of a design. On the basis of three models that showed above, the polymer resources have become an important material in the development process, such as project cost and duration optimization. The fiber glass has become especially relevant in the field of furniture design, such as chairs. Therefore, new technology and manufacturing are suggested to be used in design.

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